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INDEX TO VOL. LIII.

[For Index to Illustrations see page VI.]

ABATEMENT, smoke, 887
Abattoirs, Carlisle, 380
Abbeys: Arbroath, 846; Furness, 611; Strata Florida, 39, 775; Westminster (alleged injuries to) 235
Abbots Langley water supply, 195
Aberdeen: art exhibition, 887; building progress in, 416; the Belgian bells at, 75
Academy, royal: admissions to, 82; exhibition, 10, 453; prizes, 890; reform, 848; Scottish do., 195, 777
Accurate work, drawing instrument for, 647
Achievements in mechanical engineering, 387
Acoustics, 532
Action of light on water colours, 384, 493
Acton sewerage works, 420, 634
Additions and alterations, 117, 155
Adelaide Jubilee exhibition, 119
Adjustable w.c.'s, 346
Administration of building law, 496
Admiralty offices, new, 7, 41, 270, 347, 378, 420
Advertising hoardings, rateability of, 118
Æsthetics, architectural, examinations in, 958
Age of elm joinery, 959, 994
Air: and light, importance of, 606; chambers, underground, 431; sewer, alleged innocuousness of, 592
Aird, John, M.P., 119
Alleged injuries to Westminster abbey, 235
Almshouses: Newark (St. Leonard's) 670; Southampton (Thorner's) 116
Altar in gold and colours, 80
Alterations: and additions, 117, 155; and extras, 158; in Oxford-st. and Lincoln's-inn-fields, 603
Amalgamation of the Bath stone quarrymen, 954
America, plumbing trade in, 127
American: architects in convention, 774, 916; bridges, 281; forestry, 634; marbles, 2; master builders, in convention, 922
Analysis, water, 502
Anatomy of pattern, 279
Ancient: and modern dress, 271; Egyptian textiles at South Kensington, 237; lights, 420 (and street formation) 781
Antiquarian societies: Cambridge, 681; East London, 131
Antiquaries: society of, Newcastle, 38, 86, 563; the Edinburgh, 457; Scotland, 882, 919
Antiquities, Babylonian, 271
Antiquity of man, 388
Anti-sham sect, the, 417
Antwerp, railway jubilee at, 493
Apparent form and perspective, 854
"Applied" art, 46
Apprentices' work, exhibition of, 75, 894
Arbroath abbey, 846
Arch: construction, 644; in Lincoln cathedral, 674, 707
Archæological: associations (Bristol) 230, 282 (Cambrian) 131, 282, 344, 356; institute (Royal) 131, 230; societies (Bristol and Gloucester) 267 (Chester) 993 (Kent) 191 (Norfolk and Norwich) 882 (Somerset) 191, 205 (Surrey) 53 (uselessness of) 230, 269, 345, 381, 457
Archæologists and free lunches, 381
Archæology: British school of, at Athens, 73; Scottish, 345, 813
Architect: and builder, 456; charged with forgery, 566, 815; charge of arson against, 118; City, election of, 858, 922; in a fix, 532; modern, and his requirements, 309; of the future, 566, 673, 704, 740, 778, 814; or surveyor, 161; surveyor and contractor, relations between, 891, 892, 953; the leading living British, 48
Architects: and builders' diaries, 918; and quantity surveyors, 39, 83; and sanitation, 566; and specialists, 813; and surveyors, Sheffield society of, 282, 455, 630, 777, 958; assistants' provident fund, 600, 630, 634, 672, 680, 704, 740, 787, 814, 816, 845, 883, 920, 958; authority, 637; chances at Buenos Ayres, 457; claim, 118; conventions (Chicago) 774 (Cincinnati) 916; ignored, 83; institutes (Glasgow) 356, 670 (Ireland) 993 (Royal British) 670, 712, 783, 853, 924, 954 (Sydney) 344; point of view of schools, 930; registration, 51, 83, 153, 537, 993 (Bill) 813, 845, 848, 883, 919, 992; relations to the builder, 885; remuneration, 571; responsibility for structural injuries, 962; society of, 356, 431, 675, 748, 819, 891 (at York) 490, 502, 537, 571; tenders at Leeds, 152, 203; travelling expenses, 634; unpractical, 851
Architectural: æsthetics, examinations in, 958; art, Yorkshire, 539; associations (Birmingham) 630, 739, 777, 823, 919 (Edinburgh) 739, 777, 823, 919, 993 (Glasgow) 279, 600, 823 (London) 383, 530, 533, 640, 647, 714, 775, 786, 814, 854, 926 (brown book) 598 (conversaz) 574 (Wiltshire excursion of) 75, 229, 240, 280, 315, 345, 380, 418, 527 (Manchester) 630, 681, 740, 813, 882, 919 (Northern) 230, 740 (York) 919; design in Vienna, 925; draughtsmanship, hints on, 80; drawing, 855; enlargement of buildings, 961; lecturing, 603; modelling, 714; perspectives, 532, 886; photographs from Somerset and Wilts, 527; politics, 846; practice, 677 (in Chicago) 788; societies (Exeter) 882 (Leeds) 191, 740, 919 (Lincoln and Notts) 191 (Liverpool) 681; students (plan of campaign for) 345 (suggestions to) 129 (vacation-suggestions to) 236; weighing machines, 348
Architecture: a close profession, the proposal to make, 926, 927; Christian, origin of, 503; Dalmatian, 123; dictionary of, 607; ecclesiastical, 885; Etruscan, notes on, 504; London college of, 597; of Jerusalem, 233; optical refinements in, 711; rival features of, 43; value of the model in, 745
Ardennes, walks in the, 162
Armour, Persian, at Birmingham, 156
Arrangement of museums, 388
Arrangements: and planning of suburbs, 463; and sites, sanitary, 461
Arson, architect charged with, 118
Art: applied, 46; British, influence of pre-Raphaelites on, 679; competition, Shipley, 458; Croat an, 123; exhibitions of London, 41; fine, psychological basis of, 843; gallery (Guildhall) 533 (Sheffield, Mappin) 162; in France, Republican patronage of, 960; schools, J. C. Horsley on, 816; studies in history of, 562; Tuscan, Sir F. Leighton on, 916; Union, water colour painters' institute, 537; workmen, prizes for, 37, 348, 917; Yorkshire architectural, 539
Articled pupil, experiences of, 203
Articles, architect's, 155
Artificial stone, 315
Artists, British, exhibition, 817
Arts, society of: 38, 780; prizes for art workmen, 37, 348
Assembly rooms, Hanley, 380
Assistants, architects', provident fund, 600, 630, 634, 672, 680, 704, 740, 787, 814, 816, 845, 883, 920, 958
Assistant: surveyors' exam., Civil Service, 491, 532, 846, 884, 920; the decorator's, 647
Associated carpenters and joiners, 969
Associations: archæological (British) 230, 282 (Cambrian) 131, 282, 344, 356; architectural (Birmingham) 630, 739, 777, 823, 919 (Edinburgh) 739, 777, 823, 919, 993 (Glasgow) 279, 600, 823 (London) 383, 530, 533, 574, 598, 640, 647, 714, 775, 786, 814, 854, 926 (in Wiltshire) 75, 229, 240, 280, 315, 345, 380, 418, 527 (Manchester) 630, 681, 740, 813, 882, 919 (Northern) 230, 740 (York) 919; British, at Manchester, 348, 386; home arts, 206; master builders (Birmingham) 739 (Bristol) 267 (Leeds) 282 (Liverpool) 957 (National) 267; municipal engineers, 73, 153, 267, 344, 417, 566, 600, 633, 646, 707; sanitary (and house drainage) 501, 601, 632, 673, 741, 779, 814 (inspectors') 530, 670, 739 (do. Yorkshire) 823
Asylums: Maidstone, 72, 776; Nottingham, 718
Athens, British school of archæology, 73
Auctioneers': and surveyors' institute, 670; benevolent fund, 675
Auditorium: Chicago, 42; of a theatre, 853
Authority, an architect's, 637
Awards: BUILDING NEWS designing club, 644; University coll., London, 47
Axford, J. B., in re, 269
Ayr, new water supply, 195

BABYLONIAN: antiquities, 271; epic poem, 708
Banks: Belfast, 487; Canterbury, 454; Esher, 611; Lombard-st. (Lloyd's) 932
Barabbas, Tinworth's Release of, 669
Barfield, the late Mr. Leicester, 493
Barking, sewer ou fall works at, 708
Bar: Elliott's metal weather, 917; Mersey, 387
Barracks, Salvation Army (Oldham) 50
Basins, wave, 84
Basis of fine art, psychological, 843
Bath: stone quarrymen, amalgamation of, 954; the beauties of, 345, 380, 418
Baths: Aberdeen, 152; cheap public, 633; Droitwich (brine) 50; Edinburgh, 152; Gloucester, 600, 957
Batsford's catalogue, 533
Battam v. Knight, dilapidations, 848
Battering wall, 642
Beads and mouldings, furniture, 505, 646
Beam: load on, 815; stone, 815
Bedding, and the resistance of stone to crushing, 429
Bells, a Belgian peal of, at Aberdeen, 75
Bemuddled local board at Ventnor, 270
Bench: ends, Cornish, 822; plane, self-setting, 393
Benevolent: fund, auctioneers', 675; institutions (builders') 162, 716, 848 (builders' clerks') 163
Beresford Hope, the late Rt. Hon. A. J. B., 675
Bestiaries, mediæval, 638
Billiard-table lights, 885
Bird's-eye perspective, 566
Birmingham: and midland institute, 191, 344, 777; archi. assocn., 630, 739, 777, 823; art exhibition, 384, 887, 919; Bapt. chapel competition, 894; building by-laws of, 566, 598; improvement scheme, 960; master builders' assocn., 739
Black stains in varnished deal, 633, 674, 707
Blackwall, tunnel under the Thames, 73
Blunderfield and Aide, in re, 676
Board schools: Bradford, 599, 860; Bristol, 599; Dulwich, 72; Gateshead, 72, 86; Gravesend, 244; King's Winford, 489; Leeds (architects' tenders for) 152, 203; Nottingham (Radford) 487; planning of, 282; Upper Norwood, 72
Bogus sanitary protection association, 195
Bollman and Fink trusses, 847
Bologna, doorway of San Petronio, 915
Bolton, sanitary congress at, 75, 271, 463, 501
Book-keeping, 457
Books: early Oriental, 421; effect of electric light on, 488
Bostwick folding gate and shutter, 202
Botham, J. R., of Birmingham, the late, 602
Bottom flange, 306
Boundary line, 306, 346, 382, 419
Bournemouth: sanitary matters at, 118; w.c. accommodation at, 347
Boyle, Robert, and Son, limited, 887
Boyle's C.C. ventilators, 243
Boys' home, Chobham, 671
Brackets, scaffold, 960
Breaker, stone, a new, 821
Breakwaters, floating, 312, 570, 782
Brick: churches at Streatham, 205; gables, 790; piers (size of) 318 (strength of) 381
Bricks, fire, 315
Bridges: American, 281; Berwickshire, 609; Connah's Quay, 304; Edinburgh, 38; Forth, 117, 388, 777; iron, effects of temperature on, 355; old London, 308; railway, leakage through, 774; stresses in, 788; Sukkur, 233; vibration of, 126; weights of, 163; Wharfedale (suspension) 384
Bridgman, H. H., testimonial to, 233
Bridlington Quay, arbitration case at, 420
Bristol: archæological socy., 267; master builders' assocn., 267; University college, 379
British: archæological assocn., 230, 282; architect, leading living, 48; architects, institute of, 670, 712, 783, 853, 924, 954; art, influence of pre-Raphaelites on, 679; artists' exhibition, 817; association at Manchester, 348, 386; builders, proposed national assocn., 192; museum, stelæ at, 607; school at Athens, 73
Brittany and Normandy, notes in, 575
Brown book, archi, assocn, 598
Brush, painting, factory, 46
Brussels exhibition, 119, 244
Buchan's improved ventilators, 750
Buddicom, Wm. B, the late, 308
Buenos Ayres: architects' chances at, 457, 744; improved house-building at, 353
Builder: architect and, 456; forgery by, 40; relations of architect to, 385, 891, 892, 953; sentenced to imprisonment, 74
Builders: American, in convention, 922; associations, master (Birmingham) 739 (Bristol) 267 (Leeds) 282 (Liverpool) 957 (National) 267; benevolent institution, 162, 716 (clerks' do. do.) 163, 848; British, proposed national institute of, 192; diaries, 918; novel swindle on, 848; responsibility for structural injuries, 962
Building: Act, toboggan slides and, 383, 921; by-laws of Birmingham, 566, 598; casualities and conversion, 44; codes and covenants, 889; construction (hollow) 645 (honours, exam. in) 382; estates, 47; handicrafts, 495, 536; house in Buenos Ayres, 353; law administration, 496; legislation, 77; materials, 227, 237, 278, 313, 351, 389, 427, 497 (chemistry and geology of) 921 (permeability of) 608; NEWS designing club, 159, 359, 418, 962 (awards) 644 (rules) 680; NEWS, improvement of, 35; sites, modern, 1; slabs for lining rooms, 922; stones of Egypt, 784; trades, classes for, 464
Buildings: architectural enlargement of, 961; burning, collapse of walls of, 741; cubing, 423; law as to owners of, 924; public, requirements of, 923; sanitary drainage of, 462
Burning: buildings, collapse of walls of, 741; cement, improvements in, 571
Burmantoft faience, 270
Burt and Potts' casements, 997
Bury St. Edmund's, sewerage works, 347
Business premises: Aberdeen, 416; Birmingham, 564, 738; Budleigh Salterton, 343; Canning-town (co-op.) 954; Chester-le-Street (co-op) 454; Enderby (co-op.) 682; Islington (Premier) 669; Strand, 394; Streatham, 394; Whitechapel (co-op.) 648
Buxton, W. J., in re, 744
By-laws, building, of Birmingham, 566, 598
By order of the church wardens, 269, 272

CABINETS, 543
Cable tramways, Birmingham, 380
Cambrian archæological assocn., 131, 282, 344, 356
Cambridge: antiquarian socy., 681; sanitary science at, 493; and practice, 602
Campaign, plan of, for the architectural student, 345
Canal, Manchester ship, 379, 387, 777
Canterbury cathedral, 152
Capel's combination set-square, 886, 920, 959
Carmona, Roman necropolis at, 308, 318
Carpenters: and joiners' report, associated, 969; company (and clerks of works) 288 (library) 567; English, and foreign competition, 342
Casements, wrought-iron, 997
Castles: Edinburgh, 416; Knaresborough, 528; Liverpool, 348; Richborough, 567
Casualities, building, and conversion, 44
Cathedrals: Canterbury, 118, 152; Chester, 420 (restoration) 490; Chihuahua, Mexico, 320; Dublin (Christ ch.) 921, 959; Edinburgh (St. Giles) 41; English, dimensions of, 921; Exeter, 382, 599; Lincoln (arch in) 674, 707; Llandaff, 380; Manchester, 116; Milan, 241; Newcastle-on-Tyne, 607, 718, 752; St. Alban's, 492, 631, 705, 884, 920, St. Paul's, 232; Salisbury, 382, 457, 884, 894, 920; Seville, 357, 705, 778, 814; Southwell, 992; Truro, 458, 675, 678, 881, 932; Winchester, 41, 119, 776; Worcester, 565
Cavendish memorial tomb, 707
C.C. ventilators, Boyle's, 243
Ceiling, old plastered, at Yarmouth, 991
Cell construction, police and prison, 196
Cement: burning, improvements in, 571; concrete (expansion of) 633 (footpaths) 633; effect of freezing on, 488; on tiles, 306; painting on, 716; Portland, 780 (manufacture of) 388 (tests of) 356, 746
Cements, hydraulic, 389, 427
Cemeteries: Applethwaite, Windermere, 672; Armley, Leeds, 343; Oldham, 244; South Shields, 611
Chair of Queen Hatasu, 955
Chambers, underground air, 431
Chances, architects', in Buenos Ayres, 457
Chapels: Birkenhead (Bapt.) 488; Birmingham (Bapt.) 894 (Wesln.) 454; Blackburn (Congl.) 564; Blackpool (Meth. N.C.) 719; Bristol (Mayor's) 165; Denstone (St. Chad's College) 165; Eaton Hall, 152; Hinde-st., W. (Wesln.) 682; Hope, Wigan, 456; Ipswich (Grimwade meml.) 671; Lostwithiel (Home of Mercy) 229; Manchester Cathl. (Fraser meml.) 116; Manningham, Bradford (Congl.) 860; Maynooth (college) 543, 670; Oldham (convent) 127 (Prim. Meth.) 152; Walton, Liverpool (Bapt.) 455; Warrington (training coll.) 116; Watford (Bapt.) 489; Whetstone (Congl.) 610
Chapter house, Furness abbey, 611
Cheap: iron roofs, 194; public baths, 633
Chemical action of sea-water on concrete, 123, 192, 266, 844
Chemisty of building materials, 921
Chester: co., Penn., granite quarries of, 355; walls, 493
Chesterfield spire, 885, 921, 995
Chetham college, cloisters, 343
Chicago: architects' convention at, 774; architectural practice in, 788; auditorium, 42; utilitarianism in, 459
Chimney, picture and, 780, 815
Chimneys, stability of, 419
China, Great Wall of, 307
Chinese engravings, exhibition of, 848
Chisels, Wood's mortise, 156
Chiswick, church-building in, 645
Choice of a site for residential purposes, 162
Christian architecture, origin of, 503
Chubb's push and pull locks, 118
Church: building in Chiswick, 645; restoration 490 (Dr. Freeman on) 429; signs and mediæval bestiaries, 638
Churches: Acton-green (St. Alban) 645, 671; Axbridge (St John Bapt) 38, 131 Banbury (St. Mary) 790; Bedford (St. John Bapt.) 116; Belgrave, Leicester (St. Michael) 564; Bicton, Shrewsbury, 529; Birtley, 466, 600; Blackheath (Presbtn.) 564; Boevey Tracey, 343; Boothen (All SS.) 116; Bothal, 738; Bradford (St. Joseph, R.C.) 488; brick, at Streatham, 205; Bristol (St. Agnes) 776; Brixton (Corpus Christi, R.C.) 576; Cannington, Allahabad (All SS.) 790, 860; Cardiff (Unitn.) 265; Carlisle (Unitn.) 229; Chalons-sur-Marne, 394; Chesterfield (spire) 885, 921, 995; Chiswick, 645; City, four, 822; Claines, Worcester (St. John Bapt.) 72; Clevedon (Franciscan) 165; Copenhagen (English) 156; Crook (St. Catherine) 303; Curdridge, 881; Dewsbury, 529; Dinton, 425; Dodbrooke, 738; Doddiscombsleigh, 265; Earl's-court (St. Cuthbert) 123, 775; early, 815, 847, 885; East Leake, 453; Eastwood, 860; Edgehill (St. Anne, R.C.) 229; Edington, 432; Elie (Wood meml.) 152; Ford, Liverpool (R.C. convent) 152; Fountainbridge (Free) 610; Garton-in-Holderness, 489; Greenlaw, N.B., 192; Guernsey (St. Peter Port) 823; Halberstadt, 932; Hammersmith (St. Paul, new) 50, 123; Haughton, Staffs, 881; Haydock,

720
BU
v.53

487; Heckington, 703; Higham, 152; Holne-next-Sea, 564 (monuments in) 304; Hove (R.C.) 459; Hucknal Torkard, 76; Ipswich (St. Mary-le-Tower) 635; Islington (R.C.) 348; Italian, 894; Jesmond (St. George, reredos) 320; Kensington (St. Stephen) 38, 703; Kilburn (St. Paul) 489; Kingsland-park, Dublin (St. Kevin) 417; Knottingley, 812, 884; Langham-place, W. (All Souls) 154; Long Melford, 611; Longton, Lancs. (St. Andrew) 992; Lostwithiel (St. Bartholomew) 115; Mainstone, 343; Midland, 503; Moffat, 529; Monkton Wyld, 165; Newick, 229; North Leith, 752; North Runcton, 489; North Witham, 455; Norton, 991; Old Malton (priory, discoveries at) 131; Over Wichendon, 489; Oxford (St. Barnabas) 202; Paisley (Congl.) 599; Pearston, S.A. (Dutch) 599; Pembroke (St. Michael) 50; Pendleton (St. Barnabas) 229; Pentney, 844; Pillgwenly (R.C.) 610; Pimlico (St. Philip) 266; Plymouth (St. Matthias) 671; Pollokshields (Free) 610; Preston (St. Ignatius, R.C.) 266; Ringland, 50; Rogerstone, 166; Rouen (St. Maclou) 487 (St. Ouen) 631; Roundhay, Leeds, 611; St. Helier's (St. Thomas, R.C.) 776; St. Martin's-in-the-Fields (steps of) 75, 119, 156, 195, 271, 318; St. Mary-le-Strand, 242, 307, 318, 383, 458, 527; Sandwich (St. Clement) 115; Shrewsbury (Trinity) 564; Shustoke, 738; Smithfield (St. Bartholomew) 269, 272; Southbank, Middlesbrough, 576; South Shields (St. Aidan) 881; Sparkwell, 116; Stamford-hill (St. John) 719; Stratton, 206; Streatham (three) 205; struck by lightning, 310; Sunderland (St. Ignatius) 672; Sutton, Surrey (Christ) 600; threatened London Renaissance, 318; two West-end, 123; Upton Pyne, 492; ventilation and down-draughts in, 74, 117, 194, 231, 346, 776; Wainfleet, 776; Walford, 455; Walsall (St. Andrew) 882; Walton, Liverpool, 882; Warminster (St. Denis) 266; Warnham, 156; Washford Pyne, 50; Wednesbury (St. James) 229, 776; Westbury-sub-Mendip, 564; West Kensington (Congl.) 752; Westminster (St. Margaret) 921; Wimbledon (Sacred Heart, R.C.) 50; Woking (Christ) 739; Wood-green, Staffs (St. Paul) 229; Woodhill, Hatfield (St. Mary) 282; Woolfardisworthy, 634; Wrexham (St. Giles) 822; York (Trinity) 918

Churchill, C., in re, 566, 707

Churchwardens, by order of the, 269, 272

Chubb lock co. v. Withers, 744

City, the: architect, 856, 922 (or surveyor) 161; of London (college) 458 (court) 564, 812, 894; value of land in, 744

Civil: and mechanical engineers socy., 823, 881, 882; engineers (institution) 355, 704 (pupils) 457; service exam., assistant surveyors', 491, 532, 846, 884, 920

Claim, architect's, 118

Clamond incandescent gas-light, 859

Clapp, S, the late, 567

Classes for the building trades, 464

Clerks of works: and the Carpenters' co., 268; duties of, 113; profession of, 7, 78, 127, 160, 200, 305; to H.M. office of works, 118, 154

Clerks', builders', benevolent institution, 163

Climax Indian inkstand, 780

Close profession, proposal to make architecture, a, 926, 927

Clubs: Bedford, 576; cycling, A.A., 786; designing, 159, 359, 418, 644, 680, 962; engineers' (Philadelphia) 37; field (Hampshire) 9, 393; Kimberley, S.A., 489; Scarborough (Constitutional) 282, 669, 814, 845; sketching, A.A., 786, 814; Wiveliscombe, 894

Codes and covenants, building, 889

Codnor, sewerage of, 195, 420

Coinage, the new, 39

Collapse of walls of burning buildings, 741

Colleges: architecture, the London, 597; Cheadle (St. Wilfrid) 703; City of of London, 458; Denstone, 165; Liverpool (engineering) 533, 599; Manchester (Cheetham) 343; Maynooth, 548, 670; Newcastle-on-Tyne (medicine) 738; Oxford (Trinity) 10; surgeons' (extension of) 50; Tooting (R.C.) 416; University (Bristol) 379; University, London (awards) 47

Colour: manual of, 788; wash, rainproof, 231

Column, our competitors', 35, 48, 80, 129, 163, 203

Columns, cornstalk, 465

Combination: level and rule, 997; set square, Capel's, 886, 920, 959

Combustion, gas, products of, 885, 921, 995

Competition, foreign, English carpenters and, 342

Competitions: almshouses (Newark, St. Leonard's) 670; art schools (Shirley) 458; art workmanship, 917; asylum (Maidstone) 72, 776; baths (Gloucester) 600, 957; "B.N." designing club awards, 644; board schools, 282 (Gateshead) 72, 86 (Gravesend) 244 (Kingswinford) 489; cathedral (Milan) 241 (national gold medal) 932; cemeteries (Oldham) 244 (South Shields) 611; chapels (Birmingham, Bapt.) 894 (Blackpool (Meth. N. Con.) 719 (Hope, Wigan) 456 (Maynooth coll.) 543, 670; churches (Greenlaw, N.B.) 192 (Kingsland-park, Dublin, St. Kevin) 417 (Roundhay, Leeds) 611; club (Scarborough, Constitutional) 282, 669, 814, 845; county buildings (Paisley) 611; developing building estate (Douglas, I. M.) 417; drinking fountain (Leighton) 489; exhibition buildings (Brussels) 244; forestry, 192; hospitals (Hull, children's) 206 (Swindon, fever) 778 (West Ham) 823; hotel (Perth station) 957; institute, Imperial, 3, 10; laying out grounds (Knaresborough castle) 528; linoleum designs, 719; local board offices (East Grinstead) 268, 957; market (Ludlow) 776, 790; memorial (Edinburgh, Harrison) 957; monuments (Indianapolis, soldiers') 670, 894 (St. Anne's, Lancs, lifeboat) 682; offices (Manchester school bd.) 860; Owen Jones' prizes, 342; poster (Glasgow exhibition) 39; public hall (Helston) 456; R.I.B.A., 954; school (Hartlepool, high) 39 (Stockport, technical) 282; schools of art prize drawings (National) 196, 198, 236; science and art department, 342; sewerage (Walton-le-Dale) 860; town hall (Northampton) 417, 957; Whitworth scholarships, 342; workhouse (Chelmsford) 379

Competitors' column, our, 35, 48, 80, 129, 163, 203

Complete, failure to, 745

Composition and design, 306

Compressive strength of steel, 992

Concentrated loads, stresses in bridges for, 788

Concrete: 419 (and damp-courses) 996; cement (expansion of) 633 (footpaths) 633; effect of sea-water on, 123, 192, 266, 844; floors, 194, 306, 566; in sacks for marine works, 918; notes on, 189; roofs, 780, 815

Conductors, lightning, 384, 459, 493, 533

Conduits, storm-water, 503

Congress, sanitary: Bolton, 75, 271, 463, 501; Vienna, 533

Construction: arch, 644; building, exam., 582; fireproof, 304; hollow building, 645

Continuous stone breaker, Lowry's, 821

Contractor, surveyor, and architect, relations between, 891, 892, 953

Contracts: building, extras in, 569; unsealed, 233

Contributors of illustrations, hints to, 192

Conventional specifications, 157

Convention, architects', at Chicago, 774

Convent, Oldham, 127

Conversazione, archi. assocn., 574

Conversion, building casualities and, 44

Cornish bench ends, 822

Cornstalk columns, 465

Cornwall, potteries of, 421

Correction, a, 346

Cottage: construction, 502; homes, Fazackerley, 265

Cottages: Allington lock, 893; workmen's, 39, 51

Country vicarage designs, 359

County: buildings, Paisley, 611; surveyor, action against a, 40

Court, City of London, 564, 812, 894

Courtenay tomb, Winchester cathedral, 119

Covenants and codes, building, 889

Coverings, roof, 931

Cowick Barton priory, discoveries at, 304

Craill waterworks, 195

Crane and mortar mill construction, 459, 490

Crawford, Alex., the late, 156

Creosoting, 497

Cricket pavilion, club designs, 359, 418

Croatian art, 123

Cross: churchyard, Frome, 458; Ruthwell, 717

Crushing: of stone as affected by bedding, 429; weight of stones, 780

Crystal Palace: educational institution for ladies, 271; school of engineering, 266

Cubing of public buildings, 423

Cultivation, education, and examination, 533, 540, 573, 604

Cuming and Barnett, in re, 346

Curtains, fireproof, for theatres, 716

Curtis, R., in re, 420

Custom, professional, 535

Cycling club, A.A., 786

Cyprus, excavations in, 997

DALMATIAN architecture, 123

Dalmeny water supply, 675

Damage, liability for, 959

Damp, 674

Damp-courses and concrete over site, 996

Darlaston public buildings, 271

Darlington, the Nevill's work round, 647

Deal, varnished, black stains in, 633, 674, 707

Decay and protection of stone structures, 350

Decoration class, the A.A., 530

Decorations: mosaic, for Westminster palace, 348; sheet metal, 319

Decorative furniture, sketches, 752

Decorator's assistant, 647

Denny, N.B., water supply, 707

Deodorisation works at metropolitan sewer outfalls, 270

Department, science and art: 127, 275 awards, 342

Depot, goods, St. Pancras, 704

Desiderata, 39

Design and composition, 306

Designing: club, BUILDING NEWS, 159, 359, 418, 962 (awards) 644 (rules) 680; iron structures, 162

Designs: "B. N." club, 159, 359, 418, 962 (awards) 644; cathedral church (National) 611, 932; institute (British architects') 954 (Imperial) 3; royal academy, 890

Destructor, refuse, Bournemouth, 416

Detached villa, club designs for, 962

Detail, mass and, 273

Details, measured, a book of, 528

Devonshire, potteries, 421

Diaries, architects' and builders', 918

Dictionary of: architecture, 607; mechanical engineering terms, 881

Dilapidations, 848

Dimensions of English cathedrals, 921

Dining-rooms, 787

Dinton church and hall, 425

Dispensary: Bedford, 956; Highgate, Birmingham, 529; Hull, 116

District surveyors: fees, 40; omitting notice to, 633

Docks: Barry, 344; Bombay, 191; Dieppe, 191; Ribble, Preston, 563; Roath, Cardiff, 344; Tilbury (arbitration case) 269

Dome, the, 192

Doncaster, obscure architectural relic at, 779

Doors, iron, for warehouse, 424

Doorway, San Petronio, Bologna, 915

Douglas: I. M., estate planning competition, 417; Wm., in re, 848

Doulton's and the smoke abatement Acts, 307, 458

Down: county of, water scheme for, 492; draughts in churches, 74, 117, 194, 231, 346

Drainage: and sanitary fittings, 52, 84, 154; of buildings, sanitary, 462

Drains, house, 501, 601, 632, 673, 741, 779, 814

Drain traps, 565, 601, 632, 707

Draughtsmanship, architectural, hints on, 80

Draughtsmen, gaslight for, 815, 847

Draughtmen's provident fund, 600, 630, 634, 672, 680, 704, 740, 787, 814, 816, 845, 883, 920, 958

Drawing: architectural, 85; instrument for accurate work, 647; perspective and apparent forms, 854

Drawings: Ernest George's, 715; National prize, 196, 198, 236

Dress, ancient and modern, 271

Drill-hall, Ardwick-green, Manchester, 564, 823

Drinking fountains: Leighton, 489; Oxford, 894; Reading, 47; Stratford-on-Avon, 611

Dudley gallery exhibition, 712

Dundee water supply, 347

Duties of a clerk of works, 113

Dwellings: for the poor, West Port, Edinburgh, 610; Gordon, Camberwell, 932

EARLY: churches, 815, 847, 885; English foliage, 707, 744; Japanese books, 421

East: and West India dock co. v. Kirk and Randall, 269; Grinstead, local bd. offices competition, 268, 957; London antiquarian socy., 121; Neuk of Fifeshire, the, 75

Ecclesiastical: architecture, 885; exhibition, Wolverhampton, 543

Ecclesiological socy., St. Paul's, 775

Edinburgh: archi. assocn., 639, 777, 823, 919, 993; notes from, 317, 773, 963; Parliament-close eighty years ago, 75; science and arts association, 958; year's buildings in, 671

Edis, R. W., at the Adelaide exhibition, 996

Edmeston, J. S., the late, 566

Education: cultivation, and examination, 533, 540, 573, 604; technical, 744

Effect of: electric light on books, 488; freezing on cement, 488; sea-water on concrete, 123, 192, 266, 844; temperature (on iron bridges) 355 (on metal roofs) 608

Egyptian: porphyries, 388, 429; sculptures and paintings, 388; textiles at South Kensington, 237

Egypt: building stones of, 784; Lower, irrigation of, 388

Electricity v. Welsbach gas-light, 196

Electric: light, effect of on books, 488; lighting, 389 (v. gas-lighting) 887

Elementary schools, public, 889

Elephant and Castle, improvements near the, 960

Elgin, antiquaries at, 267

Elkington v. Smee (tobogganing slide) 383, 921

Ellington v. Clark and Bunnett (lifts), 959

Elliott's metal weather-bar, 917

Elm joinery, age of, 959, 994

Elstree, arbitration case at, 420

Emigrants, information for, 119

Emphasis of structure, 197

Employers' liability: Act, 269; for unused quantities, 815, 817

Encaustic tile pavements, 716

Ends, gables, 633

Endurance of metals under stresses, 428

Engineering: mechanical, achievements of, 387; popularly considered, 47; school, Crystal Palace, 266; society, Liverpool, 672

Engineers: civil (institution of) 355, 704 (pupils) 457; club, Philadelphia, 37; mechanical, institute of, 156; municipal, association, 73, 153, 267, 344, 417, 600, 646, 707 (exam.) 566, 633; science for, 707; society of, 543, 918 (civil and mechanical do) 823, 881, 882

English: carpenters and foreign competition, 342; cathedrals, dimensions of, 921

Engravings, Chinese and Japanese, 848

Enlargement of buildings, architectural, 961

Epic poem of Babylonia, the, 708

Escape from panics in theatres, 631

Esdaile and Peaty, in re, 269, 959

Esplanade, Lynmouth, 600

Essex: handbook, Durrant's, 503; trade signs, 503

Estates, building, 47

Estuaries, régime of, 387

Etchings, exhibition of, 678, 741

Etruscan architecture, notes on, 504

Everett, C. H., in re, 40

Examinations: cultivation and education, 533, 540, 573, 604; honours in building construction, 382; in architectural æsthetics, 843; municipal and sanitary engineers, 566, 632; public works, 843; royal engineers dept., 532, 846, 884, 920; sanitary science (Cambridge) 493; surveyors, 40 (Civil Service) 491; technical, 819; technological, 271, 384

Excellence, technical, way to promote, 199

Excursion, Wilts, of archi. assocn., 75, 229, 240, 280, 315, 345, 380, 418, 527

Exeter: and Salisbury, 382; archi. socy., 882; cathedral cloisters, 599; theatre, fire, 421, 457, 461, 531

Exhibitions: Aberdeen, 887; Adelaide, 119; apprentices' work, 75, 894; Birmingham (art) 384; British artists, 817; Brussels, 119, 244; Chinese and Japanese engravings, 848; Dudley gallery, 712; Early Oriental books (Brit. Museum) 421; ecclesiastical (Wolverhampton) 543; Ernest George's drawings, 715; Falmouth (pottery) 421; Grosvenor, 166; Liverpool (art) 421; London art, 41; nineteeth century art, 678; oil-colour painters' institute, 818; painter-etchers, 678, 741; photographic, 542; Royal Academy, 10, 453; Royal Scottish academy, 195; smoke (Albert Palace) 75; Turners' co., 644; Verestchagin's, 597; water-colour painters (institute) 537 (socy.) 852

Exit, a model, 706, 740

Exits from public buildings, 966

Expansion of Portland cement concrete, 633

Expenses, travelling, architects', 634

Experiences of an articled pupil, 203

Explanation wanted, an, 51, 83

Extras: 566; and alterations, 158; in building contracts, 569

Eyesight, 532, 566, 633

FACTORIES: Cork (bacon) 610; the largest painting brush, 46

Failure to complete works, 745

Fall: a wonderful, 269; of a roof at Woolwich, 232

Fastener, Podmore's sash, 196

Feather-edge joists, 40, 73

Features, rival, of architecture, 43

Fees, district surveyors', 40

Field: club, Hampshire, 9, 393; paths in London suburbs, 602

Fifeshire, the East Neuk of, 75

Fine art, psychological basis of, 843

Fink and Bollman trusses, 847

Finland, the forests of, 634

Firbank, Joseph, life of, 788

Fire: 268; at Exeter theatre, 421, 457, 461, 531; at Whiteley's, 242, 418; bricks, 315; prevention and exits from public buildings, 966; safeguard against, 274

Fireclay, glazed, flue linings of, 602

Fireproof: construction, 304; curtains for theatres, 716

Fires in theatres, 490, 631

First lessons in science, 342

Fittings, sanitary and drainage, 52, 84, 154

Fix, architect in a, 532

Fixing photos, 74

Flange, bottom, 306

Floating breakwaters, 312, 570, 782

Flooring, a good wood-block, 954

Floors, concrete, 194, 306, 566

Flow of water, new formula for, 856

Flue linings of glazed fireclay, 602

Folding steel gate and shutter, 272

Foliage: Early English, 707, 744; Gothic, 814

Fonts: club designs for, 160; old Irish, 885

Footpath: cement concrete, 633, preservation socy., national, 156

Foremen of masons, 490, 531, 631

Forestry: in the United States, 634; Scottish prizes for, 192

Forests of Finland, 634

Forgery by a builder, 40

Formation, street, and ancient lights, 781

Formula: 815; new, for flowing water, 856

Foundations, 598, 993

Fountains, drinking: Leighton, 489; Oxford, 894; Reading, 47, Stratford-on-Avon, 611

Franciscan order, institution of the, 348

Free: libraries (Edinburgh) 75 (Poole) 244; lunches, archæologists and, 381

Freezing, effect of on cement, 488

Frieze, sculptured, at Rome, 567

Frost and selenitic mortar, 996

Furniture: beads and mouldings, 505, 646; decorative, 752

Future of architects, and the architect of the future, 566, 673, 740, 778, 814

GABLE ends, 633

Gables, some German brick, 790

Galleries: art (Birmingham) 887 (City) 533 (Sheffield, Mappin) 162; Dudley,

35784

712; Grosvenor, 166, 597 (split at the) 708; National, 38, 45, 493, 922 (do. portrait) 271, 308 (do. do. Scottish) 886
Gangways v. staircases, 632, 673
Gas: combustion, products of, 885, 921, 995; companies directory, 503; incandescent, 715 (Clamond) 859; institute, 41; lighting for draughtsmen, 815, 847; sewer, innocuousness of, 502, 634; v. electricity, 196, 887
Gasworks statistics, 503
Gate, Bostwick folding, 202
Gauges, railway, 491
Geology of building materials, 921
Geometry: practical solid, 48; projectional solid, 775
George, Ernest, drawings by, 715
Germany, tests of Portland cement in, 746
Gillies, Miss Margaret, the late, 195
Glasgow: archi. assocn., 279, 600, 823; institute of architects, 356, 670; philosophical socy., 539; university spire, 610; year's building operations in, 5.9
Gloucester baths competition, 600, 959
Godwin, Mrs., E. W., pension for, 384
Goods depot, St. Pancras, 704
Good wood-block flooring, a, 954
Gothic: art, students' aids to, 346; foliage, 814
Grammar schools: Gainsborough, 738; Kendal, 671; Sutton Coldfield, 165, 343
Granite quarries of Chester co., Penn., 355
Grate, improved Manchester, 969
Gravitation water supplies for towns, 501
Great: span, steel roof of, 341; Wall of China, 307
Greenlaw church competition, 192
Green timber, 194
Gribble, C., in re, 195, 780
Grinding money, 269
Grosvenor gallery: exhibition, 166; split at the, 708; Verestchagin's pictures at, 597
Guardians' offices, Blackburn, 488
Guy and Bevan, in re, 707
Gyratory action stone-breaker, 821

HALF-TIMBERED walls, 40, 73, 117, 194, 306, 346, 419, 457, 491, 532
Halifax water supply, 420, 675
Hall and vestibule architecturally considered, 121
Hallicarnassian gallery, 708
Halliday's show-rooms, 466
Halls: Belfast (McArthur) 543; Bracknell, 918; Bradshaw, 991; Cranshaw, 394; Derry (St. Columb) 9; Dinton, 425; Eaton (chapel) 162; Hall-i'-th'-Wood, 991; Handforth, 991; Isleworth (Jubilee) 529; Kenyon Peel, Tyldesley, 10; Moreton-in-Marsh, 881; music, 815, 885, 959; national agricultural, Kensington, roof of, 964; Oxford (Somerville) 394; Rufford, 543
Hamilton water supply, 270
Hampshire field club, 9, 393
Handbook: Essex, Durrant's, 503; of measurements, Husband's, 488; steam-users', 775
Handicrafts, the building, 495, 536
Hanley and its mayor's chain, 384
Harbour: Aberdeen, 266, 844; construction, modern, 117; Wick, 882
Hartlepool high school competition, 39
Hayball, Arthur, the late, 47
Health lectures at Liverpool, 196
Heart, a bishop's, 41
Hebb, John, and the metro. bd. of works 922, 955
Height, safe, of shaft, 457
Helston public hall competition, 456
Hints: on architectural draughtsmanship, 80; to contributors of illustrations, 192
History of art, studies in, 562
H.M. office of works, clerks of works to, 118, 154
Hoardings, advertising, rateability of, 118
Holdings, town, 41
Holiday arrangements, metropolitan board of works, 383, 421
Home building construction, 645
Home: arts assocn., 206; office, completion of the, 51
Homes: Bullingham (St. Charles) 557; Chobham (boys') 671; cottage, Fazackerley, 265
Honours exam., building construction, 382
"Honours," State, for professional men, 195
Hope, A. J. B. Beresford, the late, 675
Hornsey, refuse destruction at, 634
Horsforth water supply, 492
Hospitals: Bootle, 416; Chichester (fever) 420; Darenth (small-pox conval) 956; Gateshead (children's) 860; Hull (children's) 206; Leeds (semi-conv.) 812; Liverpool (Hahnemann) 529; Middlesex (residential college) 529; Swindon (Victoria) 50, 778; Ventnor (consumption) 116; West Ham, 823
Hotel de Ville, Compiégne, 752
Hotels: Balsall Heath (Sherbourne) 703; Barnstaple (temperance) 611; Bond-st. (Long's) 357; Bradford (Midland) 490 (Royal) 453; Grangetown, 576; Perth (station) 957
Hot-water: pipes, 921 (new joint) 922 (painting) 532; supply, 243
House: building in Buenos Ayres, improved, 353; drainage, 501, 601, 632, 673, 741, 779, 814; model for £620, 36
Houses: Belle Vue, Double Bay, N.S.W., 72; Bexhill, 991; Bosahan, 392; Brampton (manor) 669; Bromley, Kent, 921; Grt. Yarmouth, 991; Highland-gardens, St. Leonard's, 72; Ipswich (the Ancient) 319 (Holme Wood) 991; Knole, 307, 348; Maidenhead, 320; Mount, Westerham, 244; Oakfield, Chester, 131; Plas Mawr, Conway, 543; proper thicknesses for walls of, 83; Raleigh, Brixton, 341, 418; shingle, an American, 115; Stanyard-hill, Chobham, 454; Sundridge, 855; Totland Bay, I.W., 823; town, 543; Upper Grosvenor-st., 453; Wandsworth (manor) 576; Westcombe-park 357
How a marble statue is made, 645
Humpherson v. Syer, patent case, 232
Hunting-box, Bagshot, 812
Husband's handbook of measurements, 488
Hydraulic: cements, 389, 427; passenger lifts, 844
Hydraulics, 996
Hydro-photogene light, the, 533

IGNORED, architects, 83
Illustrations: hints to contributors of, 192; of old Ipswich, 48, 393
Imperial institute: 52, 83, 115, 166, 345, 599; competition, 3, 10
Importance of light and air, 606
Improved: house-building in Buenos Ayres, 353; Manchester grate, 969; ventilators, Buchan's, 750; window sash, 320
Improvement of the BUILDING NEWS, 35
Improvements in cement burning, 571
Incandescent gas-light: Clamond, 859; works, 715
Infirmaries: Birmingham, 634; Liverpool (royal) 36; N. Shields, 152
Influence of: pre-Raphaelites on British art, 679; silicon on steel, 387
Information for intending emigrants, 119
Infringement of lift patent, alleged, 959
Initials, by Tolomeus, 357
Injuries: alleged, to Westminster abbey, 235; structural, responsibility for, 962
Inkstand, Climax, 780
Innocuous nature of sewer-gas, 502, 634
Inspectors, sanitary, assocn.: 580, 670, 739; Yorkshire do., 823
Institutes: auctioneers' and surveyors', 670; Birmingham and Midland, 191, 344, 777; architects (British) 712, 783, 853, 924 (Kalendar) 670 (prizes) 954 (Glasgow) 356, 670 (Ireland) 993 (Sydney) 344; British builders, proposed national, 192; gas, 41; guilds (and technological examinations) 271; Imperial, 3, 10, 52, 83, 115, 166, 345, 599; inventors, 266; mechanical engineers, 156; oil-colour painters, 818; royal archæological, 131, 230; sanitary (at Bolton) 75, 271; science and art (Walsall) 166; water-colour painters, 537; workmen's (Bristol) 564; benevolent (builders') 162, 716, 848 (builders' clerks') 163; civil engineers, 355, 704; surveyors', 778
Instrument, drawing, for accurate work, 647
Internal wall surfaces, 349
Inventors' institute, 266
Ipswich, old, illustrations of, 48, 393
Ireland, institute of architects of, 993
Irish: fonts, old, 885; tenders, 382
Iron: bridges, effects of temperature on, 355; doors for warehouses, 424; roofs, cheap, 194; rustless, 233, 382; staircases, 500; structures, designing, 162
Irrigation of Lower Egypt, 388
Italian marble trade, the, 491

JAPANESE engravings, early, 848
Jerusalem: architecture of, 233; discoveries near the Sepulchre church, 816
Joinery, age of elm, 959, 994
Joint, new hot-water pipe, 922
Joints: and pipes, 465; wood, stepping, 780
Joists, feather-edge, 40, 73

KALENDAR, R.I.B.A., 670
Kaye v. Chubb—lock case, 118
Kent archæological socy., 191
Kirkintilloch, Roman remains at, 344
Knole house, 307, 348

LABOUR and materials, prices of, 155
Land: and houses, 503; surveying, 306
Langley and Son, in re, 195
Largest painting-brush factory in the kingdom, 46
Lathing, 465
Law: as to owners of buildings, 924; building, its administration, 496
Laying-out of private streets, 997
Lazerges, Hippolyte, the late, 708
Leading living British architect, 48
Leakage of railway bridges, 774
Leamington, street watering at, 231
Lea, sewage in the, 231
Lecturing, architectural, 603
Leeds: architectural socy., 191, 740, 919; master builders' assocn., 282; school board and architects' tenders, 152, 203; year's building work in, 844
Leemings, compensation for, 270, 347, 420
Lees, J., of Goole, accident to, 708
Legal points, 40, 306
Legislation, building, 77
Leicester, sanitary works at, 420
Leith, water of, purification of, 118
Lengths of paperhangings, short, 531
Lessons in science, first, 342
Level and rule, combined, 997
Liability: employers', 269 (for unused quantities) 817; for damage, 959
Libraries, free: Edinburgh, 75; Poole, 244
Library at Carpenters' hall, 567
Lifter, Verity's skylight, 602
Lifts, hydraulic: 844; alleged infringement of patent, 959
Light: action of on water colours, 384, 493, and air, importance of, 606; billiard-room, 885; electric, effect of on books, 488; right to, 851
Lighting, electric, 389
Lightning: churches struck by, 310; conductors, 384, 421, 459, 493, 533
Lights, ancient: 420; street formation and, 781
Limewashed walls, 847
Limpsfield and Oxted water supply, 195
Lincoln: archi. and archæol. socy., 191; cathedral, arch in, 674, 707
Lincoln's Inn-fields, alterations near, 603
Line, boundary, 306, 346, 382, 419
Linings, flue, of glazed fireclay, 602
Linoleum designs, competition, 719
Liverpool: archi. socy., 681; art exhibition, 421; castle, 348; engineering socy., 672; health lectures at, 196; master builders' assocn., 957; Vyrnwy water supply, 195, 347, 886
Living British architect, the leading, 48
Load on beam, 815
Loads, concentrated, stresses in bridges for, 788
Local board surveyors and their perquisites, 781
Locks: Chubb's, 744; new sash, 997; push and pull, 118
Lodge: Byrkley, 576; for King of the Belgians, 565; Stonelands, 790
London: art exhibitions of, 41; bridge, piles of old, 308; churches of the Renaissance, threatened, 318; college of architecture, 597
Lowry's stone-breaker, 821
Ludlow, market competition, 776, 790
Lumber, quartered, 635
Lunches, free, archæologists and, 381
Luton, municipal engineers at, 707
Lynmouth esplanade, 600

MACLAREN, David, the late, 996
Maidstone asylum competition, 72, 776
Malt-house, Cardiff, 454
Manchester: archi. assocn., 630, 681, 740, 813, 882, 919; art gallery, 384; British assocn. at, 348, 386; building by-laws, 156; grate, improved, 969; sewage disposal, 118; ship canal, 379, 387, 777; water supply, 492
Manor houses: Brampton, 669; Wandsworth, 576
Mansions: Grosvenor, S.W., 682; Portland, W. Kensington, 576
Manufacture of Portland cement, 388
Maps, Ordnance, 847, 885, 921
Marble: and marble workers, 244, 917; statue, how made, 645; trade, the Italian, 490
Marbles: Egyptian, 388, 429: Numidian, 83
Marine parks (Southport) 455 (South Shields) 739; works, concrete in sacks for, 918
Market: Carlisle, 956; Ludlow, 776, 790; Weighton, sewering of, 567
Marks, merchandise, 384
Masons, foremen of, 490, 531, 631
Masonry: and stonecutting, 642, 744, 750, 780, 846, 856, 885, 921, 995; class prizes, 816
Mass and detail, 273
Master builders' associations: Birmingham, 739; Bristol, 267; Leeds, 282; Liverpool, 957; National, 267
Materials: and labour, prices of, 155; building, 227, 237, 278, 313, 351, 389, 427, 497 (perceability of) 608; strength of, 204
Measured details, a book of, 528
Measurement of shafts, 959, 995
Mechanical: engineering (achievements of) 387 (terms, dictionary of) 881; engineers, institute of, 156
Mediæval bestiaries, 638
Membership, professional, standards of, 968
Memorials: Cartmel (Cavendish) 707; Edinburgh (Harrison) 957; Frome (Bennett) 790; Kinghorn, N.B. (Alexander III.) 194; Llandaff (Ollivant) 380; Peterborough (Mary, Queen of Scots) 233; St. Paul's cathl. (C. Reade) 232; South Shields (Wouldhave) 860; Waterloo, 887
Merchandise marks Act, new, 384
Mersey: bar, 387; subway, 267
Metal: decorations, sheet, 319; roofs, effect of temperature on, 608; weather bar, Elliott's, 917
Metals, endurance of under stresses, 428
Metropolitan: bd. of works, 738, 780 (and Mr. Hebb) 922, 955 (and theatres) 967 (and the Piccadilly-circus scandal) 119, 233 (holiday arrangements of) 383, 421; sewer outfalls, deodorisation works at, 270
Misappropriation of building fees, 602
Mission: hall, Bournemouth (St. Michael) 599; room, Maidstone (St. Paul) 576
Model: exit, 706, 740; house for £620, 36; in architecture, value of the, 745
Modelling, architectural, 714
Modern: and ancient dress, 271; architect and his requirements, 309; building sites, 1; harbour construction, 117; sanitary methods, shortcomings of, 126
Monuments: ancient sepulchral, 991; Dublin, Christ ch. (Stongbow's) 885, 959; Indianapolis (soldiers) 670, 894; St. Anne's (lifeboat) 682; Stone family at Holne ch., 304; South Weald (O. E. Coope) 921
Mortar: 707; selenitic, frost and, 996
Mortise chisels, Wood's, 156
Mosaic decoration: Eaton Hall chapel, 162; for Westminster palace, 348
Mosque at Woking, 266
Mouldings: and beads, furniture, 505, 646; at Edington church, 432; wood, 163
Mounting photographs, 74, 117, 155
Municipal: buildings (Johnstone) 992 (Sunderland) 564; engineers' assocn., 75, 153, 267, 344, 417, 600, 646, 707 (exams.) 566, 633; regalia, tawdry, 384
Museums: arrangement of, 388; British, 607; Canterbury (stained glass in) 816; S. Kensington (Egyptian textiles at) 237; Vienna, 718
Music halls, 815, 885, 959

NATIONAL: assocn., master builders, 267; competition, schools of art, 196, 198, 236; footpath preservation socy., 156, 493; gallery (extension of) 38, 45, 922 (Scottish do.) 886; institute of British builders, proposed, 192; portrait gallery, 271, 308 (Scottish) 886
New: Admiralty and war offices, 7; coinage, the, 39; formula for flow of water, 856; Orleans, telegraph and lighting towers in, 493; photometric standard, 493; York, plumbing rules in, 421
Newcastle: cathedral, 607, 718; old, 647, 718; socy. antiquaries, 38, 86, 563
Nineteenth century society's exhibition, 678
Normandy and Brittany, notes in, 575
Norman work, 744, 815
Northern architectural assocn., 230, 740
Notes: archi. assocn., 647, 775; from Edinburgh, 317, 773, 963; in Normandy and Brittany, 575; on concrete, 189; on Etruscan architecture, 504; parliamentary, 41, 74, 118, 156, 282, 270, 307, 347, 383, 420, 458; wayside, 35, 49, 82, 150, 164, 227, 265, 303, 342, 378, 415, 432, 466, 506, 562, 597, 608, 648, 703, 717, 773, 811, 842, 859, 915, 955, 970
Novel: crane construction, alleged, 459, 490; swindle on builders, 848
Nuisance from sewer ventilators, 52, 86, 193, 230, 269, 305, 381, 418
Numidian marble, 83

OAKES, J. W., A.R.A., the late, 119
Obituary: Barfield, of Leicester, 493; Beresford-Hope, rt. Hon. A. J. B., 675; Botham, J. R., 602; Buddicom, W. B, 308; Clapp, S., 567; Crawford, A., 156; Edmeston, J. S., 566; Gillies, Miss, 195; Hardy, W. C., 970; Hayball, A., 47; Maclaren, D., 996; Oakes, J. W., A.R.A., 119; Reid, G. W., 575; Roddis, J., 270; Samuel, L., 886; Smith, Walter, of Southport, 75; Walter, T. U., 848; Williams, G. B., 41; Williams, John, 421; Woodthorpe, E., 843
Offices: Admiralty and War, new, 7, 41, 270, 347, 378; Blackburn (guardians') 488; Bradford (school bd.) 860, 956; East Grinstead (local bd.) 268, 957; Home, completion of, 51; Ipswich (newspaper) 206
Old: Ipswich, illustrations of, 48, 393; Newcastle and Gateshead, 647
Olympia, Kensington, roof of, 964
Omitting notice to district surveyor, 633
"Only thirteen," 202
Optical refinements in architecture, 711
Ordnance: maps, 847, 885, 921; survey, 83, 192, 305
Origin of Christian architecture, 503
Our: competitors' column, 35, 48, 80, 129, 163, 203; water supplies, 77; working men and what they may do, 497
Overflows, 318
Owen Jones prizes, 342
Owners of buildings, law as to, 924
Oxford: sanitary state of, 307; street, W., alterations in, 603; year's building work at, 610

PAINTER-ETCHERS exhibition, 678, 741
Painting: 498; brush factory, the largest, 46; hot-water pipes, 532; on cement, 716
Palace: St. James's, past and present of, 640; the people's, 38
Paperhanging, short lengths of, 531
Parish buildings, Oxford (St. Giles) 682
Paris, plaster of, 391
Parks: Brixton, 816; marine (Southport) 455 (South Shields) 739; Vauxhall, 816
Parliamentary notes, 41, 74, 118, 156, 232, 270, 307, 347, 383, 420, 458
Parliament-street, widening of, 41
Parquet floor joinery co., Turpin's, 233
Past and present of St. James's palace, 640
Pastoral staff at Zara, 454
Paths, field, in London suburbs, 602
Pattern, anatomy of, 279
Pavement, a new road, 280
Pavements, encaustic tile, 716
Pavillion, cricket, club designs, 359, 418
Pawley, C. J. C., in re, 492
People's palace, 38 (exhibition) 894
Permeability of building materials, 608
Perpendicular style, 707, 779
Perquisites, local bd. surveyors', 781
Perspective: 457, 532; architectural, 886, 959, 994; drawing and apparent form, 854
Perspectives: architectural, 532; bird's-eye, 566
Perspectograph, the, 920
Photographic exhibition, 542
Photographs: architectural, from Wilts, 527; fixing, 74, 117, 155
Photometric standard, new, 493
Piccadilly: circus, 316, 392 (letting of land at) 119; wooden pipes in, 207

Picture and chimney, 780, 815
Piers: Alum Bay, 344; brick (size of) 318 (strength of) 381; Ventnor, 113
Pipes: and joints, 465; hot water, 921 (new joint for) 922 (painting) 532
Plagiarism, 601
Plane, bench, self-setting, 393
Planning of suburbs, 463
Plan of campaign for the architectural student, 345
Plans: for new Admiralty and War Offices, 7; preparing, 349
Plaster of Paris, 391
Plugging wall, 996
Plumbers' registration, 119, 567, 969
Plumbing: rules in New York, 421; trade in America, 127
Pocket technical estimator, 204
Police-cell construction, 196
Politics, architectural, 846
Pollution, river, 501
Pompeii, recent discoveries at, 996
Porphyry, Egyptian, 388, 429
Portland cement: 780; concrete, expansion of, 633; manufacture of, 388; tests of, 356 (in Germany) 746
Post-offices: Bradford, 416, 487; Chicago, 960; Knutsford, 131, 192, 231, 268, 319
Pottery of Cornwall and Devon, 421
Practical: hints to marble-workers, 44; solid geometry, 48
Practice, architectural, 677 (in Chicago) 788
Preparing plans, 349
Pre-Raphaelites and British art, 679
Preservation of: stone, 314; wood, 427
Prevention of: fire in theatres, 966; down-draught in churches, 74, 117, 194, 231, 346
Price of material and labour, 155
Private: Bills for 1888, 996; streets, laying out of, 997
Prizes: for art workmen, 37, 348; masonry class, 816; Owen Jones, 342; Royal Academy, 890
Products of gas combustion, 885, 921, 995
Professional: custom, 535; membership, standard of, 968
Profession: architecture as a close, 926, 927; of a clerk of works, 7, 78, 127, 160, 200, 305
Professors of sanitation 741
Projectional solid geometry, 775
Proper thicknesses for walls, 83
Proposal to make architecture a close profession, 926, 927
Protection from decay of stone structures, 350
Provident fund, draughtsmen's, 600, 630, 634, 672, 680, 704, 740, 787, 814, 816, 845, 883, 920, 958
Psychological basis of fine art, 843
Public: baths, cheap, 633; buildings (cubing) 423 (fire prevention and exits from) 966 (requirements of) 923; elementary schools, 889; halls (Exmouth) 265 (Helston) 456 (Isleworth) 306 (Streatham) 992; works (cheeseparing policy in) 51 (examinations) 843
Pupil, articled, experiences of an, 203
Push and pull locks, 118

QUANTITIES: 532; Schofield v. Barnado, 815; unused, liability for, 817
Quantity surveyors and architects, 39, 83
Quarries, granite, of Chester co., Penn., 355
Quarrymen, amalgamation of the Bath stone, 954
Quartered lumber, 635

RAILWAY: bridges, leakage of, 774; gauges, 491; mileage of the world, 233; stations (Bombay) 165 (Bradford, Midland) 490 (Darlington) 450 (Partick) 881
Railways: Alnwick and Cornhill, 417; Dewsbury and Thornhill, 609; Glenfarg, 563; Greenock and Gourock, 455; Lanarkshire and Ayrshire, 719; North Cornwall, 882; Nottingham Suburban, 38; Scarborough and Bridlington, 563; Wirral, 609
Rainproof colour wash, 231
Rainwater tanks, 615
Raphael, 816
Rateability of advertising hoardings, 118
Rebuilding schemes, 423
Refinements, optical, in architecture, 711
Reform of the Academy, 848
Refusal to proceed, 707
Refuse destructor, Bournemouth, 416
Regime of estuaries, 387
Registration: architects, 51, 83, 153, 537, 993 (Bill) 813, 845, 848, 883, 919, 992; plumbers, 119, 567, 969
Regulation of theatres, further, 893
Reid, G. W., the late, 675
Relation: between architect, surveyor, and builder, 891, 892, 953; of architect to builder, 385
Release of Barabbas, 669
Remuneration, architects', 571
Reports: Admiralty offices, 378; associated carpenters and joiners, 969; science and art department, 127
Republican patronage of art in France, 960
Requirements of: public buildings, 923; theatres, 856; the modern architect, 809
Residential sites, choice of, 162
Resistance of stone to crushing, bedding and the, 429
Responsibilities of architects and builders for structural injuries, 962
Restoration: at Chester cathedral, 490; church, Dr. Freeman on, 429
Reviews; Anatomy of Pattern, 279; Architects' and Builders' Diaries, 918; Architectural Assocn. (Brown Book) 598 (Notes) 647, 775; Architectural Drawing, 855; Ancient Sepulchral Monuments, 991; Bateford's Catalogue, 538; Benham and Froud's Catalogue, 503; Building Estates, a Rudimentary Treatise on, 47; BUILDING NEWS Club Designs, 159, 359, 962; Colour, Elementary Manual on, 788; Dalmatia, 123; Decorator's Assistant, 647; Designing Wrought and Cast-iron Structures, 162; Dictionary of Architecture, 607; Durant's Handbook for Essex, 503; Duties of a Clerk of Works, 113; Early Christian Symbolism, 638; Elementary Treatise on Strength of Materials and Strains in Structures, 204; Emigration Circulars, 119; Engineering Popularly Considered, 47; English Carpenters and Foreign Competition, 342; First Aid to the Injured, 775; First Lessons in Science, 342; From Schola to Cathedral, 503; Gas and Water Companies Directory, 503; Gasworks Statistics, 503; Guide to the Choice of Site for Residential Purposes, 162; Handbook for Steam Users, 775; Hot Water Supply, 243; Husband's Concise Handbook of Measurements, 488; Illustrations of Old Ipswich, 48, 393; Intermittent Discharge of Sewage, 881; Life of Joseph Firbank, 788; Land and Houses, 503; Lockwood's Dictionary of Mechanical Engineering Terms, 881; Marble and Marble Workers, 917; Midland Churches, 503; Notes on Concrete, 189; Notes on the Psychological Basis of Fine Art, 843; Pocket Technical Guide and Measurer, 204; Practical Guide to Photography, 788; Practical Solid Geometry, 48; Pugin Studentship Drawings, by G. W. Browne, 728; Rating Gas and Water Undertakings, 503; R. I. B. A. Kalendar, 670; Rules for Public Elementary Schools, Education Department, 889; Sanitary Drainage of Buildings, 462; Sewage Treatment, Purification and Utilisation, 968; Strata Florida Abbey, 775; Technical School and College Building, 121; Textbook of Projectional Solid Geometry, 775; Trade Signs of Essex, 503; Transactions of Civil and Mechanical Engineers' Socy., 881; Transactions of St. Paul's Ecclesiological Socy., 775; Vestiges of Old Newcastle and Gateshead, 647; Walks in the Ardennes, 162; Waterworks Statistics, 503; Wedgwood's Encaustic Tile Pavements Catalogue, 716; Work of the Nevills round Darlington, 647
Ribble navigation works, 490
Richborough castle, 567
Right: to light, 851; way to promote technical excellence, 199
Rival features of architecture, 43
River pollution, 501
Road pavement, a new, 280
Roddis, John, of Aston, the late, 270
Roman: necropolis at Carmona, 308, 318; villa, Tockington, 630, 673
Rome, discovery of sculptured frieze, 567
Roof: 707, 744; coverings, 931; fall of, at Woolwich, 232; of agricultural hall, Kensington, 964; steel, of great span, 341; trusses, unequally loaded, 274
Roofs: cheap iron, 194; concrete, 780, 815; metal, effect of temperature on, 638
Room, strong, 457
Rouen, church of St. Ouen, 631
Royal: academy (admissions to) 82 (exhibition) 10, 453 (prizes) 890 (reform) 848; institutes (archæological) 131, 230 (architects of Ireland) 993 (British architects) 712, 783, 853, 924 (Kalendar) 670 (prizes) 954; Scottish academy, 777; (exhibition) 195
Rule and level combined, 997
Rules, B. N. designing club, 680
Rustless iron, 233, 382
Ruthwell-cross, 717

SACKS, concrete in, for marine work, 918
Safeguard against fire, 274
Safe staircases, 959
Safety theatre, Irving, Derbyshire, 681
Sage, T. B., in re, 886
Saint: Agnes (Bristol) 776; Aidan (South Shields) 881; Alban (Acton) 645, 671 (cathl.) 492, 631, 705, 884, 920; Andrew (Longton, Lancs) 992 (Monkton Wyld) 165 (Walsall) 882; Anne (Eggchill, R.C.) 229; Barnabas (Oxford) 202 (Pendleton) 229; Bartholomew (Lostwithiel) 115 (Smithfield) 269, 272; Catherine (Crook) 303; Chad (Denstone, coll. chapel) 165; Clement (Sandwich) 115; Columb (Derry) 9; Cuthbert (Earl's-court) 123, 775; Denis (Warminster) 266; George (Jermond, altar) 320; Giles (Edinburgh) 41 (Wrexham) 822; Helen's, Lancs, water supply to, 270; Ignatius (Preston, R.C.) 266 (Sunderland) 672; James (palace of) 640 (Wednesbury) 229, 776; John Baptist (Axbridge) 38 (Bedford) 116 (Clanes) 72; John (Islington, R.C.) 348 (Stamford-hill) 719; Joseph (Bradford, R.C.) 488; Kevin (Kingsland-park, Dublin) 417; Leonard (Newark almshouses) 670 (Watford) 455; Maclou (Rouen) 487; Martin (in the Fields, proposed setting back of), 75, 119, 156, 195, 271; Mary (Banbury) 790 (East Leake) 453 (le Strand) 242, 307, 318, 383, 458, 527 (Walton, Lancs) 882 (Woodhill, Hatfield) 282; Matthias (Plymouth) 671; Michael (Belgrave) 565 (Bournemouth) 599 (Garton) 489 (Pembroke) 50; Ouen (Rouen) 631; Paul (Hammersmith) 50, 123 (Kilburn) 489 (Maidstone) 576 (Woodgreen, Staffs) 229; Paul's Ecclesiological Socy., 775; Peter (Port, Guernsey) 823; Philip (Pimlico) 266; Stephen (Kensington) 38, 703; Thomas (Jersey, R.C.) 776; Wilfrid (Cheadle) 703
Salisbury: and Exeter, 882; cathedral, 457, 884, 920
Samuel, Louis, the late, 886
Sanitary: association of Scotland, 607 (and house drainage) 501, 601, 632, 673, 741, 779, 814; congress (Bolton) 75, 271, 463, 501 (Vienna) 633; drainage of buildings, 462; fittings, drainage and, 52, 84, 154; inspectors' assocn., 530, 670, 739 (Yorkshire) 823; institute (congress at Bolton) 75, 271; methods, shortcomings of modern, 126; protection association, a bogus, 195; science at Cambridge, 493; sites and arrangements, 461; stabling, 419
Sanitation, professors of, 741
Sapwood, 995
Sarcophagi from Sidon, 886
Sash: fastener, Padmore's, 196; improved window, 320; support, new, 997
Saunders, Alderman J. E., 842
Scaffold brackets, 960
Scarborough constitutional club: 669; competition, 282, 814, 845
Schemes, building, 423
Schliemann's theories vindicated, 780
Schofield v. Barnardo (quantities) 815
Scholarships, Whitworth, 342
School workshops, 311
Schools: from an architect's point of view, 830; Hartlepool (high) 39; Heaton Chapel (St Paul) 244; Hyde (Wesln.) 152; Kirkham (Wesln.) 229; Leeds (St. George) 303 (science) 957; Middlesex hospital, 529; public schools, rules on, 889; Stockport (technical) 282; Stroud-green (girls, high) 229; technical, building of, 121; West Greenwich (ragged) 957; Wimbledon (girls, high) 165; Woodford (Bancroft's) 152. See also under Board and Grammar Schools.
Schools of art: Female, 932; Glasgow, 682; Hanley, 563; Horsley, J. C., on, 816; Islington, 922; Kendal, 919; Leeds, 932; Liverpool, 528; National competition, 196, 198, 236; Rotherham, 570; St. Helen's, Lancs., 563; Southport, 455; Walsall, 166; Wolverhampton, 883
Science: and art department, 127, 275 (awards) 342; first lessons in, 342; for engineers, 707
Scotland: sanitary assocn. of, 607; socy. of antiquaries of, 882, 919
Scottish: academy, 717 (exhibition) 195; archæology, 345, 813; national portrait galleries, 886
Sculpture for the Louvre, 357
Seawater, effect of on concrete, 123, 192, 266, 844
Selenitic mortar, frost and, 996
Self-setting bench-plane, new, 393
Sepulchre, the Holy, discoveries near, 816
Seth-Smith, W. H., marriage of, 53
Set-square, combination, 886, 920, 959
Seville: cathedral, 357, 705, 778, 814; Roman necropolis near, 308, 318
Sewage: disposal, 155; treatment, 968 (and water analysis) 502
Sewer: air, alleged innocuousness of, 502, 634; ventilation, 675; ventilators (and other appliances) 80 (nuisance from) 52, 86, 193, 230, 269, 305, 381, 418
Shafts: height of, 457; measurement of, 959, 995
Shams, and the anti-sham sect, 417
Sheet-metal decorations, 319
Sheffield society of architects and surveyors, 282, 455, 630, 777, 958
Sherborne, an unsealed contract at, 233
Shingle house, an American, 115
Shop window, the, 638
Shorland's improved Manchester grate, 969
Shortcomings of modern sanitary methods, 126
Short lengths of paperhanging, 531
Shutter, Bostwick folding, 202
Sidon, sarcophagi from, 886
Signs: church, 638; trade, of Essex, 503
Silicon, influence of on steel, 387
Silversmiths' work, sketches of, 752
Site: and arrangements, sanitary, 461; choice of residential, 162
Sites, modern building, 1
Sivell, W. B., in re, 633
Size: of brick piers, 318; stock, 959
Sketches of Welsh buildings, Worthington Smith's, 41
Sketching club scheme, A.A., 786, 814
Skylight lifter, Verity's, 602
Slabs, building, for lining rooms, 922
Slate quarry arbitration, an expensive, 346
Slides, toboggan, and the Metro. Building Acts, 883, 921
Smith, Walter, of Southport, the late, 75
Smoke: abatement, 887 (Doultons and) 307, 458; exhibition at Albert Palace, 75
Societies: antiquarian (Cambridge) 681 (East London) 131; antiquaries (Newcastle) 38, 86, 563 (Scotland) 882, 919; archæological (and their uselessness) 230 (Bristol and Glo'ster) 267, 269, 345, 381, 457 (Chester) 993 (Kent) 191 (Norfolk) 882 (Somerset) 191, 205 (Surrey) 53; architects, 356, 421, 675, 748, 819, 891 (at York) 490, 502, 537, 571 (Sheffield, do.) 282, 455, 777, 958; architectural (Exeter) 882 (Leeds and Yorkshire) 191, 740, 919 (Lincoln) 191 (Liverpool) 681 (suggestions to) 129; arts, 37, 38, 780; British artists, 817; ecclesiological (St. Paul's) 775; engineering (Liverpool) 672, engineers, 543, 918 (civil and mechanical) 823, 881, 882; national footpath preservation, 156; 19th century, 678; painter etchers, exhibition, 678; philosophical (Glasgow) 739; water-colour painters, 852
Soil ventilation, 419
Solid geometry, practical, 48
Somerset: archæological socy., 191, 205; tour, a, 386
South: Kensington museum (Egyptian textiles at) 237; London, brick churches in, 205
Southwell cathedral, 992
Span, great, steel roof of, 341
Specialists, architects and, 513
Specifications: conventional, 157; not agreeing with quantities, 532
Spire, Chesterfield, 885, 921, 995
Spires and towers, stability of, 158
Stability: of chimneys, 419; of towers and spires, 158
Stabling: Drayton-mews, 669; sanitary, 419; Wood's-mews, 487
Stafford, failure of boring for water, 270, 383
Staff, pastoral, at Zara, 454
Stained glass, 41, 74, 118, 347, 492, 566, 602, 634, 675, 816, 847, 921
Staining wood, 346
Stains, black, in deal, 633, 674, 707
Staircases: iron, 500; safe, 958; v. gangways, 632, 673
Standard, new photometric, 493
Standards of professional membership, 968
State "honours" for professional men, 195
Stations, railway: Bombay, 165; Bradford, Midland, 490; Darlington, 50; Partick, 881
Statue, marble, how made, 645
Statues: Ashton-under-Lyne (H. Mason) 458; Dundalk (St. Joseph) 675; Liverpool (Gen. Earle) 960; Wellington, new, 886
Steam users, handbook for, 775
Steel: compressive strength of, 992; gate and shutting, folding, 202; influence of silicon on, 387; roof of great span, 341
Stelæ at the British museum, 607
Stewart, R. A. and J., in re, 269, 458
Stidder, J. G., in re, 707
Stockport technical school competition, 282
Stock size of scantlings, 959
Stockton water supply, 383
Stone: artificial, 315; Bath, amalgamation of quarrymen, 954; beams, 815; breaker, Lowry's, 821; cutting and masonry, 642, 744, 750, 780, 846, 885, 921, 995; family, monuments at Holne, 304; preservation of, 314; resistance of to crushing as affected in bedding, 429; spires and towers, stability of, 158; structures, decay and protection of, 350; wrongly bedded, 154, 231, 268
Stonehenge, protection of, 388
Stones: building, of Egypt, 784; crushing weight of, 780
Stopping wood joints, 780
Stormwater conduits, 503
Strains in truss, 995
Strand, St. Mary's ch., 242, 307, 318, 383, 458, 527
Street formation: and ancient lights, 781; private, 997
Strength of: brick piers, 381; materials, 204; steel, compressive, 992
Stresses: endurance of metal under, 428; in bridges for concentrated loads, 788
Strongbow's monument, Dublin, 885, 959
Strong room, 457
Stroud waterworks, 567
Structural injuries, responsibility for, 962
Structure, emphasis of, 197
Structures, stone, their decay and protection, 350
Students, architectural: plan of campaign for, 345; vacation suggestions to, 236; works at the R.I.B.A., 954
Studies in history of art, 562
Suburbs: London, field-paths in, 602; planning and arrangements of, 463
Subways: City and Southwark, 153, 388; Mersey, 267
Suggestions to architectural: societies, 129; students, vacation, 236
Surfaces, internal wall, 349
Surrey archæological society, 53
Surveying, land, 306
Surveyor: architect and contractor, relations between, 891, 892, 953; convicted, a, 676; county (action against) 40
Surveyors: district (fees) 40; examination, 40 (civil service, assistant) 491, 552, 846, 884, 920; institution, 778; local board and their perquisites, 781; quantity (architects and) 39, 83
Surveyorship, City of London, 161
Survey, the Ordnance, 83, 192, 305
Swindle, novel, on builders, 848
Swindon fever hospital competition, 50, 778
Sydney institute of architects, 344
Symbols, 847

TANKS: rainwater, 615; waterproofing, 959
Tapestry, newly acquired, at South Kensington, 533
Tavern, Shaftesbury-avenue (Cock) 669
Taylor, Albert, in re, 997
Technical: education, 744; examinations, 819; excellence, way to promote, 199; guide, pocket, 204; school building, 121
Technological examination, 271, 384
Tees, improvement of the, 417

Temperature, effects of: on iron bridges, 355; on metal roofs, 608
Temple Bar, fate of, 41
Tenders, Irish, 382
Terracotta, 315
Testimonial to H. H. Bridgman, 233
Testing of Portland cement in Germany, 746
Tests of Portland cement, 356
Textiles, Egyptian, at South Kensington, 237
Theatre, auditorium of a, 853
Theatres: Exeter, fire at, 421, 457, 461, 531; exits from, 966; fireproof curtains for, 716; fires in, 490, 531; Hanley, 266; metro. bd. of works regulations, 893, 967; model exit for, 706, 740; requirements of, 856; "safety," 681; Terry's, Strand, 161, 195
Thicknesses, proper, for walls of houses, 83
Thirteen, only, 202
Thompson: J., of Peterborough and the jubilee, 75; W., v. mayor of Stratford-on-Avon, 566
Threatened London churches of the Renaissance, 318
Tile pavements, encaustic, 716
Tiles: cement on, 306; encaustic, 502; on first floor, 815
Timber, green, 194
Toboggan slides and the Metro. Building Acts, 883, 921
Tockington, Roman villa at, 630, 673
Tottenham water supply, 534
Tour, a Somerset, 386
Towers and spires, stability of, 158
Town halls: Compiègne, 752; Elland, 50; Launceston, 738; Northampton (extension) 417, 957; Rochdale, 39
Town holdings, 41
Trade signs of Essex, 503
Trades, building, classes for, 464
Trafalgar-square, suggestions for, 708
Tramways: Birmingham (cable) 380; Bradford, 812
Traps, drain, 565, 601, 632, 707
Travelling expenses, architects', 634
Truro cathedral, 458, 675, 678, 881, 932
Trusses: Fink and Bollman, 847; strains in, 995; unequally loaded roof, 274
Tunnels: Blackwall, 73; Severn, 387
Turners' co. exhibition, 644
Turpin's parquet floor joinery co., 233
Tuscan art, Sir F. Leighton on, 916
Two west-end churches, 123
Tyndall, Prof., on lightning conductors, 834

UNDERGROUND air chambers, 431
Unequally loaded roof trusses, 274
Uniform testing of Portland cement in Germany, 746
University: college; London, awards, 47; Glasgow, 610; Liverpool, 165
Unpractical architects, 851
Unsealed contract at Sherborne, 233
Unused quantities, employers' liability for, 815, 817
Uselessness of archæological societies, 230, 269, 245, 381, 457
Utilitarianism in Chicago, 459

VACATION suggestions to architectural students, 236
Valuation, 886
Value of models in architecture, 745
Vanishing point, 806
Veitch v. Newcastle corporation, 997
Ventilation: of churches, 74, 117, 194, 231, 346; of a small room, 602; sewer, 675; soil, 419
Ventilators: Boyle's, C. C., 243; Buchan's improved, 750; sewer (and other appliances) 80 (nuisance from) 52, 86, 193, 230, 269, 305, 381, 418
Ventnor, a bemuddled local board, 270
Verestchagin's pictures, 597
Verity's skylight lifter, 602
Vestibule and hall architecturally considered, 121
Vestiges of old Newcastle and Gateshead, 647
Vibration of bridges, 126
Vicarage club designs, 359
Vienna: architectural designs in, 925; recent development of, 924; sanitary progress at, 533
Village public house, club designs, 159
Villages, gravitation water supplies for, 521
Villas: detached, club designs for, 962; Westcombe-park, 528
Vindication of Dr. Schliemann, 780
Vyrnwy water supply to Liverpool, 195, 347, 886

WALKS in the Ardennes, 162
Wall: battering, 642; Great, of China, 307; plugging, 996; surfaces, internal, 349 (new) 922
Wallen W. Dickinson, 997
Walls: collapse of, in burning buildings, 741; half-timbered, 40, 73, 117, 194, 306, 346; limewashed, 847; of Chester, 493; of houses, proper thickness of, 83
Walter, Thos. Usher, the late, 848
Walton-le-Dale, sewerage competition, 860
Wanted, an explanation, 51, 83
War and Admiralty offices, new, 7
Warehouses: 532; iron doors for, 424
Wash, rainproof colour, 231
Water: analysis and sewage treatment, 502; closets (adjustable) 346 (constructions of) 347; colours (action of light on) 384, 493 (painters' institute) 537 (do. socy.) 852; consumers take notice, 531; new formula for flow of, 856; of Leith, purification of, 118; supplies, our, 77; works in, 312, 570, 782; works, 602 (statistics) 503
Waterhouse, Alfred, R.A., 48
Waterloo, English memorial at, 887
Waterproofing tank, 959
Wave basins, 84
Waygood's, fire at, 779
Wayside notes, 35, 49, 82, 150, 164, 227, 265, 303, 343, 378, 415, 432, 466, 506, 562, 597, 608, 648, 703, 717, 773, 811, 842, 859, 915, 955, 970
Way to promote technical excellence, 199
W.C.'s: adjustable, 346; construction of, 347
Weather bar, Elliott's metal, 917
Wednesbury, sewage disposal at, 886
Weighing machines, architectural, 348
Weights: crushing, of stone, 780; of bridges, 163
Welsbach gaslight v. electricity, 196
Welsh buildings, Worthington Smith's sketches of, 41
West-end churches, two, 123
Westminster: abbey, alleged injuries to, 235; palace, mosaic decorations for, 348
Whiteley's, fire at, 242, 268, 418
Whitewash, 815
Whitworth scholarship awards, 342
Widening of Parliament-street, 41
Wilcock and Co., limited, 270
Williams: G. Barnes, the late, 41; John the late, 421
Wiltshire, architectural assocn. in, 75, 229, 240, 280, 315, 345, 380, 418, 527
Winchester cathedral, discoveries at, 41, 119
Window: sash, an improved, 320; the shop, 638
Wolverhampton ecclesiastical exhibition, 543
Wonderful fall, a, 269
Wooden pipes in Piccadilly, 307
Wood: block flooring, a good, 954; joints, stopping, 780; mouldings, 163; preservation of, 427; staining, 346
Woods: mortise chisels, 156; of Antwerp, 493
Woodthorpe, Edmund, the late, 843
Woolwich, fall of roof at, 232
Workhouses: Chelmsford, 379; St. George's East, 118
Working men and what they may do, 497
Workmen, art, prizes for, 37, 348, 917
Workmen's cottages, 39, 51
Workshops, school, 311
Works: failure to complete, 745; in water, 312, 570, 782
Wrongly-bedded stone, 154, 231, 268
Wrought-iron casements, 997

YORK; archi. assocn., 919; socy. of architects at, 490, 502, 537, 571
Yorkshire architectural art, 539

INDEX TO ILLUSTRATIONS.

***** The Lithographic Illustrations will be found immediately following the Pages indicated.**

ABBEYS: Furness (chapter house) 629; Hinton, 322; Lacock (cloisters) 506
Aberdeen harbour, 84
Academy, royal: pictures from, 12, 170, 322, 432; sculpture from, 12, 246
Allahabad, All SS. church, Cannington, near, 792, 862
Allington Lock, pair of cottages, 893
Almshouses, Hungerford, Corsham, 282
Altar: crosses, Ely and Gloucester cathedrals, 246; for St. George's, Jesmond, at Newcastle exhibition, 322; press, Truro cathl., 935; rail, Handbridge ch., 246
Alternon church, bench-ends at, 824
American portable shingle house, 90
Ancient: House, the, Ipswich, 319; trick, by H. C. Christie, 12
April day, by B. W. Leader, 12
Arcading: Furness abbey chapter house, 629; Lincoln cathedral, 789
Arch: construction, 639, 751, 858; stability of, 995; strainer, Lincoln cathedral, 674
Architectural assocn. excursion in Wiltshire, 246, 282, 322, 506
Ardwick-green, Manchester, R.V. drill-hall, 841
Arguiel castle, Jersey, 792
Arles museum, sarcophagus in, 970
Armchair, Jacobean, 130
Art: metal work, by Singers, 246; museum, Vienna, spandrel figures at, 720; school of, Walsall, 70
Ascot Jubilee cup, 754
Ashton, Steeple, church, 506
Assembly rooms, Horns, Kennington, 282
Asylums, lunatic: Hartwood, Glasgow, 684; Mapperley-hill, Nottingham, 720
Axbridge church, 151
Aysgarth school, Newton-le-Willows, 322

BANBURY, St. Mary's church, 792
Banks: Belfast (Northern) 468; Esher (London and County) 612; Landport (Capital and Counties) 684; Lombard-st., E.C. (Lloyd's) 934
Barabbas, release of, Tinworth's, 648
Barking church (All Hallows), E.C., 824
Barnstaple, Victoria temperance hotel, 612
Basins, wave: Aberdeen, 84; Sunderland and Tynemouth, 85
Battenberg presentation cabinet and cradle, 468
Beam, stone, Lincoln cathedral, 674
Bedford, town and county club, 578
Bedminster, Bristol, Wills' tobacco factory, 824
Bed: moulds, 858; stone, wrong laying of, 154
Bedroom furniture, 225
Bedstead, old Breton, 168
Belfast: McArthur hall, 544; Northern bank, 468
Bellows, carved oak, 208
Bench: ends, Cornish, 824; plane, self-setting, 393
Bennett memorial cross, Frome Selwood, 809
Beresford-Hope, memorial to Lady M., 246
Bergamo, stalls at S. Maria Maggiore, 913
Bexhill, three houses on the Marina, 970
Birtley church, North Tyne, 485
Bishop Bridport's monument, Salisbury, 896
Bishop's: palace, Evreux, 612; throne, Truro cathedral, 934
Blackheath, houses at Westcombe-park, 360, 506
Board schools: Bradford, Woodroyd, 878; Dulwich, Goodrich-road, 54; Nottingham, Radford, 468; Upper Norwood, Woodland-road, 54
Bologna, west door, S. Francesco, 913
Bollman and Fink trusses, 847
Bolton: Bradshaw hall, 972; Hall-i'-th'-Wood, 972
Bonally Tower, N.B., library at, 208
Bond-st., W., Long's hotel, 360
Bookcase cabinet, 771
Bottom flange of girder, 231
Boyle's C.C. ventilators, 243
Bradford-on-Avon, the bridge, 246
Bradford, Yorks: Congl. chapel, Manningham, 862; houses at Heaton, 896; Post-office, 468; Royal hotel, 432; Woodroyd bd. schools, 878
Bradshaw hall, Bolton, 972
Bramhall hall, fire dogs at, 246
Brampton, Hunts, old manor house, 648
Brass fire dogs, 189, 246
Breakwaters, floating, 312, 570, 782
Breton bedstead, old, 168
Brick gables, some German, 792
Bridge: and entrance gateway, 5 6; Bradford-on-Avon, 246; Dinan, 792; lodge, Nethercourt, 720
Bridport's (Bp.) monument, Salisbury cathedral, 896
Brighton corporation mace, 754
Bristol, Wills' tobacco factory, Bedminster, 824
British Museum, Queen Hatasu's chair, 955
Brittany, notes in, 792
Brixton: Corpus Christi R.C. church, 578; Raleigh house, 339, 341
Bromley, Kent, St. Catherine's house, 931
Broxbourne, house, St. Catherine's estate, 754
Buchan's: improved ventilator, 750; system of house drainage, 52, 53, 155
BUILDING NEWS: designing club (country vicarage) 358, 360 (cricket pavilion) 377 (village public house) 170, 187 (villa residence) 972, 989; travelling studentship drawings (G. J. Oakeshott) 684
Buildings in flats, Islington (Premier) 648
Bullingham, St. Charles' home, 360
Bure, on the, by E. H. Fahey, 170
Bushrangers' gang, head of the, 432
Business premises: Enderby (co-op.) 701; Strand, 396; Streatham High-street, 413; Whitechapel (co-op.) 648
By flowing stream, 432
Byrkley lodge, Staffs, 578

CABINETS: Battenberg presentation, 468; bookcase, 771; china, 88, 771; Elizabethan (at Newcastle) 132; Jacobean, 130, 862; Renaissance, 12 (Italian) 544, 852
Camberwell, Gordon dwellings, 934
Candlesticks, altar, Salisbury cathedral, 246
Cannington, Allahabad, All SS. ch., 792' 862
Caps at Mont St. Michel, 578
Carvings, Glasgow municipal buildings, 432
Cassone, Italian, 168
Castle, Arguiel, Jersey, 792
Cathedrals: Cattaro (ciborium) 132; Chihuahua, Mexico, 322; Coutances (plan of tower) 159; Ely (altar cross) 246 (tympanum, S. door) 639; Gloucester (altar cross) 246; Grado (pulpit) 132; Lincoln (arcading on screen) 789 (the stone beam) 674; Llandaff (Bp. Ollivant's effigy) 246; National gold medal design (F. Whitwell) 612, 934; Newcastle (choir) 720 (window) 754; Salisbury (altar candlesticks) 246 (Bp. Bridport's monument) 896; Seville, 360; Truro (bishop's throne) 934; Zara (pastoral staff at) 432 (plan) 125
Cattaro, ciborium in duomo, 132
"C. C." ventilators, Boyle's, 243
Ceiling in house, South Quay, Yarmouth, 970
Cement kilns, arrangement of, 571
Centrolineal for perspectives, 532
Chairs: 130; cane, 225; Chippendale, 862; Renaissance, 12, 88; Queen Hatasu's, 955
Chalfield, Great, manor house, 232, 506
Chalons-s.-Marne, Notre Dame, 396
Chapels: for the Tropics (S. J. Newman's design) 754; Hartwood, N.B. (asylum) 684; Hinde-st., W. (Wesln.) 684; Hinton Abbey, 322; Manningham, Bradford (Congl.) 862; Mont St. Michel, 578; W. Kensington (Congl.) 754
Chapter house, Furness Abbey, 629
Chester, Oakfield house, near, 132
Chest of drawers, 208
Chihuahua cathedral, Mexico, 322
Chimneypiece, Mont St. Michel, 578
China cabinet, Louis XVI., 88
Chippendale: chair, 862; lamps, 396; wine cooler, 168
Chobham, Stanyard-hill house, 432
Choir: Newcastle cathedral, 720; stalls, St. Francesco, Zara, 124
Christ: before Herod, by Tinworth, 208; the Infant, and Joseph, 208
Christchurch, Hants, north porch, 896
Churches: All Hallows, Barking, E.C. (pulpit) 824; Alternon (bench ends) 824; Axbridge, 151; Banbury (St. Mary) 792; Bergamo (S. M. Maggiore, stalls) 913; Birtley, 485; Bologna (S. Francesco, door) 913; Brixton Rise (Corpus Christi, R.C.) 578; Cannington (All SS.) 792, 862; Chalons-sur-Marne (Notre Dame) 396; Claines, Worcester (St. John Bapt.) 54, 282; Christchurch, Hants (north porch) 896; Devizes (St. John) 322; Dinan (S. Sauveur) 792; Eastwood (window) 862; Edington, 246 (mouldings at) 432; Florence (S. Michele, door) 896; Gosforth (All SS.) 544; Guernsey (St. Peter Port, woodwork) 824; Halberstadt (W. towers) 934; Handbridge, Chester (altar rail) 246; Hart-st., E.C. (St. Olave) 824; Hatfield (St. Mary) 282; Haydock, 468; Heaton Chapel, Stockport (St. Paul) 263; Ipswich (St. Margaret, porch) 282; Jesmond (St. George, altar and reredos) 322; Kinnersley (Swatman tomb) 972; Laneast (bench ends) 824; Leake, Notts (St. Mary) 432; Lehon (spire) 792; Lombard-st., E.C. (All Hallows, font) 824; Long Melford (reredos) 612; Lostwithiel (St. Bartholomew's, spire) 111; Maidstone (St. Paul, mission) 578; Mont St. Michel, 578; Munster-sq. (St. Mary Mag.—lectern) 246; North Leith (parochial hall) 754; Norton, Yorks, 972; Plymouth (St. Peter, gate screen) 246; Rame (bench ends) 824; Rogerstone, 170; Rouen (S. Maclou, organ loft stairs) 468; St. Mary-le-Strand (by John Harris) 506; Sandford (bench ends) 824; Sandwich (St. Clement) 113; Smithfield (St. Bartholomew, founders' tomb) 824; South Bank, Middlesborough (St. John) 578; Stamford-hill (St. John) 720; Steeple Ashton, 506; Stratton, Hants (new) 208; Venice (S. Paterniau) 896; West Kensington (Congl.) 754; Wrexham (St. Giles, tower) 824; Zara, 124, 125
Ciborium in duomo of Cattaro, 132
City: church interiors, All Hallows, Barking and Lombard-st., St. Bartholomew's, Smithfield, and St. Olave, Hart-st., 824; Lloyd's bank, Lombard-st., 934; of London Court, 896
Claines church, near Worcester, 54, 282
Clamont incandescent gas-light, 859
Clock tower, Stratford-on-Avon, 612
Cloisters: in the, 170; Lacock abbey, 506

Clubs: Bedford (town and county) 578; BUILDING NEWS designing (country vicarage) 358, 360 (cricket pavilion) 377 (village public house) 170, 187 (villa residence) 972, 989; Scarborough (Constitutional) 648
Cock tavern, Shaftesbury-avenue, 648
Colinton, library at Bonally Tower, 208
Commodes, 54, 225, 862
Competition designs: asylum (Hartwood, Glasgow, selected, Campbell, Douglas, and Sellars) 684; "B. N." club, 170, 187, 358, 360, 377, 972, 989; cathedral (National gold med., F. Whitwell) 612, 934; hall (Belfast, McArthur, selected, Deane and Son) 544; hotel (Barnstaple, temperance—selected, J. K. James) 612; institutes (Imperial—selected, T. E. Collcutt's) 4, 5, 12, 132, 170 (Dr. Anderson's) 90 (A. W. Blomfield's) 90 (Deane and Son's) 90 (T. G. Jackson's) 90 (Webb and Bell's) 90, 132 (Walsall, science and art—selected, Dunn and Hipkiss) 170; memorial (Wouldhave, South Shields—selected, J. H. Morton) 862; trav. studentship drawings ("B. N.," G. J. Oakeshott) 684
Compiégne, hotel de ville, 754
Concrete floors, 566
Continuous gyratory stone-breaker, 821
Conway, Plas Mawr, as restored, 544
Cooler, wine, Chippendale, 168
Co-operative premises: Enderby, 701; Whitechapel, 648
Corner cupboard, 130
Cornish bench ends, 824
Corporation maces, Brighton and Louth, 754
Córtile, entrance, Cranshaw hall, 396
Cottages, pair of, Allington Lock, Kent, 893
Country vicarage, club designs, 358, 360
Court, City of London, 896
Coutances cathedral, plan of tower, 159
Cradle, presentation, for Prince Battenberg, 468
Cranshaw hall, entrance cortile, 396
Cricket pavilion, club design, 377
Croatian architecture, 124, 125, 132
Crosses: altar, Ely and Gloucester cathedrals, 246; Bennett mem'l., Frome Selwood, 809; Kildalton, Islay, 972; St. Esprit, near Dinan, 792; Valoynes (incised) 972
Cupboards: corner, 130; hanging, 208; pedestal, 88
Cups: Ascot Jubilee, 754; from Saltaire exhibition, 754

DALMATIAN architecture, 124, 125, 132
Decorative furniture, 771
Derry, St. Columb's hall, 33
Designing club, BUILDING NEWS: country vicarage, 358, 360; cricket pavilion, 377; village public house, 170, 187; villa residence, 972, 989
Designs: "B. N." club, 170, 187, 358, 360, 377, 972, 989; cathedral (Natl. gold medal, F. Whitwell) 612, 934; chapel for the Tropics (S. J. Newman) 754; entrance gateway and bridge (G. W. Ward) 506; iron staircases, 506; town house (F. E. Littler) 544; villa, a Mentone (S. J. Newman) 754; window for Newcastle cathedral (E. Frampton) 754
Desk, litany, 824
Details: abbey (Furness) 629; cabinet, 132 (ormolu mounts to) 88; churches (Birtley) 485 (Christchurch, Hants, porch) 896 (Edington, mouldings) 432 (Ipswich, St. Margaret, porch) 282; settle, 785; staircase, iron, 506; stalls, Bergamo, 913
Devizes, St. John's church, 322
Dinan, sketches at, 792
Dining-room, Dinorben court, 684
Dinorben court, dining-room, 684
Dogs, brass fire, 189, 246
Doors, iron, for warehouses, 424, 425
Doorways: Bologna, 913; Florence, 896; Sebenico, 125
Double Bay, N.S.W., entrance-hall to Belle Vue house, 54
Drainage: house, 743 (Buchan's system) 52, 53, 155; subsoil, at Canning-town, 954
Drain traps, 565
Drawers, chest of, 208
Drawing instrument for accurate work, 647
Drawing-room: furniture, 208; South Wraxhall manor, 246
Drawings, measured: arcading, Lincoln cathedral, 789; cabinet, Elizabethan, 132; chapel, Hinton abbey, 322; chapter house, Furness abbey, 629; porches (Christchurch, Hants) 896 (Ipswich, St. Margaret) 282; settle, 785; tower, Wrexham ch., 824; town hall, Compiégne, 754
Drawings, "B. N." trav. studentship, 684
Drayton-mews, S. Kensington, stabling, 648
Dressing-table, 225
Drill-hall, R.V., Ardwick-green, 841
Drinking-fountains: Oxford (Walton Well) 896; Reading (Jubilee) 71; Stratford-on-Avon, 612
Driving the ducks, 322
Ducks, driving the, 322
Duet, a, by E. Lanteri, 12
Dulwich, Goodrich-road board school, 54
Duomi: Cattaro, 132; Grado, 132; Zara, 125
Dürer's studio, Maximilian in, 322
Dwellings, Gordon, Camberwell, 934

EAST ANGLIAN DAILY TIMES offices, Ipswich, 208
Eastwood church, Essex, east window, 862
Edington church: 246 (mouldings at) 432
Effigy, Bp. Ollivant's, Llandaff cathl., 246
Egyptian porphyry quarries, map of, 430
Egypt, the Repose in, by Müller, 396
Electric light hanging-chain and table-lamps, 246
Ely cathedral: altar cross, 246; tympanum, Prior's entrance, 639
Enderby, co-operative premises, 701
Entrance: and loggia, Upper Grosvenor-st., 432; cortile, Cranshaw hall, 396; gateway and bridge, 506; halls (Belle Vue, Double Bay, N.S.W.) 54 (Rufford hall) 544; lodge (stonelands) 792
Emperor Maximilian in Dürer's studio 322
Esher, village hall and bank, 612
Eurydice sinking back to Hades, 12
Evreux, Bishop's palace ("In Normandy") 612
Ewer, Limoges enamel, 54
Excursion, archi. assocn. in Wilts, 246, 282, 322, 506
Exhibitions: Academy (pictures) 12, 170, 322, 432 (sculpture) 12, 246; American (portable house at) 90; Grosvenor, 170, 322; home arts, 208; Newcastle (reredos at) 322; water-colour institute, 322
Exit, model, for a theatre, 706

FACE marks, French masons', 643
Factory, Wills' tobacco, Bedminster, 824
Figures, carved: art museum, Vienna, 720; gables, Great Chalford manor house, 282; Glasgow municipal buildings, 432
Fink and Bollman trusses, 847
Firedogs, brass: Bramhall hall, 246; at the Louvre, 168
Fireplace at Dinan, 792
Fire screen and table, carved, 468
Flange, bottom, of girder, 231
Flat arches in masonry, 751
Flete, Devon, lodge at, 506
Floating breakwaters, 312, 570, 782
Floors, concrete, 566
Florence, west door of S. Michele, 896
Flowing stream, by, 432
Fonts: All Hallows, Lombard-st., 824 Axbridge church, 151
Founder's tomb, St. Bartholomew's, Smithfield, 824
Fountains, drinking: Oxford (Walton Well) 896; Reading, 371; Stratford-on-Avon, 612
Four City church interiors, 824
Frame, carved mirror, 12
Free library, Poole, 246
French: construction of iron staircases, 506; masons' marks, 639
Frome Selwood, Bennett memorial, 809
Furness abbey, chapter house, 629
Furniture: beds and mouldings, 646; bedroom, 225; decorative, 771; drawing-room, 208; sketches, 12, 54, 88, 468

GABLES, German brick, 792
Gainsborough old hall, oak settle from, 785
Gaslight, Clamond incandescent, 859
Gateshead children's hospital, 862
Gateway and bridge (G. W. Ward's design) 506
George inn, Norton St. Philip, 282, 506
Girder: bottom flange of, 231; strains, 346
Glasgow: lunatic asylum, Hartwood, 684; municipal buildings, spandrels at, 432
Gloucester cathedral, altar cross, 246
Goodrich-road, bd. school, Dalwich, 54
Gordon dwellings, Camberwell, 934
Gordon's statue, Trafalgar-sq., 246
Gosforth house, staircase, 246
Gosforth, All Saints church, 544
Grado, pulpit in duomo, 132
Grandfather at Little Nell's grave, 432
Grangetown hotel, Middlesbrough, 578
Grate, Shorland's improved Manchester, 969
Grave of Little Nell, 432
Great: Chalfield manor house, 282, 506; Yarmouth, ceiling in house on South Quay, 970
Grosvenor: gallery, pictures at the, 170, 322; st., Upper, entrance and loggia in, 432
Guernsey, woodwork in St. Peter Port church, 824
Guildhall, the City, new Court buildings, 896
Gyratory action stone-breaker, 821

HALF-TIMBERED work, 419
Hall-i'-th'-Wood, Bolton, 970
Hall lamps, 396
Halls: Bradshaw, Bolton, 970; Bramhall (firedogs at) 246; Cranshaw (entrance cortile) 396; Derry (St. Colomb's) 33; entrance, Belle Vue, Double Bay, N.S.W., 54; Esher (village) 612; Gainsborough (settle at) 785; Hall-i'-th'-Wood, Bolton, 970; Handforth, Wilmslow, 970; Kenyon Peel, Tyldesley, 12; North Leith (parochial) 754; Oxford (Somerville) 396 (Trinity) 12; Plas Mawr, Conway, 544; Rufford (staircase) 544; Simonstone, 170
Handbridge church, altar rail, 246
Handforth hall, Wilmslow, 970
Hanging: chain, electric light, 246; cupboard, 208; shelves, 771
Harbours: Aberdeen, 84; Sunderland, 85; Tynemouth, 85
Hart-st., E.C., St. Olave's ch., 824
Hartwood district asylum, Glasgow, 684
Hatasu, Queen, chair of, 955
Hatfield, St. Mary's church, Woodhill, near, 282
Haydock new church, 468
Head of the bushrangers' gang, 432
Headquarters, volunteer, Ardwick-green, 824
Heaton, Bradford, houses at, 896
Heaton Chapel, Stockport, St. Paul's schools, 263
Heracles and Telephus, from the Louvre, 360
Hereford, St. Charles' home, Bullingham, 360
Hesperia, by F. Dicksee, 322
Highland-gardens, St. Leonard's-on-Sea, 54
Hinde-street, W., Wesleyan chapel, 684
Hinton abbey chapel, 322
Historic monuments, 970
Holme Wood house, Ipswich, 972
Home: arts exhibition, sketches at, 208; Bullingham (St. Charles, R.C.) 360
Horns, the, Kennington, 282
Hospital, Gateshead, children's, 862
Hotel de ville, Compiégne, 754
Hotels: Barnstaple (temperance) 612; Bond-st. (Long's) 360; Bradford (Royal) 432; Grangetown, Middlesbrough, 578
House drainage: Buchan's system of, 52, 53, 155; "clerk of works'" do., 743
Houses: Allington Lock (cottages) 893; Belle Vue, Double Bay, N.S.W., 54; Bexhill, the Marina, 970; Bonally Tower, N.B. (library) 208; Bradshaw hall, Bolton, 970; Brampton, Hunts (manor) 648; Bromley, Kent (St. Catherine's) 931; Dinan, 792; Dinorben court (dining-room) 684; Gosford (staircase) 246; Great Chalfield (manor) 282, 506; Great Yarmouth (ceiling) 972; Grosvenor-square, 684; Hall-i'-th'-Wood, Bolton, 972; Handforth, Wilmslow, 972; Heaton, Bradford, 896; Highland gardens, St. Leonard's-on-Sea, 54; Ipswich (Holme Wood) 972 (the Ancient) 319; Islington (Premier buildings) 648; Kenyon Peel, Tyldesley, 12; Lacock Abbey (cloisters) 506; Maidenhead, 322; Nottingham, 737; Mount, the, Westerham, 246; Oakfield, Chester, 132; Paddocks, Leopardstown-park, 824; Plas Mawr, Conway, 544; portable shingle (American) 90; Portland mansions, West Kensington, 578; Raleigh, Brixton, 339, 341; Rufford (hall, staircase) 544; St. Catherine's estate, Broxbourne, 754; Simonstone hall, 170; South Wraxhall manor, 246, 282; Stanyard-hill, Chobham, 432; Stonelands (lodge) 792; suburban (club designs) 972, 989; Sundridge park, 855; Totland bay, I.W., 824; town (F. E. Littler's design) 544; Upper Grosvenor-st., 432; Wandsworth (manor) 595; Westcombe-park, Blackheath, 360, 506
Hungerford almshouses, Corsham, 282
Hymn, a morning, 170

IMPERIAL Institute competition designs: selected, T. E. Collcutt's, 4, 5, 12, 132, 170; Dr. Anderson's, 90; A. W. Blomfield's, 90; Deane and Sons, 90; T. G. Jackson's, 90; Webb and Bell's, 90, 132
Improved Manchester grate, Shorland's, 969
Incandescent gaslight, Clamond, 859
Infirmary, Liverpool, royal, 12
Ingle nook, an, 951
Initial letters, by Tolomeus, 360
Ink base, carved wooden, 208
Inn, George, Norton St. Philip, 282, 506
"In Normandy" (the Bishop's palace, Evreux) 612
Institute: Imperial, designs (selected, T. E. Collcutt's) 4, 5, 12, 132, 170 (Dr. Anderson's) 90 (A. W. Blomfield's) 90 Deane and Son's) 90 (T. G. Jackson's) 90 (Webb and Bell's) 90, 132; Walsall (science and art) 170; water-colour, pictures at, 322
Instrument, drawing, for accurate work, 647
In the cloister, 170
Intrados, development of, 858
Ipswich: Holme Wood house, 972; newspaper offices, 208; porch, St. Margaret's ch., 282; the "Ancient house," 319
Irish zodiac, an, 639
Iron: doors for warehouses, 424, 425; staircases, 506
Islay, N.B., sculptured cross in, 970
Islington, Premier buildings, 648
Italian churches, sketches in, 896, 913

JEALOUSY: by Mrs. Moberley, 432; cruel as the grave, by E. Normand, 432
Jersey, Argueil castle, 792
Jesmond, Newcastle, reredos, St. George's ch., 322
Jubilee: cup, Ascot, 754; fountain, Reading, 71; miserere, Guernsey, 824

KENNINGTON, Horns Tavern, 282
Kensington, South, Imperial Institute designs: selected, 4, 5, 12, 132; Anderson's, 90; Blomfield's, 90; Deane and Son's, 90; Jackson's, 90; Webb and Bell's, 90, 132
Kensington, West: Congl. church, 754; Portland mansions, 578
Kettleness, by Gilbert Foster, 322
Kenyon Peel hall, Tyldesley, 12
Kildalton, cross at, 972
Kilndown ch., Lady M. Beresford-Hope's tomb, 862
Kilns, cement, arrangement of, 571
Kinnersley church, Swatman monument, 972
Knocker, Renaissance wrought-iron, 12
Knutsford, post-office, 132

LACOCK Abbey cloisters, 506
Ladas, by H. H. Armstead, 246
Lamps: electric-light table, 246; hall, 396
Lancashire mansions, three old, 970
Land between the lochs, 432
Landport, Capital and Counties bank, 684
Laneast church, bench ends at, 824
Leake, Notts, St. Mary's ch., 432
Lectern, St. Mary Magdalene, Munster-square, 246
Lehon, near Dinan, sketches at, 792
Leith, North, Church hall, 754
Leopardstown-park, the Paddocks, 824
Letters, initial, by Tolomeus, 360
Library: Bonally tower, Colinton, 208; Raleigh house, Brixton, 339; Poole (free) 246
Light, Clamont incandescent gas, 859
Lilith, by Hon. J. Collier, 170
Lincoln cathedral: arcading on screen, 789; stone beam, 674
Litany desk, St. Peter Port, Guernsey, 824
Little Nell's grave, grandfather at, 432
Liverpool, royal infirmary, 12
Llandaff cathedral, Bishop Ollivant's memorial, 246
Lochs, land between the, 432
Lodges: Byrkley, Staffs, 578; Flete, Devon, 506; Nethercourt (Bridge) 720; Stonelands, 792
Loggia, 49, Upper Grosvenor-st., 432
Lombard-st.: font, All Hallow's ch., 824; Lloyd's bank, 934
London board schools, two, 54
Londonderry, St. Columb's hall, 33
Long Melford church, reredos in, 612
Long's hotel, Bond-st., 360
Lostwithiel, St. Bartholomew's spire, 111
Louth corporation mace, 754
Louvre, the: brass firedogs, 189; statues of Hercules, Nero, and Trajan, 360
Lowry's continuous gyratory stone-breaker, 821
Lunatic asylums: Hartwood, Glasgow, 684; Mapperley-hill, Nottingham, 720
Lüneburg, 170

MACARTHUR hall, Belfast, 544
Maces, borough, Brighton and Louth, 754
Maidenhead, a riverside residence, 322
Maidstone, St. Paul's mission-room, 578
Malton, Norton, near, new church, 972
Manchester: grate, Shorland's improved, 969; R.V. drill-hall, Ardwick-green, 824
Manningham, Bradford, Congl. chapel, 862
Manor houses: Brampton, Hunts, 648; Great Chalfield, 282, 506; South Wraxhall, 246, 282; Wandsworth, 595
Mansions: Grosvenor-square, 684; three old Lancashire, 970
Mantelpiece, 208
Mapperley-hill lunatic asylum, Nottingham, 720
Map of Egypt, showing porphyry quarries, 430
Masonry and stone-cutting, 643, 751, 858
Maximilian in Dürer's studio, 322
Measured drawings: arcading, Lincoln cathl. (H. G. Gamble) 789; cabinet at Newcastle (G. C. Smith) 132; chapel, Hinton abbey (W. Gill) 322; chapter house, Furness abbey (J. F. Wilkinson) 629; porches (Christchurch, Hants, Stone and Irwin) 896 (Ipswich, St. Margaret, H. P. Edwards) 282; settle at Gainsborough hall (H. G. Gamble) 785; tower of Wrexham ch. (W. S. Jones) 824; town hall, Compiégne (A. B. Mitchell) 754
Melford, Long, reredos in, 612
Memorial: cross (Bennett) Frome Selwood, 809; fountain, Reading, 871; Lady M. Beresford-Hope, Kilndown, 246; Wouldhave, South Shields, 862
Mentone villa, a, S. J. Newman's design, 754
Metal work, art, 246
Mexican cathedral, a, 322
Middlesbrough: Grangetown hotel, 578; St. John's ch., South Bank, 578
Mirror frame, carved, 12
Misereres, St. Peter Port, Guernsey, 824
Mission-room, St. Paul's, Maidstone, 578
Mist-capped, by C. Stuart, 322
Model exit for theatres, 706
Mont St. Michel, sketches at, 578
Monuments, historic: cross at Kildalton, Swatman tomb, Kinnersley, and Sarcophagus in Arles museum, 972
Mooring of floating breakwaters, 782
Morning: by M. Stone, 432; hymn, by R. Hallward, 170
Mottingham, Kent, house at, 737
Mouldings: Christchurch, Hants, 896; Edington church, 432
Moulds, bed, 858
Mount house, Westerham, 246
Müller, Carl: Repose in Egypt, 396; St. Anne and St. Joseph, 208
Municipal buildings, Glasgow, spandrels at, 432
Munster-sq., St. Mary Magdalene's ch., lectern, 246
Museum: Arles, sarcophagus at, 970; British, Queen Hatasu's chair, 955; Vienna, spandrel figures at, 720

NAIAD, by Henrietta Rae, 12
National gold medal design for cathedral (F. Whitwell) 612, 934
Nell, Little, grave of, 432
Nero, statue of, in the Louvre, 360
Nethercourt, the Bridge lodge, 720
New self-setting bench plane, 393
Newcastle: cathedral (choir) 720 (window, E. Frampton's design for) 754; Elizabethan cabinet at the Castle, 132; exhition, altar and reredos at, 322; street in, by T. M. Richardson, 720
Newspaper offices, Ipswich, 208
Newton-le-Willows, Aysgarth school, 322
Nook, an ingle, 951
Normandy, in: Bishop's palace, Evreux, 612; Dinan, 792
North Leith, church hall, 754
Norton: church, Yorks, 972; St. Philip, George-inn, 282, 506
Norwood, Upper, Woodland-road board school, 54
Nottingham: Mapperly-hill asylum, 720; Radford Boulevard board schools, 468; theatre (plan) 632
Nuisance from sewer ventilators, 193, 231

OAKFIELD house, Chester, 132
Offices, publishing, Ipswich, 208
Old: engraving of St. Mary-le-Strand, 506; wall tiles, 506
Ollivant, effigy of Bishop, Llandaff, 246
On the Bure, 170
Organ loft stairs, St. Maclou, Rouen, 468
Original design for St. Mary-le-Strand, 506
Ormulu mounts to cabinet, 88
Overmantel, carved, 208
Oxford: fountain, Walton Well, 896; St. Giles's parish buildings, 684; Somerville hall, 396; Trinity college, 12

PADDOCKS, Leopardstown-park, 824
Pair of cottages, Allington Lock, 893
Pala, Cattaro duomo, 132
Palace, Bishop's, Evreux, 612
Panels, terra-cotta: Christ before Herod, 208; Release of Barabbas, 648
Parish: buildings, St. Giles's, Oxford, 684; hall, North Leith, 754
Park-lane, stables in Wood's-mews, 468
Pastoral staff at Zara cathedral, 432
Pavilion, cricket, club designs, 377
Pedestal: carved ivory, 54; cupboard, 88
Pendant, three-light, 246
Perspectives, the centrolinead for, 533
Photographs, architectural, from Wiltshire, 506
Piccadilly-circus, proposed buildings, 392
Pictures: Academy, 12, 170, 322, 432; Grosvenor, 170, 322; water-colour institute, 322
Pigeons and boy, by W. R. Stephens, 246
Plane, self-setting bench, 393
Plans: arcading (Lincoln cathl.) 789; asylum (Hartwood, Glasgow) 684; banks (Belfast) 468 (Esher) 612 (Landport) 684 (Lombard-st., Lloyd's) 934; board schools (Bradford, Woodroyd) 878 (Dulwich, Goodrich-road) 54 (Norwood, Woodland-road) 54 (Nottingham, Radford) 468; breakwaters, floating, 312; cabinet, 132; cathedral (F. Whitwell's design) 612 (Zara) 125; chapels (for the Tropics, S. J. Newman's design) 754 (Hinde-st., W., Wesln.) 684 (Hinton abbey) 322 (Manningham, Congl.) 862; chapter house (Furness abbey) 629; churches (Axbridge) 151 (Birtley) 485 (Cannington, All SS.) 792 (Edington) 246 (Gosforth) 544 (Haydock) 468 (Leake, St. Mary) 432 (Norton, Yorks) 972 (Stratton) 208 (Zara, S. Donato) 125; clubs (Bedford) 578 (Scarborough, Constitl.) 648 (Wiveliscombe) 896; co-operative premises (Enderby) 701; cottages (Allington Lock) 893; court (City of London) 896; cricket pavilion, 377; cross (Bennett meml.) Frome Selwood, 809; drainage systems, 743 (Buchan's) 53, 155; drill-hall (volunteer, Ardwick-green) 841; dwellings (Camberwell, Gordon) 934; fountain (Reading, Jubilee) 71; free library (Poole) 246; halls (Belfast, McArthur) 544 (Derry, St. Columb) 33 (Esher) 612 (Kenyon Peel, Tyldesley) 12 (North Leith, ch.) 754 (Simonstone) 170 (Somerville, Oxford) 396; hospital (Gateshead, children's) 862; hotels (Barnstaple, temperance) 612 (Bond-st., Long's) 360 (Bradford, Royal) 432; houses (Bexhill) 972 (Bromley, Kent) 931 (Great Chalfield, manor) 282 (Grosvenor-sq) 684 (Heaton, Bradford) 896 (Highland-gardens, St. Leonard's-on-Sea) 54 (Holme Wood, Ipswich) 972 (Mottingham) 737 (Mount, Westerham) 246 (Oakfield, Chester) 134 (St Catherine's, Broxbourne) 754 (South Wraxhall, manor) 282 (Stanyard-hill, Chobham) 432 (Sundridge-park) 855 (Totland Bay) 824; infirmary (Liverpool, royal) 12; institutes (Imperial—T. E. Collcutt's selected) 4, 5 (R. Anderson's) 90 (A. W. Blomfield's) 90 (Deane and Son's) 90 (T. G. Jackson's) 90 (Webb and Bell's) 90 (Walsall, science and art) 170; lodges (Byrkley, Staffs) 578 (Flete) 506 (Stonelands) 792; mansion (West Kensington, Portland) 578; memorial (Wouldhave, South Shields) 862; mission room (Maidstone) 578; offices (Ipswich, publishing) 208; parish buildings (Oxford, St. Giles) 684; Piccadilly-circus (proposed buildings on) 392; porches, church (Christchurch, Hants) 896 (Ipswich, St. Margaret) 282; post-offices (Bradford) 468 (Knutsford) 132; public-houses, village, 170, 187; schools (Heaton chapel, St. Paul) 263 (Manningham, Congl.) 862 (Newton-le-Willows, Aysgarth) 322; stabling (Drayton-mews, S.W.) 648 (Leopardstown-park Paddocks) 824 (sanitary) 419 (Woods-mews, W.) 468; staircases (iron) 506 (Venice, S. Paternian) 896; stone beam (Lincoln cathedral) 674; taverns (Kennington, Horns) 282 (Shaftesbury-avenue, Cock) 648; theatres (model exit for) 706 (Nottingham) 642; towers (Coutances cathl.) 159 (Lostwithiel, ch.) 111 (Wrexham, St. Giles) 824; ventilation of sewer, 155; vicarages, 358, 360 (Stamford-hill, St. John) 720; villas (club designs) 972, 989 (Mentone, S. J. Newman's design) 754 (Westcombe-park) 506; warehouses (co-operative, Whitechapel) 648
Plas Mawr, Conway, as restored, 544
Plymouth, screen gate, St. Peter's church, 246
Poole free library, 246
Poppy heads, Truro cathl., 934
Porches: Christchurch, Hants, 896; Dinan (ch. and school) 792; St. Margaret's ch., Ipswich, 282
Porphyry quarries, map of Egyptian, 430
Portable shingle house, American, 90
Portland mansion, West Kensington, 578
Post-offices: Bradford, 468; Knutsford, 132
Premier buildings, Islington, 648
Premises: Enderby (co-op.) 701; Strand, 396; Streatham, High-st., 413; Whitechapel (co-op.) 648
Press, altar frontal, Truro cathl., 934
Prodigal, a young, 12
Proposed buildings on Piccadilly-circus, 392
Public house, club designs for, 170, 187
Publishing offices, Ipswich, 208
Pulpits: All Hallows, Barking, 824; Grado duomo, 152

QUADRANGLE, new, Trin. coll., Oxford, 12
Quarries, Egyptian porphyry, map of, 430
Queen Hatasu's chair, 955

RADFORD board schools, Nottingham, 468
Raleigh house, Brixton, 339, 341
Rame church, bench ends at, 824
Reading, Jubilee memorial fountain, 71
Recess, seat for, 208
Release of Barabbas, by Tinworth, 648
Renaissance carved oak work, 12
Repose in Egypt, by Carl Müller, 396
Reredoses: (for St. George's, Jesmond) at Newcastle exhibition, 322; Long Melford, 612
Residences: riverside, Maidenhead, 322; villa, club designs, 972, 989; Westcombe-park, 360
Restoration of: Newcastle cathedral choir, 720; Plas Mawr, Conway, 544
Richardson's (T. M., senr.) Newcastle-on-Tyne, 720
Rogerstone church, Mon., 170
Roof: aisle, Axbridge church, 151; trusses (Bollman and Fink) 847 (strains) 885 (unequally loaded) 275, 276, 277
Room: ceiling of old at Yarmouth, 970; dining, Dinorben court, 684
Rouen, organ-loft staircase, St. Maclou, 468
Royal Academy: pictures, 12, 170, 322, 432; sculpture, 12, 246
Rufford hall, proposed staircase, 544

SAINT, the shadow of the, 322
St.: Anastasia (Zara) 125; Anne and the Virgin (by Müller) 208; Bartholomew (Lostwithiel) 111 (Smithfield) 824; Catherine (estate, Broxbourne, houses on) 754 (house, Bromley, Kent) 931; Charles (Bullingham, home) 330; Cement (Sandwich) 113; Columb (Derry, hall) 33; Donato (Zara) 125; Fermo (Verona, Torriano tomb in) 684; Francesco (Bologna, door) 913 (Zara, stalls) 124; Giles (Oxford, parish buildings) 684 (Wrexham, tower) 824; John Baptist (Claines) 54, 282; John (Devizes) 322 (South Bank, Middlesbrough) 578 (Stamford-hill) 720; Joseph and Infant Christ (by Müller) 208; Leonard's-on-Sea (Highlands-gardens, houses) 54; Maclou (Rouen) 468; Margaret (Ipswich) 282; Maria Maggiore (Bergamo) 913; Mary (Banbury) 792 (Leake, Notts) 432 (le-Strand) 506 (Woodhill, Hatfield) 282; Mary Magdalene (Munster-sq., lectern) 246; Michel (Florence) 896 (Mont de, sketches at) 578; Nicholas (Newcastle) 720, 754; Olave (Hart-st., E.C.) 824; Paternian (Venice) 896; Paul (Heaton chapel schools) 263 (Maidstone, mission) 578; Peter (Plymouth, gate screen) 246 (Port, Guernsey, woodwork) 824; Sauveur (Dinan) 792
Sale-room sketches, 88, 130, 168, 862
Salisbury cathedral: altar candlesticks, 246; Bp. Bridport's monument, 896
Sanctuary, standard, 246
Sandford church, Devon, bench ends at, 824
Sandwich, St. Clement's church, 113
Sanitary stabling, 419
Sarcophagus, Arles museum, 970
Scala Minetti, Venice, 896
Scarborough, Constitutional club, 648
Schools: Bradford, Woodroyd (bd.) 878; Dinan (porch of) 792; Heaton Chapel (St. Paul) 263; London board, two, 54; Newton-le-Willows (Aysgarth) 322; Nottingham (bd.) 468
Science and art institute, Walsall, 170
Screen: carved, 208; Lincoln cathedral, arcading on, 789; wrought iron gate, St. Peter's, Plymouth, 246
Sculpture at the Academy, 12, 246
Seat for recess, 208
Sebenico, carved doorway at, 125
Sectional system of house drainage, Buchan's, 53
Sections: breakwaters, floating, 312; cathedral (F. Whitwell's design) 612; chapel (Hinton abbey) 322; churches (Birtley) 485 (Cannington, All SS.) 792, 862 (Christchurch, Hants, porch) 896 (Ipswich, St. Margaret, porch) 282; cricket pavilion, 377; drainage, house, 743; drain traps, 565; drawing instrument (new) 647; fountain (Reading, Jubilee) 71; grate, improved Manchester, 969; institute, Imperial, designs (selected, T. E. Collcutt's) 132, 170 (Webb and Bell's) 132; masonry, 643, 751, 858; memorial (Wouldhave, South Shields) 862; public houses, village, 170, 187; settle, 785; sewer ventilation, 52, 53, 193; staircases, iron, 506; stonebreaker, Lowry's, 821; villas, club designs, 972, 989
Selections from the: Academy pictures, 12, 170, 322, 432; Grosvenor do., 170, 322; water-colour institute do., 322
Self-setting bench plane, 393
Settle from Gainsborough old hall, 785
Seville cathedral, interior of, 360
Sewer: ventilation, 52, 53, 155; ventilators, nuisance from, 193, 231
Shadow of the Saint, 322
Shaftesbury-avenue, Cock Tavern, 648
Sheet of brick gables, a, 792
Shelves, hanging 771
Shingle house, American portable, 90
Shorland's improved Manchester grate, 969
Sideboard for a house at Hampstead, 208
Silversmith's work, sketches of, 754
Simonstone hall, 170
Singer, art metal work by, 246
Sketches: at Mont St. Michel, 578; at the home arts exhibition, 208; sale-room, 88, 130, 168, 862
Smithfield, founder's tomb, St. Bartholomew's, 824
Somerville hall, Oxford, 396
South: Bank, Middlesbrough, St. John's ch., 578; Shields, Wouldhave memorial, 862; Wraxhall manor house, 246, 282
South Kensington: Drayton-mews, 648; Imperial Institute designs (selected, T. E. Collcutt's) 4, 5, 12, 132, 170 (Dr. Anderson's) 90 (A. W. Blomfield's) 90 (Deane and Son's) 90 (T. G. Jackson's) 90 (Webb and Bell's) 90, 132
Spandrel carvings: Glasgow municipal buildings, 432; Vienna art museum, 720
Spire, Lostwithiel church, 111
Spires and towers, stability of, 159
Stability of: arch, 995; towers and spires, 159
Stabling: Drayton-mews, S.W., 648; Leopardstown-park, 824; sanitary, 419; Wood's-mews, Park-lane, 468
Staff, pastoral, at Zara cathedral, 432
Staircases: Gosforth house, 246; iron, details of, 506; organ loft, S. Maclou, Rouen, 468; Rufford hall, 544; S. Paternian, Venice, 896
Stalls: St. Francesco, Zara, 124; St Maria Maggiore, Bergamo, 913; St. Peter Port, Guernsey, 824
Stamford-hill, St. John's church and vicarage, 720
Standard, sanctuary, 246
Stanyard-hill, Chobham, house at, 432
Statues: Gen. Gordon, Trafalgar-sq., 246; Louvre, from the (Hercules and Telephus, Nero and Trajan) 360; spandrel figures (Glasgow municipal bldgs) 432 (Vienna art museum) 720
Steeple Ashton church, 506
Stockport, St. Paul's schools, Heaton chapel, 263
Stonebreaker, Lowry's gyratory, 821
Stone-cutting and masonry, 643, 751, 858
Stone: beam, Lincoln cathedral, 674; wrongly bedded, 154
Stool, Moorish inlaid, 88
Strains: girder, 346; on roofs, 275, 276, 277; in truss, 885, 995
Strand: business premises in, 396; St. Mary's church, 506
Stratford-on-Avon, fountain and clock-tower, 612
Stratton, Hants, new church, 208
Streatham High-street, new premises, 413
Street at Mont St. Michel, 578
Studentship drawings, "B. N." travelling, 684
Study of a head, by Henrietta Montalba, 246
Subsoil drainage at Canning-town, 954
Suburban residences, club designs, 972, 989
Sunderland harbour, 85
Sundridge-park, Kent, house in, 855
Swatman tomb, Kinnersley ch., 970

TABLE: lamps, electric light, 246; tops, mouldings of, 646
Tables: dressing, 225; fire screen, 468; writing, 130, 771
Taverns: Kennington (Horns) 282; Shaftesbury-avenue (Cock) 648
Tazza, Henri II., 54
Temperance hotel, Barnstaple, 612
Terra-cotta: panels, by Tinworth (Christ before Herod) 208 (Release of Barabbas) 648; study of head, by H. Montalba, 246
Theatre: model exit plan, 706; Nottingham (plan) 632
Three old Lancashire mansions, 970
Throne, bishop's, Truro cathedral, 934
Tiles, wall, from churches, 506
Tinworth's terracotta panels: Christ before Herod, 208; Release of Barabbas 648
Tobacco factory, Wills', Bedminster, 824
Tolomeus, initial letters by, 360
Tomb: founder's, St. Bartholomew's, Smithfield, 824; of the Torriani, Verona, 684; Swatman, Kinnersley ch., 970
Torriani tomb, Verona, 684
Totland Bay, I.W., house at, 824
Towel horse, 225
Towers: and spires, stability of, 159; Coutances cathedral, 159; Halberstadt (Liebfrauen Kirche) 934; Lostwithiel ch., 111; Stratford-on-Avon (clock) 612; Wrexham church, 824; hall, Compiègne, 754
Town house, a (F. E. Littler's design) 546
Trafalgar-square, Gen. Gordon's statue, 246
Trajan, statue of, in the Louvre, 360
Traps, drain, 565
Travelling studentship drawings, "B. N.," 684
Triangle, the, Streatham High-st., 413
Trick, an ancient, 12
Trinity college, Oxford, new quadrangle, 12
Tropics, chapel for the, S. J. Newman's design, 754
Truro cathedral, bishop's throne, 934
Trusses, roof: Fink and Bollman, 847; strains in, 885, 995; unequally loaded, 275, 276, 277
Tyldesley, Kenyon Peel hall, near, 12
Tympanum, Prior's entrance, Ely cathl., 639
Tynemouth harbour, 85

UNEQUALLY loaded roof trusses, 275, 276, 277
Upper: Grosvenor-street, entrance and loggia, 432; Norwood, Woodland-road bd. school, 54

VALARESSO, staff of archbishop, at Zara, 432
Valoynes, incised floral cross in library, 970
Venice, Scala Minetti, S. Paternian, 896
Ventilation, sewer, 52, 53, 155
Ventilators: Boyle's "C. C.," 243; Buchan's improved, 750; sewer, nuisance from, 193, 231
Verona, tomb of the Torriani, 684
Vicarage: Stamford-hill (St. John) 720; club designs, 358, 360
Vienna, spandrel figures at art museum, 720
Village: hall, Esher, 612; public house, club designs, 170
Villas: club designs, 972, 989; Mentone (S. J. Newman's design) 754; Westcombe-park, 506
Virgin and St. Anne, Müller's, 208
Volunteers' drill-hall, Ardwick-green, 841

WALL tiles, 506
Walsall, science and art institute, 170
Walton Well, Oxford, fountain at, 896
Wandsworth manor house, 595
Wardrobe, 225
Warehouses: co-operative (Whitechapel) 648; iron doors for, 424, 425
Wash-stand, 225
Water: colour institute, pictures at, 322; works in, 312, 570, 782
Wave basins: Aberdeen, 84; Sunderland and Tynemouth, 85
Westcombe-park, houses at, 360, 506
Westerham, the Mount, 246
West Kensington: Congregl. church, 754; Portland mansion, 578
Whitechapel, co-operative warehouses, 648
Wills' premises, Bedminster, Bristol, 824
Wilmslow, Handforth hall, 970
Wiltshire excursion, archi. assocn., 246, 282, 322, 506
Window: designed for Newcastle cathedral (E. Frampton) 754; Eastwood ch., 862
Wine cooler, Chippendale, 168
Wiveliscombe, new club, 896
Woodhill, Hatfield, St. Mary's ch., 282
Woodland-road bd. school, Norwood, 54
Woodroyd bd. school, Bradford, 878
Wood's-mews, Park-lane, W., 468
Woodwork, St. Peter Port, Guernsey, 824
Worcester, Claines church, near, 54, 282
Work, half-timbered, 419
Works in water, 312, 570, 782
Wouldhave memorial, South Shields, 862
Wraxhall, South, manor, 246, 282
Wrexham church, tower of, 824
Writing tables, 130, 771

YARMOUTH, ceiling in house on South Quay, 970
Young prodigal, by G. A. Storey, 12

ZARA: choir stalls, St. Francesco, 124; pastoral staff at cathedral, 432; plans of cathedral and St. Donato, 125
Zodiac, an Irish, 639





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THE BUILDING NEWS

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MODERN BUILDING SITES.

[F a building often makes a site, it is equally true that a site often rules the plan nd appearance of a building. When build-ng-land in the great cities reaches such abulous prices as it often does, architects ıave little choice left them in the deter-nination of the kind of structure which hould be put on the land. Whereas, for-nerly, important buildings could be placed n areas of any size, independent of any estrictions, it is now obvious that the shape nd surroundings of the site have to be tudied to the best advantage. We have nstances of these conditions in several parts f London that have been recently built ıpon. The influence of site has been very orcibly shown in the large hotels and club-ıouses erected in the Northumberland-ıvenue. By the convergence of that ıvenue with Whitehall-place, we have three riangular or trapezoidal-shaped plots which ıave called for an architectural arrange-nent quite or almost unknown to the archi-ects of a former era. The Hôtel Métropole ıas a particularly acute and unpleasing-ooking corner towards the Embankment, ınd the same difficulty has been encountered, ut far more successfully, by the tower termination of the National Liberal Club-house at the adjoining corner. The Con-stitutional Club-house stands on a triangular-shaped site, and here, also, the architect, Mr. R. W. Edis, F.S.A., has successfully grappled with the eastern angle. Opposite, the Hotel Victoria is fitted to a plot of ground that re-quired considerable ingenuity in the planning, though the frontage was plain sailing. More mportant, as it regards architectural arrange-ment, is the site in the rear of the National Gallery, for which a plan has been sug-gested by the Royal Institute of British Architects. As our Metropolitan readers are ıware, at present the street improvements at the back of the Gallery have created a very awkward plot of ground. The new thorough-fare is abruptly terminated in view of the rearward portion of the gallery, which is any-thing but agreeable, and, as we have pointed out, cuts very disagreeably the outline of St. Martin's Church. The remaining portion of site at the back of the gallery can only be usefully applied to the extension of that building. Then the irregular plots of land between the Charing Cross-road and St. Martin's-lane present formidable problems to the architect. The same perversity of cir-cumstances is to be found in the newly left sites on the east of Piccadilly-circus (where the London Pavilion has been built on a triangular plot made by the new Shaftesbury-avenue) and at the northern end of that new road where it enters Oxford-street. The properties are cut obliquely, leaving some intractable and unmanageable plots for dealing with.

One feature has arisen from the modern irregular or triangular site—it is the treat-ment of corners. So long as the plots were rectangular, or large building areas were to be obtained, the corner never obtruded itself; now it is a very common feature, and can no longer be disregarded; an acute corner cannot be architecturally managed like a square corner. To cut or cant it off, or round it, is unsatisfactory, so that the architect is obliged to emphasise it in some manner, either by a tower or turret. In the United States the corner tower, often circular, finished by a conical roof, is a common feature; we see it growing as it were out of the roof, where it presents a problem of interpenetration of the cylindrical or conical and inclined roof surfaces, though there it is less the offspring of neces-sity, the right-angled plan of arrange-ment being common in American towns. The hexagonal tower, or the circular oriel projecting beyond the walls, is also applied to obviate the unpleasant effect of sharp angles. The sharpness of the receding lines of the frontages which have an acute angle has never favoured monumental effects. For purely Classic structures the corner is fatal, though in the freer treatment of the style it admits of satisfactory management. The angle tower to Mr. Waterhouse's club-house in the Northumberland-avenue is at once a redeeming feature, and is a good example of the only artistic mode of finish open to the architect. A want of balance is generally one of the disadvantages of empha-sising the end of a building in a Classic design.

There is another peculiarity which distin-guishes the contracted site. It is the "draw-ing up" of the building. The necessity for utilising the area demands additional stories and increased elevation. By multiplying the stories, the architect loses that breadth of base required to give dignity to a design. The hori-zontal division and repetition of floors are among the bugbears of city architects. How they can obtain variety in fenestration and suf-ficiency of light are important questions. We can refer to several corner buildings in which superposition has taxed the designer's re-sources severely. Near St. Clement Danes, on the west side of the Courts of Justice, is a new brick and stone block of offices which has been carried up under these trying con-ditions; but owing to the projection of the building beyond the line of the Courts, the architect has obtained a lofty corner elevation gabled, which can be seen up Fleet-street for a considerable distance. There are other negative qualities which detract from the architecture of contracted areas. One of these is the want of play in the outline of plan. The façades have to be brought close to the boundaries, leaving little opportunity for projections and recessed parts. A break forward here and there gives the architect scope for breadth of light and shadow; without them his only resource is treatment by relief and colour. Balance also is impossible when the elevation is flat and narrow, even skyline can only be purchased by costly roofing, dormers, and features on the outer plane of the façade. One can hardly conceive the architect under worse conditions than that of having to design a building for a corner site jammed between two adjacent properties, and without means for lighting the two inner sides except it be one with two fronts meet-ing at an acute angle; the latter is certainly the more discouraging of these difficult problems.

The prices now realised for building sites in the City are alone almost prohibitive of good architecture. The other day a site in St. Swithin's-lane was offered for letting on building lease by Messrs. Debenham, Tewson, Farmer, and Co., which contained an area of 2,036ft., and a frontage to St. Swithin's-lane of 63ft. 7in., and another in Salters' Hall Court in the rear. The term for letting was for eighty years. The price realised represented a rental of 11s. per square foot. In the heart of the City land has been sold for £20 to £30 per superficial foot. Where ground-rents are so enormous, sites for building become more and more pinched, and the cost of erection adds to an expenditure which, in many cases, is a severe tax on the lessee, if his profits or incoming rent are indeed sufficient to meet the "outgoings." The site, therefore, has fettered the architect, and will, it is probable, still more call into requisition his inventive powers in the future, to meet the varied demands of the law and the requirements of employers. Contrivance of plan under other restrictions, as, for example, the legal deci-sion that makes it possible for a corner house to be in two streets, and the obstruction of light, is enough certainly to require the exercise of no small amount of skill and patience. In-stead of adapting the site to the building, we have now to adapt the building to the site. Developing a plan is now only an exceptional possibility, and happy is the architect who has an unrestricted area to work upon, un-confined by adjacent buildings and streets, who can without hindrance extend his façades in any direction he pleases, place his entrances in convenient positions, and throw out wings laterally or rearward without interfering with his foreground and quadrangles. There are many new City sites which scarcely give room enough to the spectator to obtain a view of the building. In Fetter-lane one has to look at Messrs. Sampson Low and Marston's new premises near the Record Office from an opposite court, and we could mention other instances of new buildings erected in positions which require a considerable turn of the neck to examine. The usual angle they subtend is too great for a convenient view, and they may be compared to large pictures in rooms which

do not offer for their inspection any fair point of sight. Architecture under such circumstances is all but thrown away in thoroughfares which offer very small chance of ever being widened.

MARBLE AND MARBLE WORKERS.—X.

By ARTHUR LEE.

AMERICAN MARBLES.

AT North Adams, Massachussetts, there is a quarry of white marble, coarsely crystalline. Blocks were formerly produced from this quarry; but it is now almost entirely worked for stone, which is ground up and sold for marble dust.

Further south, at Lee, extensive quarrying operations are carried on. From the quarries in this neighbourhood the material was supplied for the extension of the Capitol at Washington, and the City Hall at Philadelphia. In the building of the latter, 702,000 cubic feet were used, some of the blocks being of very large size, and weighing singly over 20 tons.

The town of Sheffield formerly produced a white marble which at one time enjoyed considerable reputation in consequence of the very large size of the blocks in which it could be obtained. The large columns of the Girard College, Philadelphia, are of this marble, which with great labour was carted across the hills to the Hudson river, whence it was shipped to Philadelphia. The quarries have not been worked for some time.

Abandoned workings are also to be found at Canaan and Marbledale. At Marbledale, the first sawmill erected in the States was built by Philo Tomlinson, about the year 1800. He used soft iron toothless saws stretched on a frame forming a gang. The gangs were driven by water-power, and the saws were fed with sand and water equally distributed by an automatic arrangement, for which a patent was granted to him. For many years the business was prosperous. In 1830 as many as fifteen quarries were actively worked, and a like number or more mills were in operation within a distance of three miles of the town. When, however, the Vermont marble came into the field with a better quality at a lower cost of production, the marble trade of Marbledale was doomed, and the workings were ultimately stopped. East Canaan furnished the marble for the new State House at Hartford. This marble is fairly white; but the quality is uncertain. It is not suitable for monumental purposes, but has been much used for building. At the sawmills which were erected at this place the saws were toothed with diamonds. The carbons were set in pieces of steel or iron, and these patches were brazed into the blade of the saw. It is stated that they were wonderfully effective, sawing the blocks of marble very rapidly.

At Dover, in New York State, quarries of white marble have been extensively worked. Dover marble is of fairly fine grain, but it does not take a high polish. Two coloured marbles are raised near Chazy and Plattsburg in Clinton county. They are known as "Lepanto" and "Frency grey." The former is composed of pink and red fossilised shells in a reddish ground. The latter is of similar character, but with a darker ground. Both these marbles have been much used for furniture and interior decoration.

The white marbles of Maryland will not compare in point of quality with those of Vermont, but considerable quantities are raised and used for building purposes. The principal quarries are situated near Cockeysville and Tescar in Baltimore county. A very large trade in marble is done at Baltimore, not only in the Maryland marbles, but also in that which is imported from other states and from Italy. Some of the finest buildings in the country are constructed of Maryland stone. The Washington monument and the platform and columns of the National Capitol are made of the white marble, and the Baltimore City Hall is built of it. This stone is very sound and compact in texture. It is capable of being quarried in very large sizes: blocks 28ft. by 10ft. by 3ft. have been raised.

At Point of Rocks there is a deposit of a very fina breccia known as "Calico" marble. It has been used in the construction of the columns of the old Hall of Representatives at the Capitol building in Washington.

Near Dublin, in Harford County, there are quarries of green serpentine, which have been largely developed during the last few years; and, in Frederick county, a marble very similar to Verd antique is exclusively worked.

The marble and granite quarries of Maryland employ about 850 men. The quarries are not so carefully worked as in Vermont. In some of them the drilling is done by machinery; but the principal part of the work is got through by manual labour. In the quarries near Baltimore, Italian and Negro labour is being introduced. The quarry hands work about nine months in the year. A foreman who superintends the drilling receives from 8s. to 10s. per day; drill hands, 6s.; labourers and teamsters, 5s.; coloured labourers can be obtained for about 4s. The town of Baltimore supplies most of the monumental work done in the State. The marble-cutters there work principally on imported Italian marble. The best of them receive from 10s. to 12s. per day. Expert carvers get 16s. Letter-cutters are mostly paid by the piece, the price being in accordance with the style of work. A good man can earn about 12s. per day. Rubbers and polishers get from 6s. to 8s. per day. The men work ten hours in summer, and from eight to nine hours in winter. Men engaged to set the stone on buildings get 13s. per day. This is the Union price. Most of the stone used in house building in Maryland is either cut in Baltimore and sent from there ready worked, or is cut on the building site by Baltimore hands.

Alabama possesses an excellent white marble known as "Talladega." There are also quarries in this State which produce a grey and white non-crystalline variety, and several variegated marbles.

At Marietta, in Pinches County, North-East Georgia, there are some extensive works which have been formed to operate upon the marble which is raised in that district. This country will be opened up by the construction of the Marietta and North Georgia Railway. The deposits of marble are of large extent. In one valley there is a solid mass 5,000ft. in length, and over 2,000ft. in width, and the beds are found to spread over a space of some 7,000 acres. The quarries now in work are four in number. The Kennesaw quarry produces a limited quantity of a pure white marble, but the bulk is of light ground slightly clouded with spots and dark veins, and is similar in appearance to Italian vein. The Creole quarry produces a marble with light ground and a finely-mottled surface, and another with a light blue and grey ground, and darker veins. The Cherokee quarry produces marble of a similar character, but the markings are rather less decided. The Etowah quarry produced a great variety of coloured marbles, pink, red, and dark green, and variegated in many shades of these colours. Georgia marble is said to be very sound, highly crystalline, and dense, and to be non-absorbent in a degree which few marbles can equal. This last quality is one which should make it very useful, if the cost of working is not too high. The marble can be obtained in large sizes, blocks weighing upwards of 25 tons having been raised.

Hawkins County, in Tennessee, produces a marble which varies in colour from light pink mottled with white through all shades to deep chocolate red. It is very close and compact in texture, with almost absolute freedom from flaws. It has been employed in the Capitol building at Washington, and is much in request for general decorative work.

A very fine fossil marble is found in the beds of Devonian limestone near Charles City, Iowa. The rock is hard and fairly sound; it is non-crystalline, and is full of fossil shells and corals. The colours are somewhat dull; they vary from light drab to dark brown. The surface takes a good polish and shows to advantage the fossil remains, sometimes 8in. and 10in. in diameter, which are imbedded in the matrix.

In Illinois, a stone known as "Lemonte marble" is extensively quarried; this has been largely used in the building of Chicago. Kansas possesses some very good black marbles, and one of a light cream colour, which is soft and easily worked.

In Swain County, North Carolina, near the junction of the two branches of the Western North Carolina Railroad, there is an extensive deposit of coloured marbles. Some of them are green, blue, and pink, some black and white; they are all capable of taking a high polish, and are very sound. These marbles have been lately used in the construction of the new Governor's house at Raleigh, N.C.

In the Rocky Mountains and all through the Pacific States marble is found in large quantities. In Colorado there are deposits of white, green, and clouded marbles, and of a very fine brecciated variety. California is especially well favoured in this respect. Nine miles north of Ione, in Amador County, there are quarries of white marble, which make an excellent building stone. In Calaveras County there is a deposit of a pearl-grey marble with dark markings, which takes a high polish. Near Newcastle, in Placer County, there is a large quarry of marble, which varies from pure white to grey, and which polishes well; the Folsom prison is entirely built with this stone. The quarry was opened in 1877, and has been extensively worked. A very beautiful mottled grey marble has been lately found near Eureka, in Humboldt County. In Tuolumne County there are also very extensive deposits; most of it is of an unclouded white, fine grained, and extremely hard. Near Suisun there is a singular stone, which in its rough state looks very much like rosin; it occurs in large masses, from which blocks of enormous size have been cut. On the McCloud river there is a white statuary marble; it appears to be of fairly good quality, but very little of it has been hitherto worked.

The Inyo marbles are found in the range of mountains of that name. They are dolomite marbles, and vary in colour from pure white through all shades of rose-red, grey, brown, and green to nearly black. They have been selected as the building material of the Sharon Gate, at Golden Gate Park, San Francisco. A very fine, brecciated, yellow marble is found at Tchachipi, in Kern County, and a species of onyx marble is found near a mineral spring six miles above Kernville. In Monteroy County, near Carmelo Bay, there are deposits of white marble, to work which the Pacific Carrara Marble Company was incorporated some years ago. Nevada produces a dark-grey veined marble, which is found at Bear Creek, three miles from Colfax; and the same district produces a very compact black marble, veined with white, which is found close to the Central Pacific Railway, about a mile from Colfax. Santa Cruz County produces a dark fossil marble, which is quarried about seven miles north-east of the town of Santa Cruz.

The Californian quarries also yield hand-

some specimens of Cipolino marble, white with shadings and streaks of green, and a marble very similar to the black-and-gold of Italy. There is also raised a variety known as "Ruin" marble. This is a yellowish stone, with broken lines supposed to resemble the ruins of fortifications.

It is somewhat singular that with such a profusion of excellent marble throughout the State, the Californian demand, which is always heavy, is principally met by importations from Italy. It is a testimony to the sterling worth of the Italian marbles which speaks volumes.

In the matter of literature the marble and granite trades of the United States are well cared for. There are two trade journals devoted to their interests. The *Reporter* is published monthly in Chicago. It is conducted with a considerable amount of ability. It is representative principally of the master marble workers and dealers. Another paper is known as the *Granite Cutters' Journal*. This more especially takes up the representation of the operatives who are engaged in the trade. Like the *Reporter*, it is a monthly publication. It emanates from Philadelphia.

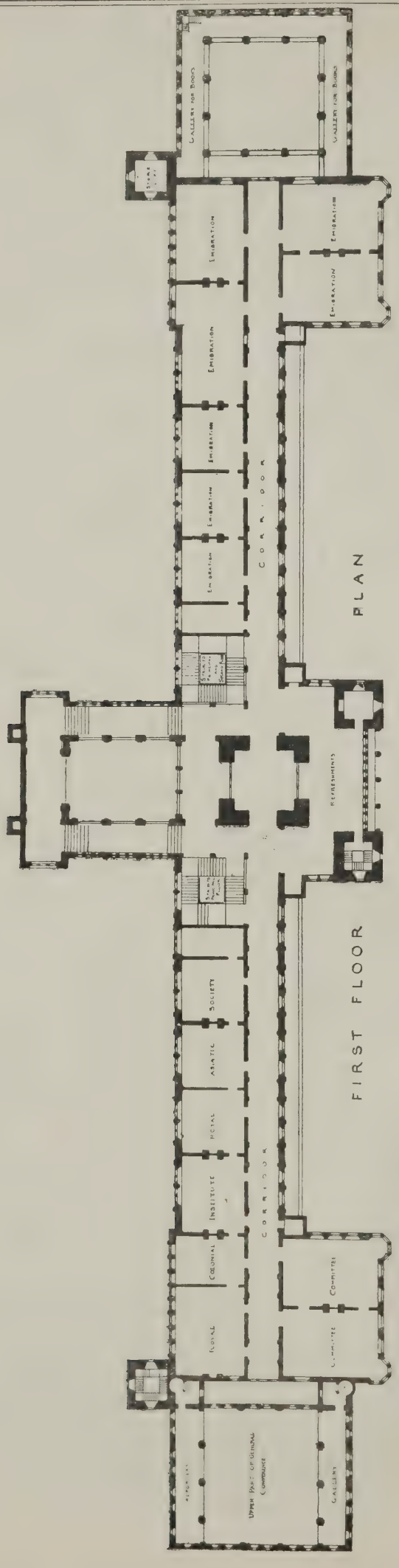
THE IMPERIAL INSTITUTE.

A CLOSER and more critical examination of the designs for this building than we were enabled to give in our general description of them last week has enabled us to confirm some of our first impressions, and point to other features in them with a view of arriving at a general estimation of their merits. The design which the judges have placed first, by Mr. T. E. Collcutt, and of which we give the principal plans and perspective, has a very excellent arrangement as a whole, and, what is of importance, one admitting of easy extension in the galleries to be set apart for occasional exhibitions in connection with the Colonial Institute; and here we must say that only one of the other competitors has taken this primary object of the institution into the consideration it deserves. The museum or the gallery is essential, and its development ought to be regarded as fundamental. Let us see how this plan complies with the requirements. The printed instructions to architects, which we published on Feb. 25 this year, have been studied in more or less completeness. The programme of the requirements there laid down may be broadly subdivided as under:—(1) The public department, comprising the entrance hall, reception hall, the library and reading rooms; (2) the secretarial and general business department, containing the emigration offices; (3) the Colonial Institute accommodation, with the conference rooms and committee rooms attached; (4) the exhibition department, or the permanent and occasional galleries for the display of exhibits. These four divisions of the plan naturally suggested a general distribution of the buildings upon the site set apart for them at South Kensington, between Exhibition-road and Queen's Gate, a new approach or roadway being formed between these thoroughfares, parallel with the Natural History Museum, and on the site of the main gallery of the old Colonial Exhibition, given to the art products of India. The first-named subdivision, that devoted to the public entrance and reception hall, is placed as an axial block in the centre of the oblong site, the secretarial and business offices, retiring rooms, and industrial and general reading rooms left and right in the front block, while a parallel range behind, separated by open courts, is devoted to the galleries. At the west end of front range is a square conference room, 54ft. by 45ft., with two others, and at the corresponding east end the library and reading rooms. A front corridor gives access to the secretarial and other rooms. So much for the principal floor. On the upper floor, the front range contains in the left wing the Colonial Institute and Royal Asiatic Societies' rooms, approached by a similar corridor, with committee rooms in projecting wings. In the right-hand side we have the emigration department, with access to galleries over conference room and over libraries at the ends. The second floor plan includes the sample rooms and laboratories in projecting wings, a position which appears open to question. The separate public entrances to galleries at the extreme ends of front range on ground floor are well placed; the ground floor also comprises the stores, the dynamo, and hydraulic machinery below the reception hall. The general distribution of the galleries and front range, which run in parallel lines east and west, with the return end blocks, forming four quadrangles of elongated shape, giving an arrangement that leaves ample space between the north gallery and the existing buildings of the Royal Albert Hall and conservatory, and is undoubtedly the best economically. The grand entrance hall, with square base of tower, projects in the centre; behind it is the staircase, leading through an octagonal ante-room into the reception hall in the rear, thus forming a connected and *en suite* arrangement. The latter hall is 128ft. by 60ft., and has an apsidal end, with retiring rooms at the sides. A row of columns on each side of hall divide it into side aisles and a central avenue.

Mr. Collcutt has chosen a style of which he is an acknowledged master—a phase of Renaissance in which English details have been combined with Flemish characteristics. The front façade shows a centre and wing gable projections, each flanked by octagon turrets surmounted by cupolas, the intermediate and recessed parts having gabled dormers breaking a high roof. A prominent feature is a lofty, square tower, rising from the entrance hall, plainly treated, and broken only by vertical ribs, surmounted by a circular cupola. The latter is the least satisfactory portion, and in the angular view would look weak. Two other smaller square towers rise from staircases at the inner angles of quadrangles. The exquisitely-drawn elevation and perspective show some fine detail and frieze sculpture in relief. The most effective feature is an external arcade along the ground story with wide piers relieved by sculpture; large scale details illustrate these features and the gables. On the whole, the front is rather over-divided by small features and detail to the sacrifice of breadth, though each bay and gable by itself contains much to approve, and the delicacy of the drawing commands admiration. Looking at the details of plan we find several effective points, such as the ante-room connection between the cortile and reception hall; the latter is well-lighted and has a clerestory; the ante-room forms a centre or rallying point of the galleries, which extend from it east and west, while beyond the reception hall is another domical hall in connection with the northward low range of galleries. The decorative treatment of the reception hall is shown by the section; perhaps the proportion of the hall is a little high for its length. At the end of the galleries are staircases, and the return blocks are set apart for refreshments and retiring-room. Of course, there are points in the plan that will admit of modification to suit the requirements; the library, for instance, could be placed in a more central position than at one end of the front block, and the reading rooms also; but the author has hit upon a plan that is capable of development and of being made suitable for the purpose, and without expensive features. A little alteration, too, might be made at the east end of the first range; the library walls are perfectly plain, divided by pilaster strips, and scarcely join agreeably with the more elaborate front. Something could be done also to obviate the unsightly protruding corridor at the end on corbels over the library; the excrescence may be taken for something else, and looks hardly a dignified arrangement at this end, which will be fully exposed to view.

We next come to the design of Messrs. T. N. Deane and Son. There is much ability displayed in the plan and architecture, which is of a far more magnificent type than the authorities are disposed to adopt. The design is worthy of an Imperial Institute, and, indeed, might have been selected had the plan been a little more workable and the cost within reason. Messrs. Deane and Son have, at any rate, produced what we may call an "Academy design," imitating all the picturesque qualities of Blenheim with the magnificence of St. Paul's. As a Classical composition, it stands far above any other attempt, but it is rather too high-flown even for an Imperial Institute. It is more of a "poem in stone," or, as one visitor we heard remark, it is "all architecture and very little building." Like Blenheim, there are advancing loggias from the central block, uniting the portico and central block to the wings. These loggias are quadrants in plan, and at each angle of the projecting wings and flanking the portico are towers in pairs, crowned by cupolas, making in all eight towers in front, in addition to the great dome which rises above the central hall of the main building. There is some fine planning in the great hall; angle recesses or niches are formed for statues, and there is a statue of the Queen in the centre. From this central hall, approaches are made to the assembly hall on the left with apsidal end, and on the right hand to a conference hall, forming corresponding wings. The stairs and intelligence rooms are at the corners of hall; in front are the secretarial rooms, lighted by areas; the advancing quadrantal and returning wings on left provide for the emigration offices, those on the right for the Asiatic and Colonial Institute, each with distinct corridor. The main central wings right and left of the central hall are devoted to the conference room and assembly hall, with permanent museums on the ground-floor level, and these wings are emphasised as separate buildings seen above the front loggias. Behind the central hall is the library, with the reading rooms on each side, while in the rear, upon the same axis as the central hall and library, is a vast amphitheatre of elongated shape, with semicircular ends united to the return wings. The elevation towards the gardens is two stories with quadrant ends round the amphitheatre. The ground-floor level contains the museum for manufactures of the United Kingdom on the left and that for Colonies on the right. The great outer dome is proposed to be constructed upon an inner cone, like that of St. Paul's, with a lower decorative dome. The authors send details and coloured decorations to the hall. The perspective is a masterpiece of draughtsmanship.

The design of Messrs. Aston Webb and Ingress Bell resembles somewhat that of Mr. Collcutt, in being an elongated double quadrangle arrangement, the return wings projecting forward and forming massive pavilions, while in the centre of the front range an oblong block projects, devoted to the Institute proper. The authors divide their scheme into three main sections, the United Kingdom comprising the western wings round quadrangle, the centre portion the public and Institute section, including the transverse axial block, and the eastern wings the Indian and Colonial section. The front projecting block in the centre is devoted to the secretarial offices and committee rooms, which are approached by side corridors from front square hall. Beyond this is the principal staircase, top lighted, with two grand flights from the hall. In a line east and west run the main gallery, devoted to the United Kingdom and Colonies, with sample rooms forming the projecting ends of the return



FIRST-FLOOR PLAN OF THE IMPERIAL INSTITUTE. SELECTED DESIGN.

Thos. E. Collcutt, F.R.I.B.A., *Architect.*

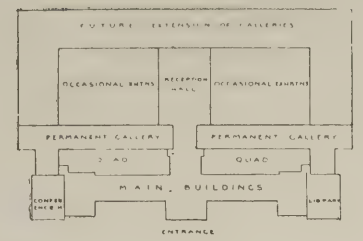
eastern and western wings. Passing the main staircase we enter a reception hall with its axis north and south, 112ft. by 53ft. 6in., with a circular end. There are side corridors leading to the library in the rear of the reception hall, with the mercantile, general, and industrial reading rooms on each side, while in continuation on each side are the exhibition gallery, forming the north range of the building. On the first floor a general conference room, 79ft. by 53ft., is placed over the entrance hall, with other conference, committee, and refreshment rooms on the right and left. The galleries are continued on this floor also, one side being given to United Kingdom and another to Colonial products. Coupled columns divide the galleries into a centre and side avenues; they are top lighted at ends. There is much skill shown in the planning of the Institute group of buildings; the library and reading room are readily accessible to the public; the reception hall has retiring rooms at the north end. The transeptal arrangement given to the upper part of hall by extending the walls over the corridors secures ample light, and the projecting arms form central features in each of the quadrangles. There is shown a flat dome over the crossing, and the decoration shows a figure frieze representing Industry and the Arts; the roof is arched, with a clerestory over the corridor. An entrance to the gardens is obtained at each end of the buildings. The authors have selected a freely-treated florid kind of Romanesque, with two stories of round arched windows—in fact, the style of the Natural History Museum, with which the design is intended to harmonise, and form one complete whole with the arcades of the Horticultural Gardens. There is something to be said for this treatment. While there is much skilful handling of detail in the main features, we do not like the engaged columns with figures along the lower story; the pavilions at ends are rather lumpy, and the recessed attics would be lost to view; an exception must be taken also to the isolated tower standing away from the building opposite the main entrance. We cannot see the object gained by a detached tower, which would look unpleasantly like a detached chimney shaft, and would not "pull up" the centre masses of the buildings in the side view. The authors have followed closely the Natural History Museum details, and the design would work out well in brick and terracotta; the banded courses indicate this kind of treatment. The centre block is pronounced externally by projecting ends and a high figure frieze.

Mr. T. G. Jackson has a decidedly clever design in red brick and stone disposed in bands, displaying a masterly hand in English Renaissance and details of Early 17th century character, the main front being pronounced by an imposing tower which rises from the façade, and as it ascends is broken into five stages, square below and octagonal above. Lofty pinnacles at the corners fill up the angles. The outline is elegant and pleasing, and the general treatment reminds us of the Brussels Town Hall. The plan is a square, a large quadrangle occupying half the area between the front block and the north gallery. Here the great hall is placed transversely east and west, with large octagon-ended bay recesses, and with the conference room in continuation westward makes up the inner block. In front a long corridor gives access to the postal service rooms, secretary's department with board and committee rooms at end, on the west side of entrance hall, while to the right are the telephone and other rooms, emigration offices, mercantile reading room at end; at the corners are octagonal towers terminating the angles of front. The corridors going north on the return wings communicate on the left with the refreshment rooms, on the right hand with the emigration offices. The rearward block has also a centre corridor to the sample

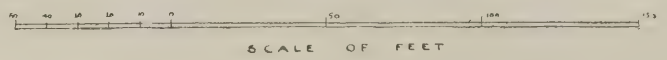
IMPERIAL · INSTITUTE BUILDINGS AT South Kensington

THE SELECTED DESIGN

Mr THOS E COLLCUTT F.R.I.B.A.
ARCHITECT



BLOCK PLAN



PRINCIPAL PLAN

rooms, ladies' and gentlemen's cloak rooms. The museum for United Kingdom and Colonies surrounds the great quadrangle. On the first floor, at west in the front, is a library for readers, divided into bays; the corresponding half is devoted to the Colonial Institute rooms, and a conference room is at the end. The dining and refreshment rooms are in the return block. In the centre block are the conference room and great hall with bay windows, facing the large quadrangle, a daïs being at one end; on the right-hand return block follow the reading and retiring rooms. Between the two main blocks is a vestibule with principal staircase leading to the conference room and great hall, somewhat wanting in axial arrangement. On the second floor are rooms for the Asiatic Society, gallery level of library and committee rooms. Only the front and two returns to main block are carried up to this floor. Many artistic points are to be noticed in the arrangement of the plan, which has a college-like grouping; the vestibule and side projecting stairs are a feature, and the author shows some scholarly detail to this portion, which has a coved and decorated ceiling. The great hall has also a ribbed vaulted ceiling, and iron principals and ribs are shown above. The large elevation shows the ornamental gables which break the front roof; there are towers at the end. The red brick and stone are in bands, the former predominating and harmonising with the new roof.

Mr. Arthur W. Blomfield, M.A., adopts the round-arched style of the Natural History buildings in the north portion. The north front is disposed in bays subdivided by the windows of each floor, brick and stone in courses being shown. The plan is a double quadrangular arrangement; there is a large octagonal entrance hall 70ft. square in the centre, which dwarfs by its size the other features in connection with it. The front range on each side are set out in the following order: west wing, mercantile reading room next the hall, postal and telegraph offices, library, 110ft. by 36ft., with projecting bays, and at the end a projecting reading room; on the east are secretary's offices, committee rooms, general conference room, 86ft. by 32ft., with platform recess and emigration offices at the end. Passing the vestibule from entrance hall, and going northward, we enter the reception hall on centre axis of buildings with apse at end. It is divided by columns into five bays of 22ft. 3in. each, with a 44ft. nave and 8ft. 3in. aisles. A corridor surrounds the hall, and retiring rooms are on each side of apse. The galleries for natural and manufactured products of India and Colonies are over the western galleries, surrounding quadrangle. In the centre of the western block is a covered space for unloading. The United Kingdom products are similarly accommodated round the east quadrangle. Each "quad." is divided into galleries for occasional exhibitions as required by the instructions, and refreshment rooms are provided in the rear of the front range. The entrances to galleries are at the north end. The elevation to the front is very much broken by square bay windows and recesses, and there are two projecting loggias, with arched entrance, in front of main block; also two cupola-crowned towers over staircases at the extreme ends of the façade. The main centre block of buildings is lower than the side wings, which have high roofs hipped next the great dome. The general effect is disappointing. The façade, shown by a pencil perspective, of Renaissance character, is lost by the overcrushing dome in the centre, which seems to cleave the side wings apart, and to interrupt harshly the horizontal lines of the composition, which are accentuated. The façade is divided into bays of Classical features and cornices, a high roof with dormers.

We next come to a comparatively modest Classic building of 18th-century character in brick, with stone dressings, by Dr. R. Rowand Anderson, R.S.A., admirably suited for a hospital building, but hardly so for an Imperial Institute. The site is covered by a deep block of buildings with two museum courts. The reception hall, 115ft. by 52ft., is axially placed in the centre, with an apse at the end. In front are located the emigration offices on the left, and the secretarial department on the right side. The restaurants and dining rooms are on the return side block on the left with a vestibule approach; on the corresponding side are the sample rooms. The first floor on the left we have in front the Colonial Institute department provided for, with the conference room in return block, while on the right side are the mercantile, intelligence, and industrial reading rooms, and on the return side the libraries and laboratories, The author's design is well balanced, but the cupolas in centre and side are small and insignificant, and scarcely impart the dignity required. They are almost in amusing contrast to the prodigious domes of the last and a previously-noticed design.

Nothing was said in the conditions about style, but it will be seen that four periods of the Renaissance have been tried, from the earlier English and Flemish varieties to the Monumental Classic. The Round-arched or Romanesque treatment adopted by Messrs. Aston Webb and Ingress Bell has much to recommend it, and the authors have displayed some breadth and skilful detail in the sculptural decoration.

For architectural dignity and massing, no site offered a better opportunity than the position chosen by the Imperial Institute Council; but, of course, we are not expressing in this opinion any agreement with the suitability of the locality for the new institution. The attractive work of Mr. Waterhouse, the Natural History Museum, has an almost unique position to the main road, and will, to some extent, cut off the view of the more extensive buildings of the Institute, yet it has the undoubted advantage of occupying the central position between the Museum and the Royal Albert Hall, which latter will form an imposing climax to the new structure. An opportunity is presented for displaying architectural grouping, such as will not soon occur again in the Metropolis. The Classical style is in keeping with the Italian garden and style of architecture of the surrounding buildings. The design of the plan in such a position is everything, as great care is necessary to make the most of the area so as to admit of future extension.

THE PLANS FOR NEW ADMIRALTY AND WAR OFFICES.

THE Select Committee of the House of Commons appointed on March 4th last to reconsider the plans and proposals for an Admiralty and War Office have just published their report. In 1884 the design of Messrs. Leeming and Leeming, of Halifax, was selected after public competition. The Committee, however, now come to the conclusion that the scheme of demolition and rebuilding should be abandoned. The report concludes thus:—"We are satisfied that by making additions to the present Admiralty all the requirements of that department may be suitably provided for; that this work, including some repairs and improvements to the existing building, can be done at a moderate cost, and may be completed within two or at most three years; that a very large reduction of expense for buildings would thus be secured, and to this must be added, as against the cost of erecting a new War Office, the value, estimated at £266,000, of the portions of the Spring-gardens site which would be preserved after providing for the suggested additions to the Admiralty and for the opening of the Mall into Charing Cross. We therefore recommend that the entire official staff of the Admiralty and War Office respectively should each, as soon as possible, be placed under one roof; and that the two buildings should be situated at no great distance from each other; but we are of opinion that these recommendations can be carried out, and that a great saving of money and time can be secured by adopting other plans instead of those which have been referred to us for consideration; and we find that the main buildings of the Admiralty may with advantage be retained. We further recommend that steps should be at once taken to insure greater economy and efficiency by bringing the clerks of each department to work together in greater numbers and in fewer rooms, and that the estimate of accommodation required for the staffs of the two offices should be based upon such rearrangements."

THE PROFESSION OF A CLERK OF WORKS.*

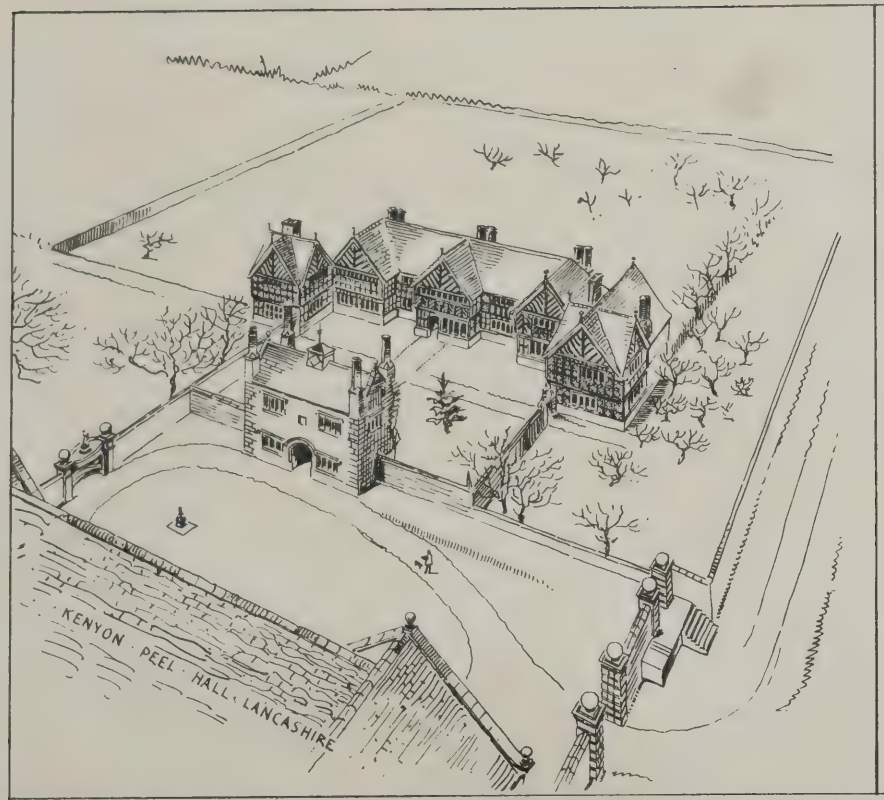
By THOMAS POTTER,

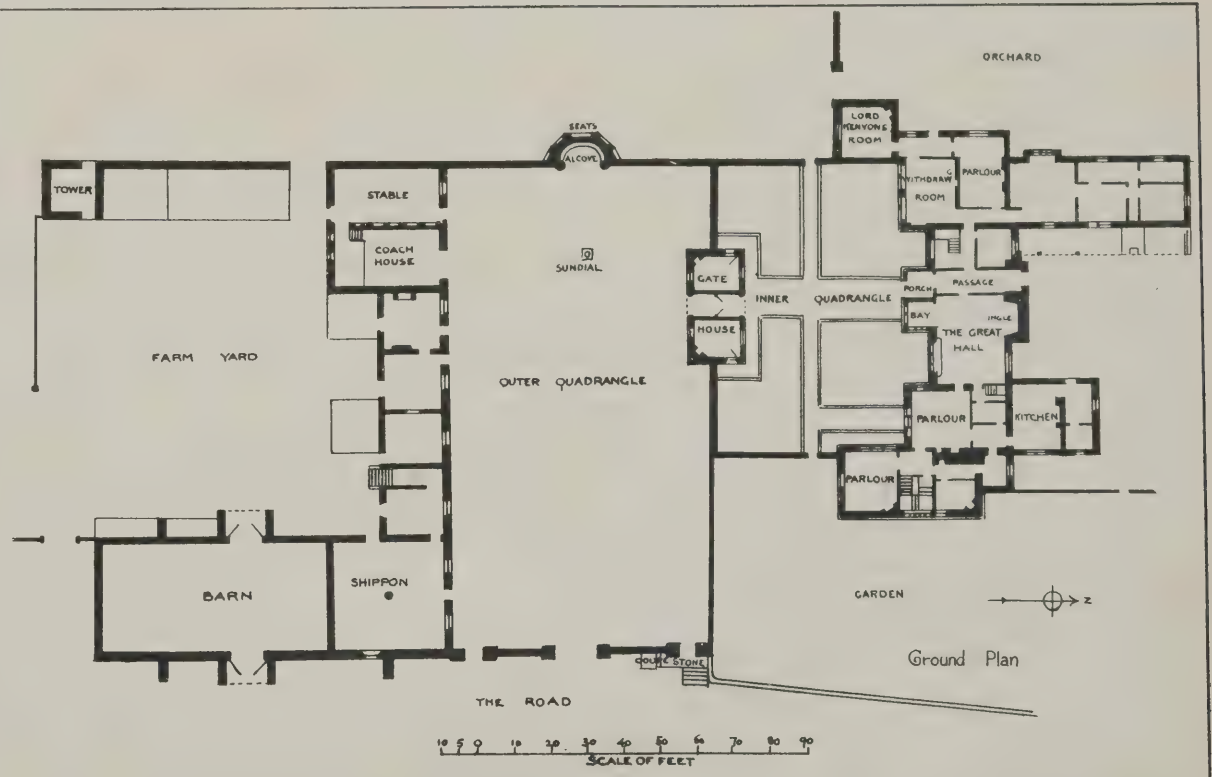
Author of "Concrete: its Use in Building," "The Construction of Silos," &c.

OF all the various occupations, trades, and professions which, from the architect downwards, are in some way or other necessary in the construction of buildings of importance, there is not one concerning which less is known by the general public than that of the "clerk of works." The clerk of works has of late years become an important factor in carrying out extensive building operations, and chiefly because of the keen competition existing, and the diminutive profits often made (where any are made at all) out of building contracts, which have rendered the strictest surveillance an absolute necessity, and the clerk of works a *sine quâ non*. Fifty years ago he was not considered by any means so essential as at present, the result being he was of small importance in a general way. When the press of that period furnished particulars of any newly-erected buildings, the architect and builder were the only persons whose names were given in connection therewith as deserving of mention; but at the present time that of the clerk of works appears as a matter of course. Even now we read and hear but very little of that functionary; he is not to be found airing his grievances or pleading his wrongs in the trade journals, and in this respect does not follow the practice of some of his employers. When a building is about to be commenced he is generally the first on the ground; and when completed is usually the last to leave. Where he comes from troubles no one, and where he goes to apparently nobody knows and nobody cares. The good and bad fortune which appear to be a peculiarity of the architectural profession, whereby some of its members, by merit and otherwise, monopolise a larger share of work than they can reasonably attend to, while others secure the crumbs only that are left, make it impossible for the more favoured portion to give that constant and personal attention to the details of works in progress which they otherwise would do; but assuming the clerk of works to be competent, painstaking, and trustworthy, it is doubtful whether any gain would result from irregular and divided surveillance, even were it practicable for the architect to take upon himself the *rôle* of clerk of works. A building of any importance is a mass of details where one error in construction may bring in its train a dozen others, and it is manifest that a minute knowledge of each and every portion, together with a perfect understanding of the intention of the drawings and specifications, should be acquired and directed by an individual, or individuals, whose entire time should be devoted to the fulfilment of these duties. Moreover, the tendency has been growing for years among many architects to give greater attention to the artistic element in connection with buildings and less to the constructive, whether to the general advantage of everyone concerned is another matter; at any rate it places more responsibility upon the clerk of works, and necessitates a superior class of man. The system of superintending building operations by a clerk of works whose whole time shall be given to a single building is subject, however, to certain exceptions in London and some of the largest towns, where architects may have several works in progress within a moderate distance of each other, and

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to each of which they can give a limited amount of personal attention. Individual works may not perhaps be of sufficient importance to employ a clerk of works entirely thereon, and with the frequent surveillance of the architect this necessity is still further reduced; the clerk of works' time is, therefore, divided amongst those of his architect's buildings which are being carried on simultaneously and at no great distance from each other, and as a matter of necessity he is then paid by the architect. The clerk of works' position in cases of this kind is analogous to that of the contractor's walking foreman; but although there is practically no remedy, the system is scarcely a good one, and rarely works well. The divided surveillance, which affords a loophole for an astute builder occasionally to creep out of, and the absence of personal supervision at times when it is usually most wanted, have to be carried to the debtor side of the profit and loss account. The title given to the clerk of works at the head of this article may be considered a misnomer; but I plead a difficulty on this point, inasmuch as his is not a trade, if so it would be difficult to define it, while it is certainly not a business, and the terms avocation, vocation, occupation, &c., are too far-fetched and indefinite. Nowadays, too, the three recognised professions of divinity, law, and physic represent not a tithe of what are by courtesy commonly known as professions. But having selected the title in default of a better, and with no other object, it may anyhow be considered a matter of but little importance. The term and vocation of "clerk of works" can be traced back many centuries; Gwilt says the earliest instance of which we have any record of the name being used is in connection with certain works done at Windsor Castle in 1241. William of Wykeham also held an appointment as "Clerk of all the King's Works," but which partook probably more of the character of architect, according to the designation as understood at the present time. In Hollingshead's "Chronicles," however, we learn that in 1350, William of Wykeham received 1s. a day as architect to Edward III., while his clerk of works received 6d. a day, and some clue is afforded as to the comparative remuneration then enjoyed by the architect, clerk of works, and mechanic, to note the wages of ordinary workmen at that period. According to the same authority, "master freemasons" received 4d. per day, other masons 3d., a master carpenter 3d., other carpenters 2d., their helpers 1½d., plasterers 3d., and tilers 3d. Probably the terms "master mason" and "master carpenter" had reference to what we should designate at the present time, "foreman mason" and "foreman carpenter." The rate of wages as here given was apparently the standard all over the country, and fixed by authority, for we read that a law was passed enacting that both building mechanics and helpers were to be placed in the stocks for refusing to work, or demanding higher wages; at a later period this was supplemented by another, ordering that incorrigible defaulters in either respect were in addition to be branded on the forehead with the letter F. The good old days evidently would not have been appreciated by those sections of the working classes of modern times whose *penchant* is to strike for higher wages at fitting opportunities, and rigidly keep the festival of Saint Monday and of other Saints whose names are not to be found in the Calendar. Chaucer, the poet, held an official position as clerk of works; we don't, however, learn that his fame rests upon his abilities for filling the latter position; probably he found the two occupations of an incongruous character. There are reasons for believing that the clerk of works, so-called, of that period was, however, not exclusively engaged in superintending building operations, and may indeed, have had little or nothing to do in that direction; but, as the name implied, was the accountant or clerk, and whose duties principally or wholly consisted in keeping the books and accounts; the master mason and master carpenter would superintend their respective branches, and their only superior possibly was the architect himself. If this was really the general custom in those days, we have an instance of a title coming down to the present time with quite different duties attached to it. Dance, the architect, was clerk of works of the City of London; but it would appear as if the title was retained long after the positions of architect and clerk of works had become more clearly defined, for not longer than 120 years since the City clerk of works was in the habit of meeting his artificers once a week at the Moorgate coffee house to receive his instructions. The artificers referred to were no doubt the master tradesmen of the various building trades engaged in carrying out work for the Corporation, and not ordinary mechanics. Clerks of works at the present time form, all told, a very numerous body, for there are, besides the architect's clerk of works—so called because he is intrusted with carrying out the designs of the former—many in the service of railway and other public companies, to construct and maintain their stations and general buildings. Large institutions, asylums, cathedrals, and similar important structures have usually a clerk of works and staff of workmen, more or less in number according to requirements. Civil Service clerks of works are employed to superintend the erection and repairs of public buildings, and landed estate clerks of works perform the same duties in connection with the mansions, farm-houses, and other structural works which form a portion of large agricultural and residential properties. Practically, the duties of each of these different sections assimilate, but with certain distinctions. For instance, the architect's clerk of works is usually engaged but for the limited period of erection occupied by the buildings the construction of which he is to supervise, for it would be impossible for architects with a moderate practice to guarantee that as soon as one building was completed another would be ready for commencement; but with most of the other branches—if the term is applicable—the employment is more constant, and in some cases (the Civil Service and on landed estates, for example) is often of a permanent character, subject, in the latter instance, to the continuance of a necessity for a clerk of works and the maintenance of his personal qualifications. Necessarily the extent and importance of the buildings, &c., over which the clerk of works has to exercise his functions vary considerably; they may be of so limited a description that his position is almost a sinecure, or they may be just the reverse. Dealing firstly with the architect's clerk of works and the two important factors in connection with that position, duties and qualifications, it may not be out of place to ascertain what were the requirements forty years ago. A writer in the *Builder* in 1847, possibly an architect, thus enumerates them:—"The primary duty is the superintendence of the works, to see that the drawings are fully carried out in all their dimensions, constructions, and details; that the specification is fully obeyed in all particulars; to prevent the admission of unsound, defective, or improper materials; and that things are of their proper size, weights, and qualities. For all these purposes it should be absolutely necessary that he should be the first man on the works in the morning and the last man off at night, and not leave the building when, in his judgment, injustice may be done to his employer in his absence. It is his duty also, in case of his discovery of any defective construction, to report the same to his employers, for however carefully a set of drawings may be studied, there are generally some points arising in the course of execution that seem not to have been studied at all; in such cases an instant report to his employer is required. In measuring up, it is his duty to be strictly honest to his employer, however much his feelings may be in favour of the builder, and in paying bills the practice of deducting commission should be especially avoided. To sum up, his duty is honesty, integrity, and uprightness, both to his employer and the tradesman, favouring neither one nor the other, and as such he is in a place of great trust." Mr. G. G. Hoskins, F.R.I.B.A., a few years since wrote some articles in the BUILDING NEWS called "The Clerk of Works," which were afterwards published as a small handy volume. Mr. Hoskins places the duties and necessary qualifications together, and which, summarised, are as follows, prefacing them, however, with the remark that although the clerk of works is paid by the employer, the former should always remember he is appointed by the architect, and responsible to him:—"The clerk of works must be of known integrity and vigilant in the performance of his duties; must possess a practical knowledge of the various building trades; had experience in measuring and valuing executed work, and also of materials previous to use; a knowledge of drawing and practice of ready sketching; capacity to furnish reports at fixed intervals, including a valuation of the work executed, materials on the ground, and such remarks as circumstances may suggest; essential that he should be fairly acquainted with the current prices of raw materials; competent to note all work not in the contract and hidden during progress, and taking measurements of same," and the performance of minor matters not necessary to be described here. The duties forty years ago appear to have been somewhat different to what they are now, for it is not usual at the present time for the clerk of works to measure up the work where it is being done by measurement or according to a schedule of prices, or where extras in a general contract crop up; but by the architect, or someone appointed by him, and on the builder's part by his own surveyor or measuring and estimating clerk. It is the practice, however, for the clerk of works to take notes of and agree with the builder's representative as to extra depths of foundations, extra brickwork, masonry, or work of any kind that may be in excess of the specification or drawings, and which cannot be readily ascertained after the buildings are completed. Nor is it customary for the clerk of works to pay bills. Practically there would be none to pay where the work was executed by contract, except the periodical instalments which the clerk of works has nothing whatever to do with. The writer in the *Builder* of forty years ago apparently alludes to a system of employing tradesmen for each branch in the same way that several important works have been carried out of late years—viz., without the intervention of a general contractor, letting portions piecemeal, labour only, or labour and materials as may be found most expedient and executing other portions with day workmen, the whole being under the general supervision of a clerk of works. Nor is it the general custom now for the latter to commence his duties at the same time as the builder's workmen, although in this point there is a difference in practice, for some architects, in provincial towns especially, expect him to be on the works during the same hours as the workmen. This is scarcely reasonable, for there are many occasions in which he has to spend considerable time after the workmen have left in preparing working drawings, examining details, checking dimensions, or other clerical duties which he finds can be attended to in a much better manner quietly and without fear of interruption. The early morning as a rule is not the time when the greatest vigilance is necessary, but rather when work is in "full swing." At any rate where the hard and fast line is laid down that the clerk of works must be on the works when workmen commence for the day, it may be safely assumed that in the majority of cases he makes himself a similar hard and fast line of quitting the works when the workmen leave for the night, no matter what pressing matters need attention for the morrow. On the whole it may be safely accepted that when the clerk of work's hours are fixed to commence at nine, making it optional when he thinks it necessary to be there earlier, the work is better looked after than when he is expected to begin his duties hours previously, and no doubt exists but that the majority of clerks of works, rightly or wrongly, look upon the early system as an unfair one, and possess no qualms of conscience in balancing the account in some way or other before the work is completed if an opportunity offers. It will be obvious to the general reader that the responsibilities of a clerk of works, according to the authorities quoted, are of no mean order; more important, indeed, now than at any other period, for not only is competition in tendering for the whole of the work in a building, the recognised principle in most parts of the country, but usually the lowest tender is accepted no matter whether it represents a fair price or hundreds of pounds less than what the cost, if done well, will probably be. It is almost needless to say that the practice of adopting a hard and fast line in this respect does not find favour with many architects, who, however, have often to





KENYON PEEL HALL NEAR TYLDESLEY.

View drawn by MAURICE B. ADAMS F.R.I.B.A.



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C

way to the wishes of clients, the universal ng of self-satisfaction at making what ars a good bargain predominant. Perhaps le end there is a revulsion of feeling in respect. When a low tender has been pted, the clerk of works' position may y well be guessed, for although the builder in his own heart wish to do his work well, but human. Self-preservation is the first of nature ; and when he finds he is slowly surely spending his own money on another 's building, he is prone to try by every llable means in his power to confine the unt so expended within the smallest possible pass. It is then the clerk of works' bles begin in earnest, and the experienced will tell you that, do the best he can in cases, the buildings, when completed, are creditable to any one concerned. Accord- to Mr. Hoskins, the qualifications a clerk orks should possess do not at first glance, ough they include many duties, appear to f a very searching character. In reality, ever, they comprise more matters of general wledge than any one man can reasonably ect to become thoroughly perfect in within compass of an ordinary lifetime. A tling assertion, I admit, but nevertheless . "Must possess a practical knowledge of various building trades" is a formidable n, for it means a thorough knowledge of ivators, bricklayers, masons, carpenters, and other allied occupations, and not a mere erficial knowledge, which is quite another ter. Many individuals possessing a certain unt of mechanical genius acquire with but e tuition a smattering of draughtsmanship, entry, masonry, painting, and such like ul knowledge in its way ; but just the rse when put into practice under the wrong ression that the possessor thereof is com- nt to act as clerk of works, or practise as a der, or even as an architect, if by an illimit- amount of assurance he can persuade clients accept his services. It is a common error ng persons unacquainted with building ters to imagine that individuals of this de- ption, if incapable of undertaking the duties responsibilities of a builder, are at any adapted to fill the position of clerk of ks, for they argue that the builder is a ctical man who knows his business, and ploys capable foremen and competent work- n, that he sets out the buildings and all the ils, and the clerk of works has simply to that what he does is done properly. This is utterly fallacious argument ; it requires but mited experience and average practice to w if work in a general way appears to have n done well. But in a clerk of works this ot enough ; he should know *when* it is being e well, and, further still, if it is being cuted in a skilful and workmanlike manner. instance, assuming a massive wooden stairs laborate design is being constructed ; it is only essential that it should appear on com- tion soundly executed, but that the seemingly lless amount of hidden work in framing, ssing, housing, and fitting should be cor- tly performed, and if the clerk of works is thoroughly acquainted with all the minutiæ details connected with that class of work, w can he detect shortcomings? Again, there y be some intricate design in masonry to be formed, or alterations necessitating a special owledge of shoring and under-pinning, or ficulties in the way of securing a solid ndation, or fireproof floors to construct, or aborate cornices, friezes, and decorations to be rried out, all of which are as opposite in eir character as can be well imagined, but e to be performed, or intended to be, in the st possible manner, and the methods of doing hich are supposed to be within the knowledge the clerks of works.

(*To be continued.*)

DAY AT PETERSFIELD WITH THE HAMPSHIRE FIELD CLUB.

THE neighbourhood of Petersfield was visited by the Hampshire Field Club last week. he members first visited Petersfield Church, hich contains some fine examples of Norman ork. The west doorway and the chancel rch are of special interest, with their zigzag nd diaper-pattern mouldings. The tower is t the west end of the church ; but it appears from a moulding which springs from one of the piers supporting the chancel arch, that was originally a central tower, the present chancel arch with the pillars over it forming the east side of what was probably a lantern tower. The church was built about the year 1150, and the town must have had its origin about the same time, for it takes its name from the church, which is dedicated to St. Peter. On Petersfield Heath, which forms a recreation ground for the town, some examination was made of a remarkable group of pre-historic burying places, about eighteen in number, of several distinct shapes. Of these, Mr. W. Dale, F.G.S., gave some description. Mr. T. W. Shore also made some remarks about this ancient burial place, saying there was not in any other part of Hampshire so large a collection as on this heath, and there were no doubt formerly many besides the eighteen now visible which had been obliterated. Weapons and implements of this Celtic people have been found ; an unusually fine bronze spear-head and a bronze blade or dagger was found about 1847 in draining operations at Sheet, as also was a blade of dagger 15in. long of a type comparatively rare in England, but common in Ireland. Of their earthworks were mentioned the entrenchment lines of Froxfield, as if to defend against any approach to Stonor and Ashford Hills from the westward (each entrenchment has the ditch on the west and the bank on the east), the remains of earthwork lines on the west of Butser Hill, and the great camp at Old Winchester Hill. By the kindness of Mrs. Minty, Mr. Shore was enabled to show the party an ovoid stone of considerable size found in one of the Petersfield barrows. This stone, which had been well rounded and polished, Mr. Shore suggested was buried with a body as a symbol of immortality ; but this view was combated by Mr. Dale, who thought it was a millingstone or muller, such as are found in the lake dwellings of Switzerland, worn into its present shape by rubbing up the corn ; and this view was supported by Dr. Seymour Haden. A small piece chipped out of it showed it to be a Wiltshire Sarsen stone.

A move was next made to the Ridge, Froxfield. On Lith Farm attention was called to some blocks of flint conglomerate, and on the top of the Ridge Mr. Dale made some remarks on the geology of the district, saying they were at the extreme western end of the Weald, a vast natural amphitheatre shut up on all sides by chalk hills, except on the east, where it is bounded by the sea. Each side the chalk forms a long bold escarpment called North and South Downs, ending on the one side at Beachy Head and on the other at Dover cliffs. This area consists of beds older than the Cretaceous rocks. This Wealden area was not a great bay of the sea, but was once entirely covered by the chalk beds, thrown up into a long dome, as it were, by the old disturbance that made the London and Hampshire basins. In the course of long ages the top of this dome of chalk got planed off, to use Sir A. Ramsey's expression, by sub-aërial denudation, exposing the softer bed below, and leaving the chalk in bold escarpments each side, which are still working their way back. That this great area was not a bay of the sea was shown by the drainage system ; the rivers did not run out eastward, but cut their way through the chalk on the north and south, and thus found their way to the sea, as is the case with a small stream which rises near here, and flows easterly for some time, but soon joins the Arun, and the Arun has an exit southward which it has made for itself. When these rivers first began to run the whole country was much higher. They ran off the top of this chalk dome, and as the ages went on and the chalk became removed, these rivers still kept their same courses, only excavating their channels deeper. On this ridge are the remains of a Roman encampment, now not very clearly defined, and scattered about the borders of the fields were bits of Roman pottery and tesseræ. Mr. Shore said there was no spot in Hampshire which showed a more continued occupation by man than this. The name Froxfield was a corruption of Folks' field, and it was so called in a MS. of 1434. It was then the field where the ancient community ploughed their fields with oxen, still used for the purpose in this part of the country. In the Pavilion on Petersfield Heath, earlier in the day, a fine specimen of Roman tile (lent by Mr. J. Silvester, of Slade) was exhibited, from the site of the Roman station at Froxfield, where a shallow bath has been brought to light. The remains of tesseræ and pottery found here are of a type common in Hampshire. Steep Church (a little building with half-timbered tower and tiled roof and dwarf spire) was the last place visited. This contains inside some interesting details of Norman work ; the nave is separated from the aisles by Norman arches, though some of the pillar capitals have been renewed. A special feature here is formed by the steps to the rood loft, of which there are very few examples in Hampshire.

SPECIMENS OF RENAISSANCE CARVED OAK.

WE illustrate to-day a few sketches of Renaissance oak carved in a manner characteristic of that period. The cabinet at top of page has a good frieze, and the panels are treated with Scriptural subjects. The chair on the right is Italian of good design, though the legs and carved staining piece are somewhat too heavy for the upper part. The knocker is rather crude in conception, but vigorous in execution. The mirror is a pretty piece of furniture, the cherubs and shields being well carved. The cabinet next it is of the same suite as that at the top of page, but it is not so well carried out, and the carving is very feeble in places. The whole of the oak belongs to Mr. Ichenhausen, who kindly allowed us to sketch it.

ST. COLUMB'S HALL, LONDONDERRY.

THIS hall is now in course of erection for the St. Columb's Total Abstinence Association, Derry. The great fall in site afforded scope for ingenious planning, and the successful architects seem to have converted apparent disadvantages to advantages. By careful manipulation of the levels they have obtained entrance from street to each floor direct, the the ingress and egress to assembly hall being especially convenient. Besides the accommodation shown on plans, there is provided on first floor a large reading-room, also committee-room, balcony, &c. The cut stone being used is from the Dungiven and Dungannon quarries, the balcony over portico being carried on polished red Aberdeen granite columns and pilasters. The group on pediment over main entrance, representing Erin, Temperance, and Industry, is being executed by Mr. C. L. Harrison, sculptor, Dublin, and the general contract has been intrusted to Mr. Joseph Ballantine, Derry, who is carrying out the works under the superintendence of the architects, Messrs. Croom and Toye, Derry, whose design was selected by Mr. Thos. Drew, R.H.A., Dublin, in limited competition some time ago.

The new Post office at Halifax was opened to the public for business on Thursday in last week. It is in the Early English style, freely treated, and has frontages to the new Commercial-street and to Old Cock-yard. The principal front has a length of 108ft., and here are the letter-boxes, the entrance to the spacious front office (43ft. by 16ft.), and the entrance to the Inland Revenue department. Other rooms are provided for the despatch of the postal and telegraph business. The new building covers an area of 1,050 yards. It was deigned by Mr. H. Tanner, of the Board of Works, and the contractors were Messrs. Armitage and Hodgson, of Leeds.

The memorial stone of the new church for the Barony parish of Glasgow, which is being erected a little to the south-west of the present old Saxon edifice, in the vicinage of the cathedral, was laid recently. The church is being erected from designs by Messrs. John Burnet, Son, and Campbell, of Glasgow, which were chosen in competition, the style adopted being a Scottish development of the Early English style. The walls are to be of rubble freestone, the open roof to nave of red pine, the seats of pitch-pine, and the floors of wood. We illustrated the church in the BUILDING NEWS for Jan. 7th and 14th of the present year.

A new organ was opened on Thursday in last week in a church on Callow Hill, in the district parish of Dewsall, Herefordshire. The instrument was built by Messrs. Brindley and Foster, of Sheffield.

CONTENTS.

Modern Building Sites 1
Marble and Marble-workers.—X.... 2
The Imperial Institute 3
The Plan for New Admiralty and War Offices 7
The Profession of a Clerk of Works 7
A Day at Petersfield with the Hampshire Field Club... 9
Specimens of Renaissance Carved Oak 9
St. Columb's Hall, Londonderry... 9
Our Lithographic Illustrations 10
Our Competitors' Column 35
Wayside Notes... 35
The New Royal Infirmary, Liverpool 36
A Model House for £620 36
Prizes for Art-Workmen 37
The Engineers' Club of Philadelphia... 37
Building Intelligence 38
Engineering Notes 38
Architectural and Archæological Societies 38
Archæological 39
Competitions 39
Correspondence 39
Intercommunication 40
Legal Intelligence 40
Parliamentary Notes 41
Stained Glass 41
Our Office Table 41
Trade News 42
Chips 42
Tenders 42

ILLUSTRATIONS.

THE IMPERIAL INSTITUTE.—TRINITY COLLEGE, OXFORD.
PROPOSED NEW ROYAL INFIRMARY, LIVERPOOL.—
SELECTIONS FROM THE ROYAL ACADEMY.—KENYON
PEEL HALL.—SPECIMENS OF RENAISSANCE CARVED
OAKWORK.—ST. COLUMB'S HALL, LONDONDERRY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE IMPERIAL INSTITUTE.

WE give this week a double-page view and plans of the selected design for the Imperial Institute, by Mr. T. E. Collcutt. We have elsewhere entered fully into particulars with regard to the six designs submitted, and will only add a hope that in execution Mr. Colcutt's design may be modified as little as possible. Next week we shall illustrate the other five designs submitted. The foundation-stone is to be laid on Monday next by the Queen. A temporary pavilion has been erected for the occasion, seated for 11,000 persons. It has been built by Messrs. Lucas and Aird, and is 340ft. by 210ft., there being 30 tiers of seats, each rising by about 10in. There are 12 entrances. In the centre is a dais 32ft. by 24ft.; this is covered by a canopy, which, together with the whole of the seats, is covered with crimson cloth, and cocoa-nut matting is to be laid along the passages dividing the various blocks. Upon the daïs will be placed about 40 gilded State chairs from the Lord Chamberlain's office. The foundation-stone is a block of grey colonial granite, weighing more than four tons. Sir G. H. Chubb has presented a casket 2ft. long and 15in. deep, which will be deposited in a cavity in the stone. It is made of copper and brass. On the front are the letters "V. R. I.," and the dates 1837 and 1887. The position of the stone is as nearly as possible in the centre of the façade of the proposed building.

TRINITY COLLEGE, OXFORD.

THE new house for the President, which is now nearly finished, will complete the new quadrangle of Trinity College, which has been built from Mr. T. G. Jackson's design. The first part consisted of a long range of buildings bounding the new quadrangle to the east, and containing undergraduates' rooms, lecture and reading rooms, and a set of rooms for a Fellow. The President's house forms the north side of the quadrangle between the new buildings just mentioned and the east end of the College chapel. The site of the new quadrangle was formerly occupied by the President's kitchen garden and stabling, and on the site of the new house stood a building containing undergraduates' rooms, which was built by President Bathurst in the last century. It possessed no architectural interest, and was unsubstantially constructed. The contractors for the first block of buildings were Messrs. Parnell and Son, of Rugby; and those for the present building are Messrs. Horsman and Co., of Wolverhampton, Mr. E. Long being clerk of works for the College buildings, and Mr. Mockford for the President's house. Our illustration is reproduced from the architect's own drawing, now at the Royal Academy.

THE NEW ROYAL INFIRMARY, LIVERPOOL.

FOR description see page 36.

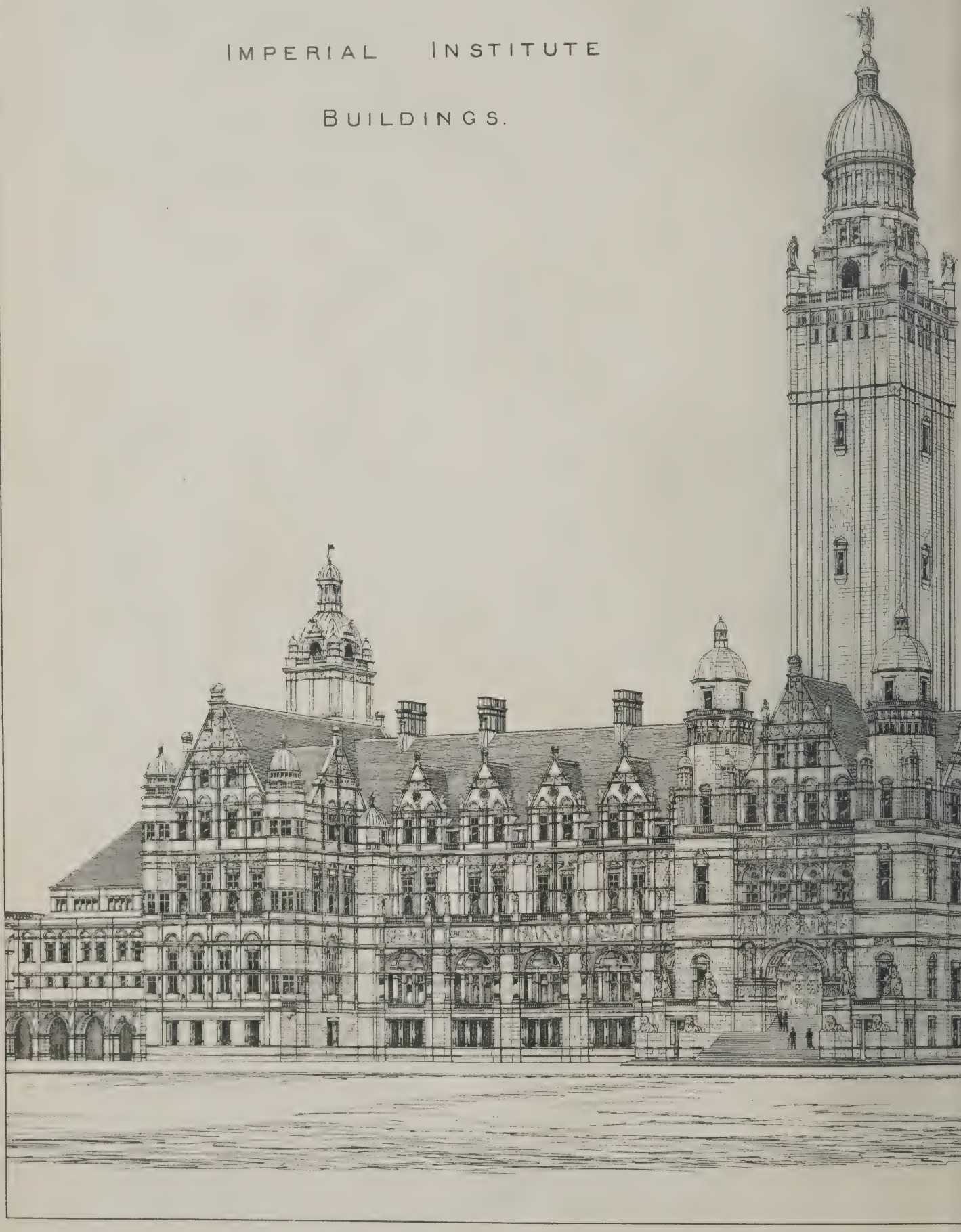
SELECTIONS FROM THE ROYAL ACADEMY EXHIBITION, 1887.

THE exquisite landscape by Mr. B. W. Leader, A.R.A., called "An April Day," of which a reproduction from the artist's pen-and-ink sketch is printed herewith to-day, is one of the few unquestionably great pictures in the present exhibition. The old timbered church represented once stood close to the painter's house at Whittington, near Worcester, and it furnished the same subject which Mr. Leader painted three years ago with the title "In the Evening Time it Shall be Light." Everyone, of course, is familiar with that celebrated picture. In "An April Day" the scene is cast looking the reverse way, with a spring morning effect instead of a winter's sunset. Nothing of architectural interest is known about the church itself, but the artist has invested it with a reputation for picturesqueness, at any rate, which is not likely to prove of a mere transient character. The shower is over, and we who have been standing up under the yew tree, or in the church porch, need not be told that a wet walk through the long spring grass lies before us. The elms and the oaks are not yet in leaf, and the lambs by their mothers' sides nestle close alongside, for the air is fresh and chill. The farmstead adjoining the churchyard was painted, like the meadows, from nature, and by its welcome comeliness the house inspires a confidence as we pass on our walk that, should the passing cloud prove a harbinger of a really wet day, here, at least, will be found a refuge from the elements. The spirited sketch gives an admirable idea of this masterly performance. Mr. G. A. Storey's "Young Prodigal" is full of life, character, and colour, and the picture is replete with interest and humour. "He has reckoned without his host," and so the ancient *roué* in the rear, under cover of the landlord's application, rises, as if suddenly inspired with a cute idea that as the repast is over he, at least, had better be going, while his other "jolly companion," warmed by the genial influence of the wine, defiantly drinks the host's good health in the unpaid-for liquor. The lasses, like the laddies, are gaily dressed, but there is nothing too loud at the moment in their apparent behaviour. In the distance sit two gamesters, and the festive character of the grounds indicate with some distinctness that the style of company usually entertained here is matched by the proprietor. He, with powdered wig, gay waistcoat, and clean apron, bows politely to the company as he demands payment of his bill. Young Folly empties his pocket swab upon the table, and, no doubt with perfect truthfulness, declares that these are all the coins with which he has to pay. The waiter lad, well trained in mischief, grins at his master's misfortune, while the slumbering dog and cat suggest that the party has been one of some considerable duration, and thus it may be safely relied on that the bill is no light one. The sequel to the *al fresco* repast remains for the imagination of the spectator, though with reliable accuracy it may be taken for granted that the end thereof was less entertaining than the beginning. Of Mrs. Ernest Normand's (Henrietta Rae) two life-like paintings of the nude, little need be said beyond a special reference to their charm of colour and refined drawing. The smaller picture of the two—"A Naiad"—is hung on the line in the last room, and the life-sized figure of "Eurydice" is well-placed in Room No. 6. This picture, of which the artist's pen-and-ink reproduction gives a very good idea as to form, has worthily attracted considerable attention. It represents Eurydice in the act of sinking back to Hades, from whence Orpheus, by the melody of his lyre, had obtained from Pluto her restoration on condition that he did not look behind him before he reached the earth. The two other drawings, lent us by the sculptors, represent two groups of interest—viz., "An Ancient Trick," by Mr. H. C. Christie, and "A Duet," by Mr. Edouard Lantéri. Both sculptures explain themselves.

KENYON PEEL HALL, NEAR TYLDESLEY.

THE well-wooded situation and charming surroundings of Kenyon Peel Hall always added, no doubt, to its great picturesqueness, while the close proximity of the old Roman road from Manchester made the place of comparatively easy access. The new line running between Bolton and Manchester has brought the old hall within the sound almost of the steam-engine, and a walk of about a quarter of an hour from Little Hulton Station will bring the visitor to it. Owing to the mining operations under the house many settlements occurred, and the place had to be shored up; but lately a thorough repair has put the fabric in order, though this has been done with but little regard to the historical character of its architecture. Our view was taken previous to these restorations. Facing south, the house and buildings are arranged round three quadrangles after the symmetrical fashion characteristic of the 17th century, as shown by the plan which accompanies our view to-day. A stone-built barn forms one side of the first quadrangle, which is devoted to a farmyard with a shippon (as a cowhouse was called), a stable, outhouses, and cartsheds. The stone column or shaft in the centre of the shippon deserves mention. The stone mullioned windows of the stables facing the middle quadrangle are well proportioned, and here and there the façade is enriched by date stones or carved coats of arms. Over the great doorway of the gatehouse runs the legend:—Peace be within these walls. 1637." and by the side of this are the initials, "R. G. B." Some have said that the gatehouse building was used as a courthouse, the great room over the archway (measuring some 28ft. long by 13ft. wide) being so designated. The bell cote over is said to contain a silver bell, with the following inscription upon it:—"Come away, make no delay. A.R., 1731." The sundial in the central quad, the alcove in the wall, and the entrance gate piers with the old mounting block by the side all add to the quaintness and interest of the old buildings as the visitor, with but a small effort of imagination, peoples the quadrangle with a busy group of retainers waiting to attend the host and hostess of the hall, accompanied by their guests of courtly degree and of latest fashion on some hunting party or similar expedition in gay costume and brilliant trappings. The flanking walls east and west of the main front of the house have gateways in them, surmounted by stepped gables. That on the western side has the inscription $\frac{R.}{G.\ B.}$ 1634 upon it, and on the other gable are the initials of George Rigbye, and dated 1631, showing that he was the builder. The hall itself is erected on the plan of the letter Π, the central wing being rather of less projection than this character would show. It is half-timbered, or "magpie," in black and white. The rooms are low, and the whole design is exceedingly picturesque, though the slates lately put on the roofs in place of the old grey slabs of stone are a great mistake, and do much to spoil the character of the place. The plan, which is reproduced by permission from "Old Lancashire Halls," shows the arrangement of the buildings and the disposition of the great hall in the centre of the house. The ingle nook and bay window are rather unusually placed, and, like the high table at Barcroft, the daïs stood here, probably facing the great fireplace. The old chimneypiece, once so rich in carvings, has now gone, and the timbers of the ceiling are plastered over. Some of the apartments are still furnished with good wainscot panelling, and have nice fireplaces, with what are now called overmantels, and in many ways internally the mansion is of considerable interest. Rames' Notes to Gastrell's "Notitia" furnish the following account connected with the history of the place:—"Peel Hall was rebuilt in 1634 by George Rigbye, fourth son of Alexander Rigbye, of Middleton, Esqre., and conveyed by marriage, in 1657, by his sole daughter, Alice Rigbye, to Roger Kenyon, Esq., M.P. His descendant, Lord Kenyon, was appointed Chief Justice of the Court of King's Bench, and created Baron Kenyon in 1788." The property still remains among the estates of the Kenyons. Mr. Henry Taylor's bird's-eye view shows the general grouping of the place with the gatehouse and forecourt. We are indebted to him for much of the above information respecting the house, and for permission to reproduce the isometrical picture from his interesting book on "Old Halls."

IMPERIAL INSTITUTE BUILDINGS.



South Kensington.

Selected Design.

T. E. Collcutt Architect.

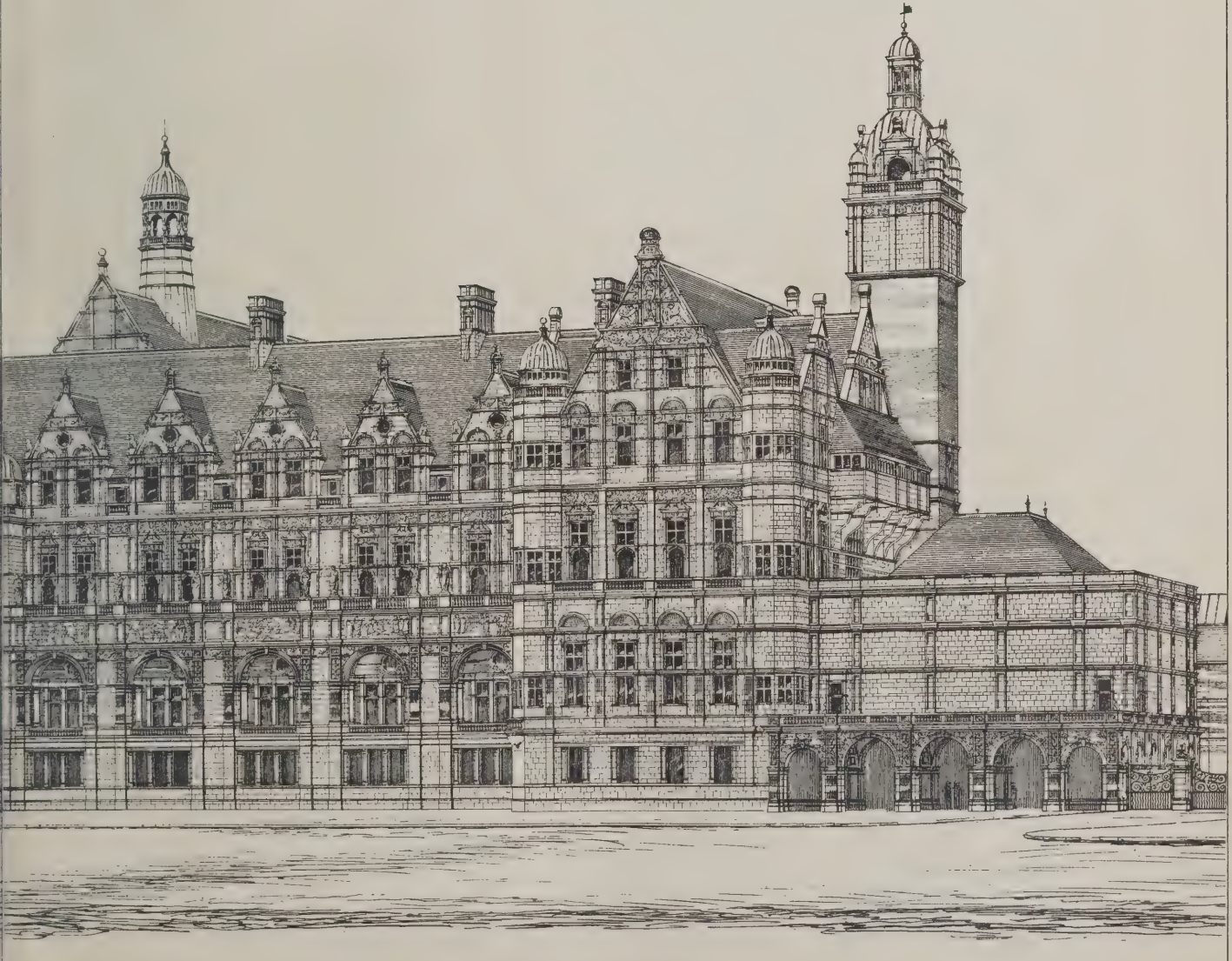
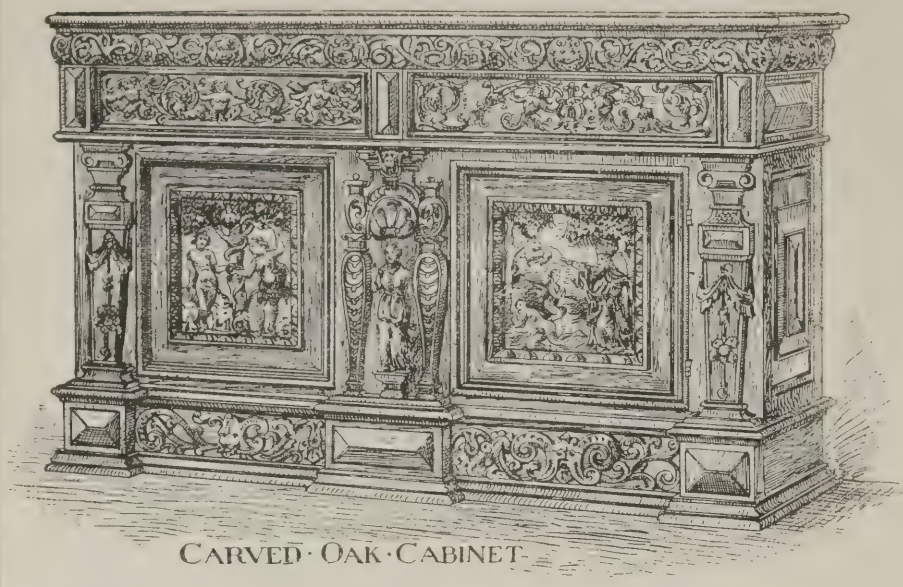


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Specimens of Renaissance Carved Oak Work &c



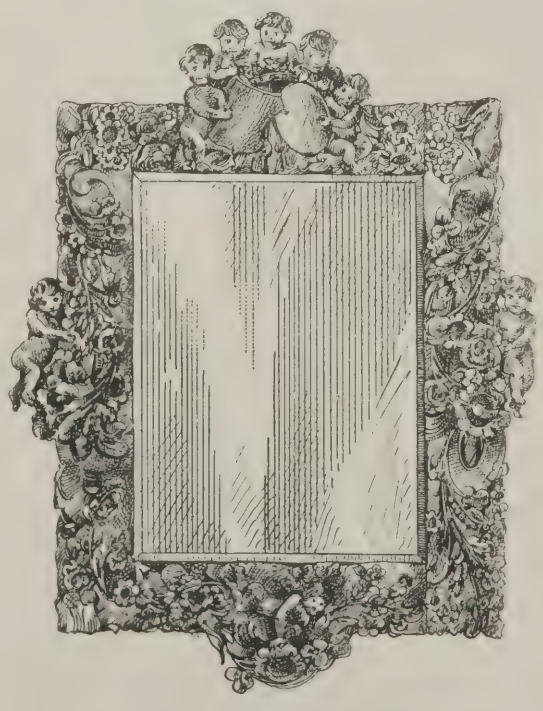
Carved Oak Cabinet.



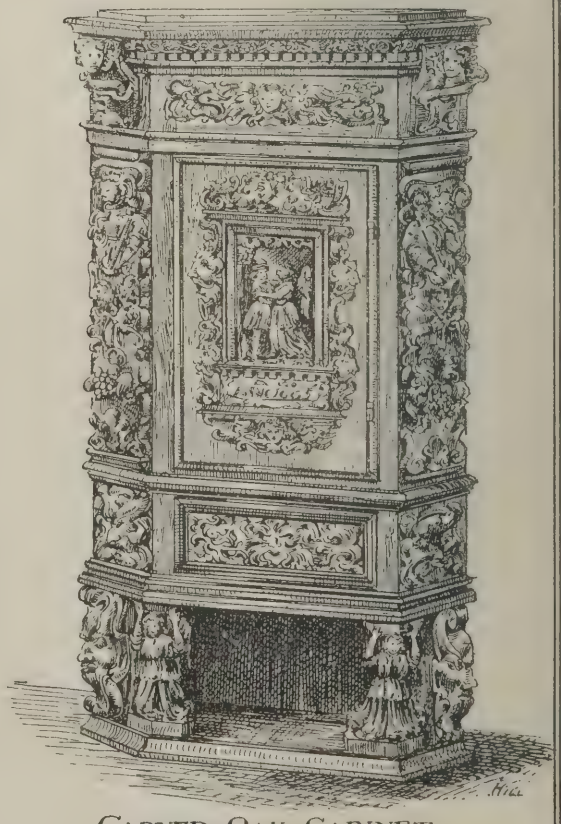
Carved Chair



Wrought Iron Knocker



Oak Mirror Frame



Carved Oak Cabinet

W. F. Young del.



"AN ANCIENT TRICK," H. C. CHRISTIE.



"AN APRIL DAY," B

SELECTIONS FROM THE ROYAL



"A NAIAD," HENRIETTA RAE. (Mrs ERNEST NORMAND.)



"A YOUNG PRODIGAL," HE HAS RECK



. LEADER, A.R.A.



"A DUET," EDOUARD LANTÉRI.

ACADEMY EXHIBITION, 1887.

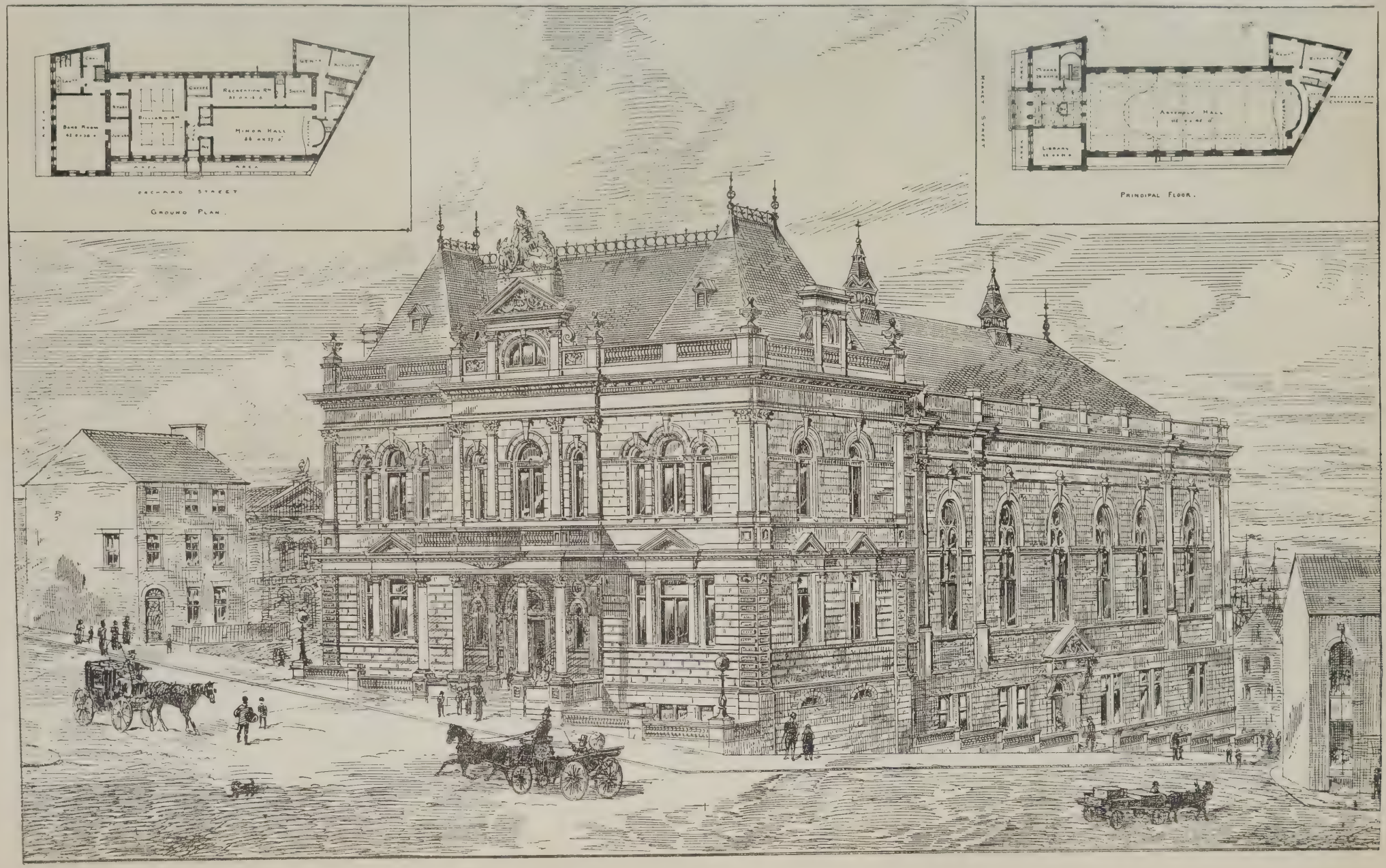


D WITHOUT HIS HOST. G.A.STOREY, A.R.A.



"EURYDICE SINKING BACK TO HADES,"
HENRIETTA RAE (MRS ERNEST NORMAND.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



ST. COLUMB'S HALL, LONDONDERRY.

OUR COMPETITORS' COLUMN.

IT goes without saying that our object in proposing our fifth subject was, to some extent, a selfish one. To be candid, we expected that it was just possible that some of our readers, while responding to our invitation to submit suggestions for the improvement of the BUILDING NEWS, might favour us with opinions more or less direct respecting the existing features and characteristics of the journal, and we have not been disappointed. The frankness of some of our readers is as refreshing as it is only fair to ourselves to say their suggestions are impracticable. The authors of most of this sort of advice seem to labour under the delusion that a newspaper is printed in columns or pages and afterwards stuck together on a sheet. We may perhaps be allowed to say that this is not so, and that the fact unfortunately disposes of a good many ingenious ideas for the improvement of pagination, and the arrangement of matter and illustrations, with which we have been favoured. All such matters, we assure our readers, receive full consideration here, and if self-evident improvements of the kind are not carried out it is only because the exigencies of a newspaper office prevent it. It must be remembered that the BUILDING NEWS is not a book which can be carefully indexed and consecutively arranged at leisure, but a newspaper, and that, as is the case with most of its contemporaries, the time allowed for its mechanical production is to be counted by hours, and grows yearly shorter and shorter. Some of the diametrically opposite recommendations of our contributors are amusing. One gentleman says, "Double the space accorded to 'Intercommunication'; it is the most valuable feature in the journal." Another says, "Do away with 'Intercommunication,'" and is good enough to add that "it only affords amusement instead of information." Possibly, with a lively remembrance of the fable of the old man and his ass, we shall best assure our own continued prosperity and usefulness by persevering in our present course, in the face of these and a few other similar diverse counsels. We may perhaps next be allowed to say that we certainly did not contemplate the inclusion in the suggestions we invited of such matters as the desirability of publishing a complete index to our fifty-two volumes. One contributor thinks we might depend on the voluntary help of our readers in compiling such an index, and on their purchasing it when published. Results, however—most of our readers know very well that our journalistic experiences are not confined to the BUILDING NEWS—are not favourable to such conclusions, and we do not see our way to publish such an index. One valued correspondent, who is bitten with this index idea, wants us to publish it two pages at a time, at the expense, if necessary, of two pages of our illustrations. We are sure the large majority would not thank us for adopting his suggestion. Another wants us to devote much more space to archæology, especially for the benefit of readers who are members of the principal archæological societies. We *do* give space to archæological matters, so far as they affect architecture; in time past we have given more, but it attracted little recognition and less courtesy from the archæological societies, which seem to us—with the exception of the Society of Antiquaries, which does good, sound work—merely to touch the fringe of archæology, and year by year to degenerate more and more into amiable organisations for the arrangement of pleasant outings; so we fear we cannot do much in this direction. Several other readers want us to restore the weekly lists of prices of materials that used to appear after the tenders. We discontinued these with regret, but solely because prices—of timber especially—vary so frequently in different parts of the kingdom, that they gave more dissatisfaction than they did good, and for the same reason we do not see our way to resume them. Very many readers urge us to give more constructional details, especially of ordinary buildings, such as factories, mills, farms, sewerage schemes, and civil engineering works. We can only say we should be delighted to do so, if people would send them. We would gladly give six pages more illustrations weekly, devoted to such practical details, in addition to those we already publish; but the fact is they don't reach us—partly because drawings are seldom made for such works, and partly because some architects are a little chary in parting with such information. Our first question to an unknown correspondent who is good enough to offer us a subject for illustration generally is: "Is it a church or house? Because if so it must be something good to secure a place among the hundreds of proofs of similar works that are already in our drawers waiting their turn to appear; if it is a factory, or a mill, send it along at once." It is *our* business, of course, to obtain and to be first in the field with illustrations of really first-class and national buildings, with the aid of their authors—never yet, we are proud to say, refused us by a single architect of any character or position—but we cannot possibly be aware of the execution of thousands of private commercial and manufacturing buildings, the details of which it would be most desirable to illustrate, if only the architects thereof would send them. We are a little disappointed to find that one comparatively recent innovation apparently meets with little approval. We have for the past three years, and this year to a larger extent than ever, devoted part of our space to illustrations of the principal pictures and sculpture of the year at the Royal Academy and elsewhere. We are able to reproduce these in a manner which few other publications published at the price of the BUILDING NEWS can equal, and we thought the majority of our readers would welcome a yearly record of the best examples of the year's art. If the large number of recommendations to us this week to give fewer pictures and to stick to architecture is a criterion of the opinion of the great mass of our readers, we have for once erred. In all probability, we shall reconsider the matter another year, and, in the meantime, any expressions of approval or disapproval would be welcome, and would influence our decision.

We award the prize in connection with our request for "Suggestions" to "Action." We do not print any paper—we have fairly summarised above the many recommendations that have reached us; the grains of golden counsel we keep for our future guidance, and we offer our best thanks to very many correspondents for their kindly words in acknowledgment of our past efforts.

We now invite all readers to name

THE LEADING LIVING BRITISH ARCHITECT,

With a prize of One Guinea to the sender of the best short appreciative monograph of his work. To make our meaning clear—Suppose five hundred readers compete, and 250 name Brown, 100 Jones, 80 Smith, and 70 Robinson as the first living architect, the prize will go to the one among the 250 who gives the best appreciative short account of Brown's works. To be sent in by Friday, July 1.

A further prize of One Guinea is offered for the best series of

HINTS ON ARCHITECTURAL DRAUGHTSMANSHIP,

to be sent in by Friday, July 8.

And another prize of One Guinea for the best

SUGGESTIONS TO ARCHITECTURAL SOCIETIES

for sessional papers next year, with hints as to subjects most appreciated by members, illustrated, if desirable, by references to and comparisons with past papers.

To be sent in by Friday, July 15.

CHIPS.

At Barrow, on Wednesday, a statue of the Queen was placed in a prominent position in a niche in front of the new Town Hall. The hall, which has been erected at a cost of nearly £60,000, from plans by Mr. W. H. Lynn, R.H.A., of Belfast, will be formally opened on the 14th inst. by Lord Hartington.

The Bishop of Rochester, on Saturday, consecrated St. Bartholomew's Church, Barkworth-road, Rotherhithe New-road. The church is in the Early English style of architecture, and has been erected at a cost of £7,500. Mr. Taprell Allen, of Southampton-street, Strand, was the architect.

Probate has been granted of the will of Mr. Samuel Cousins, late of Camden-square, Regent's Park, R.A., who died on the 7th ult. He bequeaths to the Artists' Orphan Fund and the Artists' General Benevolent Institute, £5,000, and to the Artists' Benevolent Fund £1,000. The personalty has been declared at £112,367.

A fire occurred on Thursday night at Messrs. Aveling and Porter's engineering works at Strood, near Rochester, by which considerable damage was done to the engine house, casting foundry, and machinery.

WAYSIDE NOTES.

THE last great competition is over. Few persons will differ from the opinion of the judges. All, however, will feel a sense of disappointment at the resultant mass of architectural design produced, although the general standard of the work submitted is decidedly above the average. As regards the selected design, Mr. Collcutt's architecture, while very original, is extremely light, and lacks that monumental character which one feels should be stamped upon the new building. So light and fanciful, indeed, is the design, that it is probable that, executed solely in stone, it will look somewhat tame in parts. The peculiar architecture would seem to demand a realisation in red brick and buff terracotta, similar to the author's excellent building in Oxford-street, as many of the forms shown (both constructional and artistic) are wholly out of sympathy with the true principles of old stone architecture. Good draughtsmanship has again been victorious, though, of course, this has nothing to do with Mr. Collcutt's excellent plan and merited reward.

The central portion of the façade of the selected design is a pleasingly original composition; but the immediate extensions at each side strike one as rather commonplace, and suggestive of desirable residential chambers, or similar buildings. The outline is not over pleasing, though there is nothing particularly wrong in it. The detail is magnificently drawn. On the whole, the decision of the judges will be seconded by the profession. Most probably the building will find little sympathy with the general public.

Probably the most dignified design is that of Messrs. Deane, of Dublin, though this seems to lack originality in detail. It is finely conceived, however—rather too much so, as it is altogether too costly and extensive on plan. If it had been carried out as shown, the authors should have felt themselves bound in honour to forward a honorarium by way of royalty to the lineal descendants of Sir Christopher Wren, as the drum and dome of their design are evidently slightly altered models of those at St. Paul's. The conical brick kiln which supports the lantern in the latter building is slightly domed by Messrs. Deane—a doubtful improvement in construction.

There are no designs in any way founded on Grecian architectural principles. Messrs. Deane's details are distinctly Roman in origin. The arch rules supreme in most designs, and one misses any attempt at purely trabeated architecture, such as would have been very suitable on this occasion. But, having regard to the proposed situation of the building, Mr. Collcutt's style must be regarded as eminently suitable, especially if executed in brick and terracotta, as it would then harmonise with the group of buildings formed by the Natural History Museum, Kensington Art Schools, Albert Hall, and Technical Institute.

When I visited the exhibition of the designs at Kensington there was great bustle and activity on the site of the future building: men hammering and sawing as if they had caught the fevered haste of the Institute Committee; great preparations in the way of timber stands were being made; vast sheds of timber, covered with sailcloth, were being erected; workmen hurrying about in all directions, and a general air of brisk business on the site of the late Colonial and Indian Exhibition. A fire-engine with steam up was ready in case of emergency—a very necessary precaution considering the highly inflammable nature of the sheds that are being put up for the accommodation of the sightseers at the coming ceremony of laying the foundation stone. This stone, of colonial granite, merits some respect, since it has the importance that accrues from a weight of somewhat over four tons.

More royalty has favoured the new People's Palace, one of the many kings present in London in the Jubilee week having laid the foundation-stone of some further buildings in connection with this institution. All these ceremonies that have happened for some time past will doubtless be eclipsed in splendour by the affair on the 4th inst.

The Directors of the Scarborough Constitutional Club have extended the time allowed for preparing designs for their new building. Competitors need not now send in their drawings till the 29th of July. This extending of time in competitions is a practice not to be in any way encouraged, as it often puts the procrastinating competitor on the same footing as his more energetic *confrère*. The man who has promptly set to work on his drawings on receiving the instructions has little or no advantage over those who habitually put off work to the last minute, and have a rush and scramble to get their plans finished in time.

Another discovery at Winchester. We seem now to be constantly hearing of some curious find in this city. This time it is the receptacle of the heart of Bishop Nicholas of Ely (1279). It is gratifying to one's sentimental feelings to learn that the pewter case containing the heart was not uncovered, but reinterred after drawings of it had been made by a Mr. Bargent. No mean personage was this Bishop Nicholas of Ely, as we hear that he was Lord Chancellor and Lord High Treasurer of England before he was made Bishop of Winchester.

Remembering the unpleasant state of the river, so noticeable on the 21st ult., it is satisfactory to learn that the new Thames By-laws, sanctioned by an order in Council, prohibit the casting or suffering to flow into the river, or on the banks or tow-paths, any sewage, rubbish, or other offensive matters. This is only as it should be, and especially at this time, when so many persons live for a few days on the river in house-boats. Henley Regatta sees a whole fleet of these boats every year. I presume this new law only applies to what is known as the Upper Thames. Below London Bridge any attempt to sweeten the waters is quite hopeless under the present arrangements, as anybody can find out who journeys down the river either to Gravesend or Australia. The first two hours of such a voyage is not at all cheering. I have not been down the river for some years, but plainly remember that upon the last occasion our steamer churned up a nasty-looking and offensive-smelling foam.

It is reported that the Parisian journal, the *Matin*, in its issue of the 27th ult., besides endeavouring to revive the old claim against England of the modest sum of £20,000,000, also states that our Buckingham Palace was "restored" with French money. My knowledge of history generally, and that of Buckingham Palace in particular, is not sufficiently deep to warrant my offering an opinion on this subject. The Palace itself, however, is of great interest just now. Many views and descriptions have lately been published of the building. The *Graphic* of last week has a very good illustrated article on the place. The writer describes the structures that have occupied the ground prior to the present building by Nash, who appears to have had considerable difficulty with the King (or, rather, Prince Regent) at the time in coming to a decision as to the best way of adding to the old structure.

Previous to Buckingham Palace there seem to have been buildings on the spot at different times called respectively "Goring House," "Arlington House," and "Buckingham House." The first, built by Sir George Goring, afterwards Earl of Norwich, is described by Evelyn as "ill-built, but capable of being made a pretty villa." This edifice afterwards came into the hands of the Earl of Arlington. It was destroyed by fire about the year 1674. The earl thereupon erected a new building—"Arlington" House—which was described by a contemporary writer as "a most neat box, and sweetly seated amongst gardens, besides the prospect of the park and adjoining fields."

The *Graphic* gives a little view of this house—a building with two wings and a simple cupola in the centre. Many doubtless would agree with the old chronicler and dub it a "neat box," and that is all. To some, however, it might appear to be a very pleasing example of unadorned composition, and of quiet and gentlemanly appearance, being plain and unpretentious. At any rate, it would seem to be infinitely better architecture than the incongruous building that succeeded it, which had neither rhyme nor reason in its mass and outline, but appears to have had a skyline composed chiefly of the effigies of half-a-dozen nude personages executing a war-dance on the top of the balustrade.

This new building was erected (1703-5) by the Duke of Buckingham, who ultimately came into possession of Arlington House, which he apparently razed to the ground. His architect was said to have been a "learned and ingenious" Dutchman. Buckingham House was added to and altered, but substantially remained up till Nash's time, and, in fact, it would appear that parts of it are now incorporated in his building.

Nash was undoubtedly heavily handicapped in preparing a design for the new Palace. Indeed, as Mr. D. C. Bell says in the article in the *Graphic*, "it is but doing justice to Nash, judging by the elegant and skilful arrangement of the new rooms above, to say that if he had not at the outset been cramped by the dimensions and level of the original building, he would have produced a more creditable general result." Nash's difficulty with his kingly client was much the same as every architect feels at times more or less—he was not allowed to pull down *in toto* the old buildings. Every house owner has an exaggerated notion of the worth of an old building, and seldom can be convinced of the greater economy of building anew than of patching and adding to the old work. GOTH.

THE NEW ROYAL INFIRMARY, LIVERPOOL.

[WITH LITHOGRAPHIC ILLUSTRATION.]

THE existing buildings of the Liverpool Royal Infimary having become altogether inadequate to meet the growing needs of the City, the governors have decided to erect a new structure on the same spot from plans by Mr. Alfred Waterhouse, R.A., of whose design we give illustrations to-day. Of course, it became necessary to add considerably to the present very restricted site, and this has been done by absorbing the narrow street called "Pembroke-gardens," and purchasing a large strip to the north of it.

Were it not for certain blocks of houses at the N.W. and N.E. angles, which it was found unnecessary to acquire, the enlarged site would cover the whole space between Pembroke-place on the north, Dover-street to the south, Ashton-street on the east, and Brownlow-street to the west. Advantage has been taken of the 184ft. frontage to Pembroke-place between these blocks of unacquired property, &c., occupying approximately the centre of the northern side to place the administrative block at this point. This at once strikes the keynote to the general arrangement of the building, which will best be comprehended by a glance at the two plans, which we give in addition to the perspective view.

The administrative block is thus apportioned: The basement to wine, beer, and coal storage; the ground floor to the administrative offices; the first floor to private rooms for the officers of the staff; the second floor to nurses' and lady superintendents' rooms; the third floor to maids' cubicles; and the fourth and uppermost floor to the kitchens and their adjuncts. Of these floors only the ground and fourth have a completely covered communication with the main building, though, from a point on the staircase midway between the first and second, there is an open-air connection with the first floor of the central ward block.

Passing now to the main building, it will be seen that the wards are arranged in six blocks—three to the north and three to the south of a main corridor running east and west. At the junction of this corridor, with the one running north to the administrative block, is placed the principal staircase, with a clear width of 7ft. 6in. for each flight, and the two principal lifts—one for passengers, large enough to take a stretcher with its attendants, and another for service purposes.

The wards of the first floor are intended for females exclusively, and those of the second floor for males only. The oblong wards to the S.E. and S.W., which on the second floor take 32 beds each, are on the first floor curtailed to give space for small pay-wards and rooms for sick nurses in the S.E., and for operation rooms in connection with the "Thornton" or obstetric ward in the S.W. block. The Thornton ward block has two small theatres attached to it, while all the wards have a scullery (or dirty room), a sister's room, a doctor's room, a separation room for two beds, a dining or convalescent room, and a receptacle for patients' clothes. A lecture theatre below, and an operating theatre (with top light) above, are placed between the north-east and north central wards.

The outpatients are ministered to on the ground-floor of the north central block, and have their own independent entrance from Pembroke-place. The arrangements of this department, as well as those of the laundry, *post mortem*, and mortuary buildings will be sufficiently explained by the plans. To the south of the laundry buildings the existing nurses' home has been retained, while a new covered way gives it a sheltered communication with the end of the main corridor.

The chapel is at the west end of the main ground-floor corridor, and a large recreation hall on the same floor is managed underneath the south central ward. A great variety of other accommodation will be found by a reference to the plans. The wards are supplied from the kitchens of the administrative block by means of trucks upon a railway running through the roof to a service room on the third floor of the main building and at the head of the service lift.

It is intended that the buildings shall be erected of local grey brick, with dressings of red terracctta and red Ruabon brick, the roofs being covered with Westmoreland slates. Glazed bricks will be largely used for the internal wall surfaces, and steam heating will be adopted in conjunction with open fireplaces. The total number of patients' beds is 290.

A MODEL HOUSE FOR £620.

IF there is one characteristic more conspicuous than another among the *soi-disant* pioneers of what is termed "high art," it is an eminently keen sense of money's value. Under the cover of a pretence to abhor all that pertains to mundane interests—"spurning the secrets of the world's machine, and what the rights of man may mean," as "doom'd, pompous and absurd"—they frequently display an appreciation of the main chance which may well suggest a useful lesson to those of "that shouldering herd"* whose fate it is to live by the commonplace. We are not surprised, therefore, at the prominence given to the above amount of money as the sum for which the "Model House" illustrated in the July number of the Century Art Guild's "Hobby Horse" can be built. A suburban house, with a drawing-room 31ft. by 29ft., a dining-room 28ft. by 22ft., and a kitchen 27ft. by 22ft., with an arcaded hall, open porch, w.c., pantry, and scullery, with bedrooms to match, for £620! surely surpasses the ingenuity of the most bare-faced speculating builder. Cubed up, this masterpiece works out for this amount exactly at 2½d. a foot! and the following is the description which accompanies the design: "It is an endeavour to introduce a certain dignity of treatment and interest of detail into a class of houses which has been hitherto left to the suburban builder to run up as insufficiently and vulgarly as the genius of commercialism is able." All this, of course, in plain English, is mere bunkum; for the design is as twopenny-halfpenny as the estimate—in fact, nothing could be more puerile and absurd, or elementarily crude, notwithstanding the assurance with which the description closes: "In this building, imperfect as it is, it may be seen how practical is the principle of the unity of the arts, and how easy it is to introduce colour and sculpture into the simplest architecture." This delicate allusion to sculpture has reference to two statues which are carried on two projecting piers in the front façade dividing the structure into three, and having, by way of a niche-like effect, a Classic cornice broken round over them without any visible means of support. The "harmony of colour" referred to is thus

* Matthew Arnold, in the same number of the "Hobby Horse."

explained:—"To make the house warmer and to prevent the absorption of wet, the brick walls are coated with cement rough-cast. This tinted to a pleasant yellow, makes an agreeable harmony with terracotta and white mouldings." "This frank treatment of the construction" of thin walls and intermediate piers "produces a pleasant effect in elevation." Taking briefly the plan first, we have a long porch, colonnaded with a series of five Doric columns, leading at the back of the house into a vestibule looking under the stairs. From the hall, the scullery copper ends the vista, and as the draught from the back door to the front is as perfect as can be insured, a good wholesome odour from the aforesaid copper may confidently be relied on. The w.c. opens from the first step of the main staircase, from which it is entered two steps down, while next to this necessary apartment is situated the pantry. There is neither light nor ventilation to the service lobby of the kitchen, and all food for consumption in the dining-room must be brought into the hall in front of the entrance. The staircase window is so placed that only the upper half of it would light the stairs, the remainder being hidden behind it. This is a mere detail, and like the other points mentioned, need only be considered by "the shouldering herd" of commonplace architects. "The Century Guild lays stress upon the fact that all art makes for the needs of an entire people, and more particularly does it recognise this fact in the case of architecture." Of the elevations of the precious "model" "design" we need only say that the house is simply an elongated parallelogram with square windows and a low-pitched, hipped roof, behind a solid parapet, which in perspective would hide it entirely. There is a bell-cote in the centre, and two low chimney-stacks about 3ft. high above the ridge. The first-floor windows are about 4ft. from the floor, and the scullery copper has no chimney to it. "The special aim of the Guild is to bring architecture within the reach of all," says the letter-press with this design. We need add no more, save to remark that the house would cost about £1,500 at the least.

PRIZES FOR ART-WORKMEN.

THE Council of the Society of Arts have determined, on the recommendation of the Committee of the Applied Art Section, to offer prizes to art-workmen in certain classes of art-workmanship. These prizes will be awarded to workmen only, and the work must have been executed in the United Kingdom or its dependencies.

The objects submitted for competition may be the work of one workman, or of several workmen working in combination. They need not necessarily be the property of the workman or workmen sending them in. Manufacturers or employers may exhibit articles on behalf of their workmen. In this case, besides the name of the manufacturer, the names must be given of all the workmen who have executed portions of the work, with a statement of the portion executed by each. If any prizes are awarded they will be given to the workmen, and a certificate, enumerating the award or awards, will be given to the manufacturer.

The objects in each class may be:—(i.) Copies of existing works; (ii.) Modifications of existing works; and (iii.) Original works.

In awarding the prizes, the judges will take into account the following points:—1. Originality or beauty of design; 2 Fitness of treatment; 3. Excellence of workmanship.

Before the award of prizes is finally made the candidates must be prepared, if called upon, to satisfy the Council of their competency.

The works will remain the property of the competitor, or of the person from whom he has borrowed them for the competition.

Prices may be attached to articles sent in and sales made, and no charge will be made in respect of any such sales.

All the prizes are open to male and female competitors on equal terms.

When two or more workmen combine in the production of any article sent in for competition, the names of, and the respective parts taken by, each must be specified when the article is sent in, and the proportions must be stated in which they may have agreed, if successful, to divide any prize which may be awarded.

All articles for competition must be sent in to the Society's House in John-street, Adelphi, W.C., on or before Saturday, 3rd December, 1887, and must be delivered free of all charges. Each work sent in competition must be marked with the workman's name, or that of the manufacturer, or, if preferred, with a cypher, accompanied by a sealed envelope, giving the name and address of the workman or manufacturer. With the articles a description for insertion in the catalogue should be sent. The works will be exhibited at the Society's House, or, if the necessary arrangements can be made, at the South Kensington Museum.

The Council reserve the right of withholding any of the specified prizes, or of substituting smaller prizes, or varying in any way their respective amounts. Silver and bronze medals may also be given at the discretion of the judges.

Prizes are offered in the following eight classes for the present year as follows:—

1. Painted glass, £25, £15, £10.
2. Glass-blowing in the Venetian style, £10, £5, £3.
3. Enamelled jewellers' work, £25, £15, £10.
4. Inlays in wood, with ivory, metal, or other material, with or without engraving, £25, £15, £10.
5. Lacquer, applied to the decoration of furniture or small objects, £25, £15, £10.
6. Decorative painting on wood, copper, or other material, applied to furniture and internal decoration, £25, £15, £10.
7. Hand-tool bookbinding, £25, £15, £10.
8. Repoussé and chased work in any metal, £25, £15, £10.

THE ENGINEERS' CLUB OF PHILADELPHIA.

THE Proceedings of this club is of general interest. The annual address of Mr. Washington Jones, the retiring president, whose portrait in phototype adorns this number, deals with railway enterprise and other subjects. Speaking of capital and labour, Mr. President Jones eloquently deals with the problem of how to restore harmonious relation between them. He says: "When returning reason shall awaken the working man to the facts that every man possesses the indefeasible right of free individual action, and that the most intolerable oppression known is the tyranny of a mob; and, on the other side, when employers realise that a larger output and increased returns result from justly remunerated, contented labour, the first milestones on the way to a lasting settlement of the so-called 'labour troubles' will have been passed. The hum of spindles will be silenced by command no more; nor will the forge fire smoulder whilst its master sits in enforced idleness awaiting permission to resume the toil that brings food to wife and eager little ones." Referring to the railway traffic of the United States, the president states that during the past year the total mileage was increased by 8,000 miles, of which about 100 miles in length was laid by the Baltimore and Ohio, from Baltimore to Philadelphia, intended as a link to connect the Reading Railroad and its leased lines through to New York, and another, of longer distance, has been made from Philadelphia up the Schuylkill Valley into the anthracite coal regions. In Kansas also there has been great activity in railway building. Referring to bridges, the president described the Poughkeepsie Bridge, which has been commenced over the Hudson River. It will be of steel, of four spans each, of 525ft. in length. The masonry piers will be carried up 30ft. above the water, and will sustain steel superstructures 135ft. high, upon which the bridge floor will rest. The deck of the bridge will be 55ft. above the floor, and will carry a double railway track, as it will be the only bridge crossing the Hudson below Albany. A new highway bridge is now being constructed over the Schuylkill River, Philadelphia. It is of iron, on the cantilever principle, 550ft. in length, 77ft. in width, resting upon old foundations, except the anchorage or shore piers, which are new; the former are to be rebuilt from low-water level to 8ft. above high water. The river portion will be five lines of single intersection trusses, containing ten double cantilevers and five suspended trusses. The cantilevers are 167ft. in length, 22ft. in depth at piers, and 9ft. at ends, which is also the depth of the suspended trusses. The piers are 215ft. between centres. The shore spans have plate girders 64ft. in length. The roadway is carried on transverse beams covered with buckled plates, upon which is laid asphalte composition and granolithic concrete for footways. A bridge of iron and steel to cross the Harlem River at Tenth Avenue, New York, has a central span to swing, and allow masted vessels to pass. It has a length of 508ft. and a width of 80ft. Water supply is one of the many developments of engineering. In the United States over 250 plants of water supply are now being constructed. One of the largest undertakings of this class is the Amsterdam Water Company at Weesp; the supply is obtained from an outlet of the Rhine to the Zuyder Zee, and the water will be conveyed through a 48in. main about three miles to the pumping station, which is fitted with 10 boilers and two pairs of compound beam engines moving four low-lift and four high-lift plunger and bucket pumps. Each low-lift pump has a capacity of 183,500 gallons per hour, and raises the water into settling reservoirs of 18,000,000 gallons; from these it passes through filter beds into a series of covered reservoirs, from which it is taken by the high-lift pumps (capacity 161,300 gallons per hour), and forced into stand pipes against a total head of 230ft. There is a double system of delivery, one set of mains 2ft. diameter, seven miles long, delivering to domestic users, another set of larger mains to deliver river water to manufacturers. There are 120 miles of distributing pipes, and it is stated that no fewer than 100 canals must be passed under by them.

Other works of engineering that are reviewed have already been described. The Panama and Manchester Ship Canal street railways, electric motive power for railway cars, cable railways, and other new branches of municipal engineering are made the subjects of remark, but are of less interest to our readers.

CHIPS.

A somewhat novel case in connection with buildings is reported as likely soon to occupy our courts of justice. A barrister, who had persuaded his landlord to reroof his house, claims compensation and redress because his quiet enjoyment of the premises has been impaired by reason of the building operations.

On the 21st ult. the foundation stone of the new Victoria Hospital, at Bournemouth, was laid amid great rejoicings. The estimated cost of the building is £7,000.

The Mayor of Lancaster has commissioned Mr. Percy Wood, the sculptor, to execute a life-size group in marble of Her Majesty and the late Prince Consort for the fine-art gallery which Sir Thomas Storey is erecting in Lancaster, together with a scientific institute, library, and reading-room, at his own cost.

The blinds throughout for the new National Liberal Club have been made and supplied by Messrs. G. A. Williams and Son, of Queen's-road, Bayswater, and have given every satisfaction.

The "Royal Jubilee Wall-Paper," made by Messrs. Jeffrey and Co., of 64, Essex-road, N., was selected for the decoration of the old council chamber of the Guildhall on the occasion of the Corporation Ball, given by the City of London on Coronation Day.

The Bishop of London will consecrate the chancel of Hammersmith new parish church tomorrow (Saturday), July 2. The work has been carried out by Messrs. Chamberlain Bros., from the designs and under the supervision of Mr. H. Roumieu Gough, F.R.I.B.A., at a cost of about £6,000. We hope to give a description of the building in our next issue.

The Adelphi Hotel, at Llandudno, was reopened last week after structural alteration and renovation. Messrs. Morris and Norton, Corporation-street, Birmingham, carried out the contract for decorations and furnishing, and Mr. Richard Conway that for plumbing.

A stained-glass window, erected as a memorial, was dedicated in St. James's Church, Horseley Fields, Wolverhampton, on Sunday. The window is a three-light window, representing respectively figures of Faith, Hope, and Charity, under a crocketed canopy. Mr. Samuel Evans, of West Smethwick, was the artist.

Building Intelligence.

AXBRIDGE.—The grand old parish church of St. John the Baptist, Axbridge, Somerset, was reopened last Friday, 24th ult., after final restoration. The nave and aisles had been restored and reseated in 1879 at a cost of £3,200. The chancel was taken in hand in 1880, when a triple sedilia and piscina were discovered on the south side, and on the north a doorway and small squint, which once opened into a now non-existent priest's chamber. The work now carried to completion comprised the restoration of the chancel aisles and south transept. On taking down a large monument to Mrs. Prowse from before the east window of the south aisle, three small groined niches, remains of a reredos, were discovered. The six-light window of transept has been rebuilt, and the roofs oak panelled, restored, and recovered with lead. A stained-glass window, the gift of Mr. Sidney Hill, of Langford, has been placed in the east end of the church by Messrs. Bell and Sons, of Bristol. The four lights represent respectively the Nativity, Crucifixion, Resurrection, and "Feed my Sheep." New choir stalls of oak upon a surbase of Ham Hill stone have also been placed in the chancel. The work has been carried out at a total cost of about £5,000, by Messrs. Trask and Sons, of Norton, near Ilminster, from designs by Mr. J. D. Sedding, the diocesan architect, and under the direction of Mr. W. Jane as clerk of the works.

NATIONAL GALLERY.—The new series of galleries, together with the grand entrance staircase, at the National Gallery, of which we gave illustrations in our issue of April 29 last, are completed, and will be opened on Monday next. The work has cost about £50,000. The builders of the foundation of the new fabric were Messrs. Mowlem and Co., the second contract for the remainder of the builder's work having been placed in the hands of Messrs. Stephens and Bastow, of Bristol. The whole of the marble work, with the exception of the mosaic floors, has been executed by Messrs. Farmer and Brindley, of Westminster Bridge-road, the mosaic floors having been laid by Messrs. Burke and Co., of Newman-street, Oxford-street, W. The works have been carried out from plans by and under the superintendence of Mr. John Taylor, of H. M. Office of Works. The chief rooms are a new central gallery, measuring 65ft. by 40ft., lighted from the middle of roof by a lantern; a new north gallery, 85ft. by 40ft., the largest and finest apartment in the whole building; and two cabinet rooms, each 30ft. by 20ft.

SOUTH KENSINGTON.—A new parish room, vestries, and morning chapel are being added to St. Stephen's Church, Queen's Gate, from the designs of Mr. Hugh Roumieu Gough. A corner stone was laid by Lady Borthwick on the 23rd inst., and it is expected that the works will be completed in about three months' time. Messrs. Chamberlen Bros., of Hammersmith, are the contractors for the new buildings, which will cost about £1,400.

THE PEOPLE'S PALACE.—The King of the Belgians on Saturday laid the first stone of the library which is to be erected as one of the adjuncts to the People's Palace at Mile End, from plans by Mr. E. R. Robson, F.S.A. The library is to be an octagonal building, and will comfortably seat 500 people. Galleries will run round the interior walls, and the lighting will be almost entirely from the top. It is intended as an appendix to the Queen's Hall, with which it will be connected by two large reading rooms and a conservatory. This new building, when completed, will be the second largest library in London, that of the British Museum alone surpassing it. It will contain both books of reference and of general literature.

The Duke of Westminster has commissioned Mr. Frampton, of Buckingham Palace-road, London, the artist who designed the stained-glass windows in St. Mary's Church Without the Walls, at Chester, opened last week, to design a great west window for St. John's Church in the same city as his jubilee gift to that church. The window is to be historical in subject, illustrating the ecclesiastical history of St. John's.

Engineering Notes.

EDINBURGH.—A new bridge has just been completed on the old Queensferry-road over the Water of Leith at Bells Mills, providing a carriage drive from the west end of Edinburgh to the Queensferry-road. The whole cost of the improvements is from £18,000 to £19,000, of which about £5,000 was spent on compensations. The engineers for the bridge are Messrs. Blyth, Cunningham, and Westland, George-street, and the contractors Messrs. Henderson, Matthews, and Co. About 500 yards from the bridge a new roadway with a rising gradient of 1 in 24 has been constructed within stout retaining walls—varying in thickness from 10ft. at the bottom to 3ft. 6in. at the top. On the south side the wall is broken up, and relieved by an arcading of dressed stones, while on the north side the blind arches are of brick. The river is crossed by a single round-arched bridge of 68ft. span, the piers being carried up 12in. above the castellated parapet. The retaining walls, which have step-breaks, are surmounted by a coping of freestone, while the 5ft. parapet of the bridge has a coping of red granite. The roadway between the parapets is 40ft. in width, the footpaths being each 7ft. It took 12 charges of dynamite to blow the old bridge down, and among the ruins was found the trowel of one of the masons who had originally built the structure. From Palmerston-place a narrow lane has been widened out into a broad street, 60ft. in width, with footpaths on each side. There is still a piece, 20ft. at least in width, opposite Douglas-crescent, as to which terms have not yet been arranged, and which forms an eyesore at present. On the east side the arches have been opened, and are to constitute cellarage for the houses which may be built along that line. The gradient of the road from Palmerston-place is 1 in 13½, and the parapets are finished with stepped caps. The raising of the level of the roadway has also involved the erection of a new lodge and entrance gate to the Dean Cemetery, and the raising of the wall of the Orphan Hospital.

NOTTINGHAM.—The first step towards boring a tunnel under Mapperley Hills, which forms one of the principal portions of the work in connection with the construction of the new Nottingham Suburban Railway, has been taken by sinking a shaft in the hill. The Nottingham Suburban Railway Bill received the Royal Assent on June 25, the share capital has been subscribed, and negotiations with most of the owners of land through which the railway will pass, have been concluded. The proposed line is estimated to cost £215,000. The contract has been let to Mr. J. P. Edwards, of Birmingham, who is at the present time engaged in constructing the Heanor and Ripley extension of the Midland line, and he has undertaken to complete the Nottingham railway within a period of two years.

CHIPS.

The Court of the Carpenters' Company having offered to the Clerks of Works' Association the use of a room in their premises in London Wall for their meetings, the Association have removed their headquarters from 31, Spring-gardens, which has since the formation of the body in 1882 been generously placed at their disposal by Mr. John Oldrid Scott, to Carpenters' Hall.

The Queen will lay the foundation-stone of the equestrian statue of the Prince Consort, the Jubilee offering of the women of England, and a replica of the one at Glasgow, on Thursday week, the 14th inst. The site selected by the Queen is near Smith's lawn in the most picturesque portion of Windsor Great Park, between Cumberland Lodge and Virginia Water.

The foundation stone of a new Established church was laid at South Connel, near Oban, last week. The church will cost £1,300, including fittings and site, and will seat 240 persons. Mr. David Macintosh, of Oban, is the architect, and the contractors are Mr. Roderick Mackenzie for mason work, and Mr. W. Menzies for all other trades.

The Manchester Ship Canal Company have contracted with Mr. T. A. Walker, of Westminster, to complete the canal for a sum which is £561,000 less than the Parliamentary estimates. Mr. Walker will also take, if requested to do so, half a million in ordinary £10 shares as part payment.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

NEWCASTLE SOCIETY OF ANTIQUARIES.—The third country meeting of this society for the season was held on Saturday, at Hexham. The party, under the guidance of Mr. J. P. Gibson and Mr. C. C. Hodges, visited the Abbey Church. On arriving at the church, Dr. Bruce remarked that they were in the "Heart of all England," an extremely pretty place, a fruitful land, a likely situation to be occupied by the Ancient Britons. He also conceived it was occupied by the Romans, it was just the sort of place they would take possession of. Then they had this grand sanctuary — the Abbey Church, one of the best specimens of Early English in all England. The workmen who built these grand edifices must have been men of great skill, as they had apparently gone to work without any elaborate detailed drawings. Mr. C. C. Hodges read a paper on Hexham, in which he expressed the opinion that Hexham was not the site of a Roman station, and that the Roman stones found at Hexham had been brought from the neighbouring Roman station of Corstopitum (Corbridge), which outshone in splendour any other Roman city in Northumberland. Referring to the Roman altar and other worked stones taken from the bed of the river Tyne a few days previously, Mr. Hodges suggested that the carters in carting Roman stones from Corbridge to be used in the building of the church at Hexham, had had the cart upset in the river, and had not been at the trouble to get the stones out of the water again, but had returned for another load. At any rate, judging from the wear of the water upon the stones, they seemed to have lain in the river for many centuries. Mr. Hodges exhibited views of what the abbey and monastic buildings were like a century and a half ago, and the party were conducted over the church, the crypt, the cloisters, the chapter house, and shown those portions of the old monastic buildings which still remain.

THE SOCIETY OF ARTS.—The annual meeting of the Society of Arts, concluding the 133rd session of its history, was held on Wednesday in the great hall of its house, John-street, Adelphi. The report, which was read by the secretary, Mr. H. Truman Wood, was adopted. Having enumerated the papers read and the lectures delivered during the session, the report stated that prizes to the amount of £368 had been offered for competition to art workmen for articles to be sent in next December. Prizes for the best motors for electric lighting had also been offered to practical students in that important branch of investigation. Among other matters mentioned in the report were the presentation of the Albert Medal to Her Majesty in recognition of the progress made in arts, manufactures, and commerce during her reign, and the erection of a memorial tablet on the house of the late Mr. W. M. Thackeray. The income of the society during the past year amounted to £12,575. The result of the balloting for the election of officers was announced. The Prince of Wales was re-elected president, and among the vice-presidents were the Duke of Edinburgh, Prince Albert Victor, Sir Frederick Abel, the Duke of Abercorn, the Attorney-General, Sir Edward Birkbeck, Sir Frederick Bramwell, Sir Philip Cunliffe-Owen, Sir Douglas Galton, the Duke of Manchester, Sir Henry Ponsonby, and Lord Thurlow.

The ceremony of turning the first sod on the site of the proposed Dartmouth Park Extension Pool was performed at West Bromwich by Earl Dartmouth on Saturday afternoon. Lord Dartmoth gave the original park to the town eight years since, and has now presented an additional piece of land containing nine acres, which will be laid out as a boating lake. Mr. Jeavons is the contractor for making the pool.

Mr. Cosmo Innes, M.Inst.C.E., Secretary of the London Sanitary Protection Association, died on the 18th inst., at 11, Upper Phillimore-gardens, aged 45. Mr. Innes was the youngest son of the late Cosmo Innes, Professor of History in Edinburgh University.

The whole of the officers and men engaged by the Corporation of Droitwich in the gas, water, and sewerage departments were entertained by the borough surveyor, Mr. C. Hendon, C.E., at his residence on Saturday evening. The Mayor presided.

ARCHÆOLOGICAL.

STRATA FLORIDA ABBEY.—The ruins of this ancient abbey are now being excavated by Mr. Stephen W. Williams, F.R.I.B.A., Rhayader, Radnorshire, who is about to contribute a paper thereon to the next annual meeting of the Cambrian Archæological Society. Strata Florida Abbey is situated in a remote part of Cardiganshire, and was founded in 1076 by Rhys ap Tewdwr, and in 1164 further endowed and enlarged by Rhys ap Griffiths, Princes of South Wales. In 1281 it was burnt down during the wars between Edward I. and the Welsh, and subsequently rebuilt. It appears to have flourished until the dissolution of the monasteries in the reign of Henry VIII., when it gradually fell into ruin, and all that now remains above ground is a fragment of the north transept wall, a portion of the west wall of the nave, with the great western doorway and the west window of the south aisle. Mr. Williams has already uncovered most of the foundations of the abbey church so as to ascertain with accuracy the plan of the building, and during the progress of excavation has discovered many interesting fragments of moulded stonework, encaustic and glazed tile pavements, the piers of the nave, the piers of the great central tower, and the eastern chapels of the north and south transepts. It is hoped that funds will be forthcoming to clear the entire area, as there is little doubt if this were done that many more interesting facts will be elucidated, as it was for several centuries the burial place of the princes of Wales, and may, indeed, be called "The Westminster Abbey of Wales."

COMPETITIONS.

PROPOSED HIGH SCHOOL FOR HARTLEPOOL.—A special meeting of the governors of Henry Smith's charity was held on the 27th inst. in the Council Chamber, Hartlepool, the Mayor presiding, to consider the question of the plans of the proposed new High School in connection with the Trust. The Charity Commissioners had written that the plans submitted were not sufficiently detailed, the plans being those marked "Rover," and selected by the Board on condition of their being approved by the Charity Commissioners. In reply to Mr. Wood, the clerk gave it as his opinion that there was no contract binding on either the Board's or the architect's side, as the agreement stipulated that the commissioners were to give their approval. The Mayor thought that a proper course would be to call in the services of a first-class architect, and tell him exactly what they wanted, and ask for an estimate of cost. Mr. Wood supported this view. Mr. Henry Belk moved, that seeing the plans marked "Rover" had failed to receive the consent of the commissioners, they be not accepted by the Board. Mr. Nielson seconded, and this was carried. A discussion then arose on the Mayor's suggestion of calling in an architect, when it was agreed that a committee should consult Mr. G. G. Hoskins, of Darlington, relative to plans and specifications for the proposed High School.

THE GLASGOW INTERNATIONAL EXHIBITION.—At a meeting of the Printing and Advertising Committee, held on Tuesday, the premium of £15 for a design for a poster was unanimously awarded to the sketch bearing the motto "Legibility." The author is Mr. Harry C. Mitchell, 2, Baxter-place, Edinburgh. The design shows a figure with outstretched arm representing the advance of civilisation, overlooking the Glasgow Bridge and part of the river Clyde, with a distant view of the city. Below the figure, which is in the right-hand corner of the poster, there is the Glasgow coat of arms. Thirty-one designs were submitted to the committee.

The foundation-stone of the enlarged parish church of St. Peter's-at-Gowts, Lincoln, was laid on Tuesday week. Mr. C. Hodgson Fowler, F.S.A., of Durham, is the architect. Mr. H. S. Close, of Lincoln, has taken the contract for masonry, and Mr. S. Barker, of the latter city, for joinery. The cost will be about £1,800.

A bust of the Queen by Mr. Boehm, R.A., mounted on an oak pedestal, was unveiled at Chelsea Hospital on Monday by the Duke of Cambridge.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—W. I. and Son.—R. H.—B. H. and Co.—J. McQ.—M. P. B. and Son.—P. and Son.—C. G. R.—D. and Co.—R. G. and Co.—J. L. A.—S. Bros.—F. W. R.—B. of R.—B. A.—B. P. B.—M. and T.—A. E. Co.—C. and Co.—E. and Sons.—R. L. L.—J. A.—J. W. and Co.—L. W. and S. Co.—J. G.—A. D. D.—W. E. R. and Co.—N. and S.—G. B. and L.—G. B. J.—H. H.

"BUILDING NEWS" DESIGNING CLUB.

NINTH LIST OF SUBJECTS.

R.—A small country vicarage in brick and stone, with tile roofs. Study (12ft. × 13ft.) to have a waiting lobby adjoining, with a separate porch for persons calling on the priest. House to have a drawing-room 18ft. by 14ft., dining-room 20ft. by 15ft., six bedrooms, bath-room, one dressing-room, and w.c. on both floors. A back staircase to be provided. Scale 8ft. to the inch. Two plans, one elevation, and section (or two elevations), and perspective sketch.

S.—A cricket pavilion for a private club. Club-room to be 22ft. long by 16ft. wide, with a raised gallery over it for ladies. In front a terrace, with seats for 200 persons, is to be provided, and a verandah the whole length of the club-room, and 10ft. wide, is to be contrived. A refreshment-bar is to be situated at one end of the club-room on the ground floor, and at the other end a committee-room is to be placed. Over the latter are to be two dressing-rooms for members, with lavatory, urinal, and w.c., reached by a stair out of the entrance-lobby, and over the bar a ladies' retiring-room, with lavatory and two w.c.'s, are to be arranged. These may be reached from the gallery staircase landing. A players' terrace is to occupy the front of the committee-room. Building to be in half-timber on a brick base. Scale, 8ft. to the inch; elevation, two plans and sketch.

(This list is the last of our present series.)

DRAWINGS RECEIVED.—"Protoplasmic Globule," "Suum Cuique," "Clair," "Half-and-Half," "En Avant," "Truth," "Hand in Hand," "Gereon," "Northumberland," "Stag," "Toujours Pret," "Eton," "Elean," "Oxon," "Loidis," "Norseman," "Dunedin," "Cancer," "V. R.," "Vitruvius," "Barum."

Correspondence.

DESIDERATA.

To the Editor of the BUILDING NEWS.

SIR,—As an appendix to Mr. Edwards's valuable suggestions in your last number, would you allow me to say that a series of "Plans of country houses," by acknowledged masters of the subject, would be invaluable to the ordinary practitioner. I believe that the late Mr. Burn was considered an adept at planning a mansion, and if a set of papers could be written on the subject, illustrated by acknowledged masterpieces of "arrangement," great good would result from it. In my experience many architects can design a suite of "entertaining rooms," but only very few can grasp the requirements of the working part of a country house. So far as my observation has extended, it requires more genius to plan the "service" part of a mansion and the stabling than any other part of it. My remarks refer to "planning," and are not intended to refer to architectural treatment.—I am, &c.,

Chester, June 27. JAMES GOODSON.

ARCHITECTS AND QUANTITY SURVEYORS.

SIR,—I am sorry to hear from "Quantity Surveyor" "that most architects in the present day take out quantities"; I thought that only persons who were not up to much at architecture did so. I do not profess very much knowledge of the matter; my only wish is to see better architecture, and I think this can only be done by men devoting their whole time to it, and not attempting to take out quantities.

When I said that a person could be an architect and surveyor, I meant that he should do such surveyors' work as cannot be properly done by a quantity surveyor "pure and simple."—I am, &c., C. F. M.

WORKMEN'S COTTAGES.

SIR,—The plans of a pair of workmen's cottages which are placed first in the issue of June 17th, are about the worst that could be conceived—from a sanitary point of view.

The larder-door, opening from the scullery and lighted from the washhouse (the latter being superfluous in this class of building, unless used by two or more tenants); the w.c., separated by a thin wall from the kitchen cupboards and under a bedroom; the pump, in an angle of the washhouse (I suppose) is intended to be used on both sides of the wall—a very ingenious arrangement for producing black eyes, if not broken bones.

In the design placed second in the last issue the above objections, with the exception of the w.c., do not apply; but the latter ought always to be outside the main building.—I am, &c.,

JAMES THORNELOE.

ROCHDALE TOWN HALL.

SIR,—In your issue of the 24th inst. a mistake was made in calling me the architect of the Rochdale Town Hall. This must have been merely an inadvertence, as it is very well known that the many beautiful details of that building are due to Mr. Crossland.—I am, &c.,

A. WATERHOUSE.

20, New Cavendish-street, Portland-place, W.
June 28.

THE NEW COINAGE.

SIR,—It seems to me that every art journal should unite in a positive condemnation of the design and execution of these coins. We are flattering ourselves with the progress made in art, knowledge, taste, and mechanical excellence during the last 50 years, and yet this coinage, which is to commemorate through the future her Majesty's Jubilee, is a flat contradiction to what we are crediting ourselves with. Design and execution display childish impotence compared with the work of Pistrucci 60 years ago. Mr. B. may be able to design bulls, but he should let alone bullion.

The ancients, with their clear-sightedness, confined the portraiture to the head as filling well the field, and that is all that is needed. As to the heraldry, the charges are not big enough, and the tinctures of shields should have been shown. But as regards the "reverse," I should like to have got rid of the shields for something more novel, as the head of a trident, with a fish on one side to indicate our oceanic colonies, and a star the other, to remind us of India, with, on the margin, the name or value of the coin. The superscription on the obverse I would have: "Victoria Brittaniæ et Hiberniæ et Coloniorum Regina, atque Indiiæ Imperatrix."

As a gracious Providence has given us mighty colonies and extended empire, it is a ridiculous and culpable false shame not to claim and show forth our honourable position.—I am, &c., M.

Intercommunication.

QUESTIONS.

[9331.]—**Fixing Photos.**—Would you or any of the numerous readers of the BUILDING NEWS inform me of the best paste for fixing photos in albums or on card-board, and also how to prevent the unsightly bulging?—G. H. G.

[9332.]—**Various.**—Will any of your readers be good enough to reply to the following questions?—(1) Which is the best paint for putting on the exterior of a stucco house already painted, and how many coats are required? (2) Which is the most effective outlet ventilator to discharge into flue? (3) Can anything be done (other than relaying the floor entirely) with plain jointed boarding in a dining-room, the joints of which have gaped very considerably? (4) The floor of a porch, composed of stone slabs, has very much worn with the traffic upon it. Would it be possible to hack off an inch or so all over the surface to make it level, and then fill up with mosaic or tiles flush with the stone steps?—A FIVE YEARS' SUBSCRIBER.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—I would esteem it a great favour if some practical authorities on the subject of ventilation would give their views in connection with the following matter:—A large Congregational church having galleries along the whole length of two sides of the nave and across the west end, also a number of traceried windows, giving a large cooling glass area round the galleries and a roof of unusual height over nave, is at present causing much speculation as to the reason of the large amount of draughts that sweep down on the heads of the congregation in a most inconvenient and unaccountable manner. So much so does the evil exist that some of the seatholders have left the place, and others threaten to do so unless the defect can be remedied. Many say there is no scientific system of ventilation provided. There are a number of openings certainly, "communicating into the false roof only," and running down the nave at the apex of the Gothic arched open-timbered roof, the line of which the ceiling plastering follows between the spars; but there is no turret or other ventilator with tube connections, and in contact with the openings in question to act as exhausts. Now, my own theory is, first, the old building being so very lofty, provides a large cubical area of cold air in the upper levels, which, for want of a proper system of draw-off or outlet ventilation, becomes displaced and thrown down by the rising current of warmer air when the heating apparatus is turned on (low-pressure hot water); and 2nd, because these down-currents being felt by the congregation so severely during the whole of the Sunday—and this, in face of the fact that the heating apparatus would be in working order on the Saturday—seems to point to the supposition that the heating arrangements are inadequate. And these two evils of want of ventilation and heating power so combine as to provide a nicely-balanced equilibrium of favouring circumstances that would induce and maintain the circulation of air-currents or down-draughts, and which would go on indefinitely unless an equable temperature could be induced by some means. I have no doubt that the case brought forward is but one of many such instances of failure, and the subject is, therefore, one of great importance to the designers of public buildings. With your kind indulgence, I would place the subject before your readers in the hope it may be the means of initiating an interesting discussion and expression of opinion that may prove of value to a large number of your readers. Before closing, I would suggest as a remedy in the case in question (and I do so "merely as an expression of opinion"), first, that a hot-air apparatus be placed in the basement; that two shafts be carried up from same, one to deliver hot-air into the large area comprised in the space between the crown of nave arches and ceilings above, and the other air-shaft to be connected with properly-placed exhaust shafts, distributed along the highest point of ceiling, and thence properly connected to an exhaust turret ventilator at the highest available point of roof. And third, that the heating power be increased in the existing apparatus. I may, I confess, be entirely wrong in my views, and I shall be glad to be corrected if in error, and learn the opinions of others.—REX.

[9334.]—**Extras.**—A. and B. are surveyors who met and measured extras to contract. A. proposes making out his valuation of the extras, based on Laxton's prices, and have the accounts stamped—that is the sheets on which the aggregate amount is made out. B. is not a licensed appraiser. Kindly inform me through the columns of your valuable paper whether the account so made out can be set aside? I may say the object of stamping is to prevent, if possible, any litigation.—SURVEYOR.

[9335.]—**Foundation-Stone.**—Will some reader who knows kindly tell a young architect what he is expected to do at the ceremony of laying a foundation-stone of a new building being erected from his designs? A few hints which would put him in the way of creditably performing his duty on such an occasion would greatly oblige a—JUNIOR.

[9336.]—**Ground Plans of Dominican Monasteries.**—Can any reader favour me with the names of any pre-Reformation Dominican houses in this country, and the usual arrangement of ground-plan in buildings erected for this order?—EAST ANGLIAN.

REPLIES.

[9310].—**Half-Timbered Walls.**—The criticisms of "F. B. P." would have more weight if he had first made himself acquainted with the history of this kind of construction. It so happens that the method proposed by H. Rumble is a much nearer approach to the older and truer style than filling in with brickwork, this latter method being a greater innovation than that of H. R. The old workmen did not fill in brickwork, and if they had done so they would not have plastered it over, for the very simple reason that such a method would be contemptible. If brickwork will keep out the wet, why plaster it? If not, the brickwork is best separated from the plaster, and better still, not to overhang. The sneer about the scene-making plainly shows "F. B. P.'s" practical ignorance, as the cost of the lead is a very small factor in proportion to the total cost.—JAMES THORNELOE.

[9322.]—**Feather-edge Joists.**—I have been away from home, or would have replied to the above question earlier. Feather-edged joists in wood is a subject entirely new, and one consequently worth quietly considering. I am not one who places much reliance on the published tables of tensile and compressive strengths of timber, as they are invariably framed upon selected scantlings, cut from logs or deals grown under circumstances with which we are entirely unacquainted, and wholly irrespective of the weakening influence of knots, which occur invariably in groups of five at intervals of 18in. or 2ft., passing through the volume of longitudinal woody fibres at an angle of about 45° with a rapid increase in size as they approach the outside. This refers more especially to the top end of logs or deals; but, as seen by passing a cut down the heart of the tree, they are more or less present and pronounced in all qualities of fir wood. I mention this detail as having an enormous influence upon wood, and regret that it is practically ignored by all specialists framing tables of the strength of timber. In dealing with the question of feather-edged joists, I do so with well-autheticated tables, as being the best instruments within reach; but they nevertheless are, in my opinion, very imperfect instruments, and in practice a wide margin should be given for contingencies like the above; more especially when tensile strength is under consideration. The late Mr. Thomas Laslett, timber inspector to the Admiralty, furnished very exhaustive tables in his admirable work, "Timber and Timber Trees—Native and Foreign," extracts from which, so far as they bear upon the question at issue, I give below—

EXPERIMENTS ON PIECES 2IN. × 2IN. × 30IN.

	Direct cohesion. lb.	Crushed with. Tons.
Dantzic fir, average of 5 tests	3·231	2·625
Riga fir do. do.	4·051	1·844
Average	3·641	2·234
Equal to	32½cwt.	44⅝cwt.

The tensile experiments are only taken as pieces 30in. long, as being most suitable for holding in the clamps; but the vertical or crushing experiments are taken on a variety of lengths, from which I have selected 2in. × 2in. × 30in., the shorter showing greater power of resisting the crushing load. As the question before us—broadly speaking—is Baltic fir, I have averaged the two shipments of Dantzic and Riga. By this we get a fair average of bearing timbers. The experiments do not extend to Swedish, Finnish, or Russian sawn goods, which, although more suitable for wrought work, are infinitely inferior for joists or timbering purposes. From the above experiments we see that the 2in. × 2in. × 30in. scantling parted with a tensile strain of 32½cwt., and that the same scantling crushed longitudinally with a vertical weight of 44⅝ cwt. This proves that the tensile power is inferior to the compressive powers as 3 to 4, and that if applied in practice to a 12in. × 6in. beam, the lower edge should be 7½in., and the upper edge 4¾in. broad. This is about the result we might anticipate, as it conforms with those of other materials; but there is this to be said, that in the case of wood, in which knots form such a weakening agency, the weakness is only apparent on the lower edge or part in tension, which should be increased in volume at the expense of the part in compression. In answering the above question, I prefer to leave out the detail of tension, as I hold it would be but slightly affected by making the lower edge of a beam or joist broader and the upper edge narrower, the depths and sectional area being undisturbed.—WM. STEVENSON, The Park, Scarborough.

[9328.]—**Surveyors' Examination.**—The subsection of the students' proficiency examination for building comprises the following subjects—Land surveying, levelling and elements of trigonometry, book-keeping, practical measuring (oral exam.), bills of quantities and measurement of artificers' work, constructive and working drawings, elements of law of fixtures, of dilapidations, and law of easement. For surveying, Baker's "Land and Engineering Surveying," or Merritt's work on the same subject may be used; for bills of quantities, &c., I should recommend Leaning's "Quantity Surveying" and "Complete Set of Contract Documents," published at 10s. by E. and F. N. Spon; for the elements of the law of fixtures and easements, read Grady "On Fixtures and Dilapidations," Houldsworth's "Law of Landlord and Tenant," and Innes' "Digest of Easements." Attention should be particularly given to surveying, to the preparation of working drawings and quantities, and the elements of the law bearing on landlord and tenant and easements; how the rights of support, light, and air are acquired, the law as to party structures, Metropolitan Building Act, how these easements are infringed, and the remedies for infringement; Public Health Act, 1875, as to dangerous structures, &c.—G. H. G.

[9330.]—**Legal.**—A stamped agreement ought to be prepared and signed by the contractor as well as the plans and specifications. 2. The clause that any variation made in carrying out the works is not to vitiate the contract is chiefly intended to apply to alterations during the progress of the work, and should be incorporated in the legally-drawn-up contract or agreement. 3. If the "extras" ordered were of such a nature as to require lengthened time, and were mixed up with the original contract work, the employer cannot sue the builder for penalties. The builder is not liable for any damage, if through the act of employer the work is delayed. If there is no legal or stamped agreement it may be desirable to waive the penalty for completion, though circumstances must dictate the proper course to adopt. The written acknowledgment of liability, if made after the extras were all ordered, is the only ground upon which action can be taken.—G. H. G.

The report of Mr. Williams, C.E., on the completion of the outfall works on the river Witham, South Lincolnshire, has just been issued, with a map, in pamphlet form. The total cost of the works has been, including Parliamentary expenses and land, £167,941; and the absolute gain or depression acquired is 4ft. at the Grand Sluice, 4ft. at the Black Sluice, and 5ft. 6in. at the Hobhole Sluice.

LEGAL INTELLIGENCE.

DISTRICT SURVEYORS' FEES.—At Hammersmith Police Court on Tuesday, Charles Bowyer, the owner of two houses in Goldhawk-road, Hammersmith, was summoned to show cause why he refused to pay £3 12s. 9d., claimed by the Metropolitan Board of Works. Mr. Norman Bevan, on behalf of the Board, said £3 formed the fees paid to Mr. Knightly, the district surveyor, for inspecting the houses, which were in a dangerous condition, and the 12s. 9d. was for general expenses. The Act allowed 20s. to the surveyor for each house, but the Board allowed him 15s. in each case. A clerk from the Board's offices was called to prove that the item 12s. 9d. was charged under the decision in the case of the Board v. Flight. A question arose as to whether the Board had the power to charge for general expenses. Mr. Bevan submitted that it was not in the discretion of the magistrate to question the item. He said the Board had absolute power to allow anything they thought proper. Mr. Paget: They may give £1,000? Mr. Bevan: Of course, they would not do it. Mr. Paget: I am not quite sure. The defendant contended that he was not liable, as it was not necessary to take the buildings down, and that the fees were not charged according to Act of Parliament. Mr. Paget said he was with the defendant on the point as to charging the fees according to Act of Parliament. The question was how much the Metropolitan Board were entitled to pay. He should not make any order in respect of the general expenses. He then ordered the defendant to pay 40s., the full amount which the Act allowed, with 2s. costs. His knowledge of the law was better than that of the clerk of the board. Mr. Bevan said the board would not allow the case to rest there.

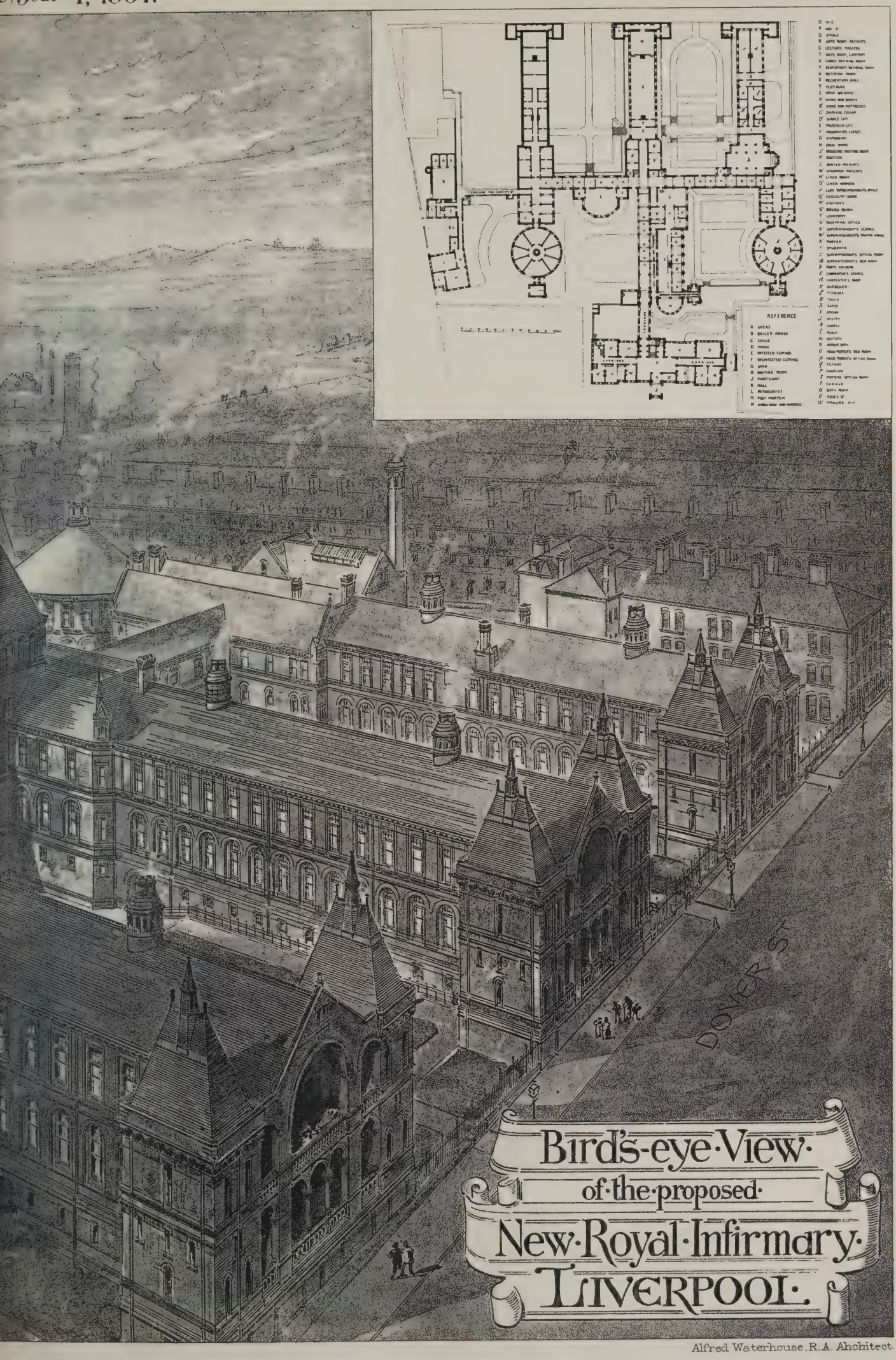
ACTION AGAINST A COUNTY SURVEYOR.—At the Sessions at Magherafelt, on Wednesday week, a case in which considerable interest was aroused came on before Mr. J. C. Neligan, Q.C., Recorder of Londonderry, and a special jury. The action was brought by Robert Waters, of Allahabad, in India, brigade surgeon, having property in Moneyguiggy, near Tobermore, against A. H. Adair, of Londonderry, county surveyor, and John Hagan, and Francis Hagan, both of Drumdoig, road contractors, to recover £50 damages sustained by reason of defendants having broken and entered plaintiff's lands, in the townland of Moneyguiggy, and pulled up and destroyed a hedge, plaintiff's property, and removed a quantity of thorns, and converted same to their own use. Evidence having been taken, his honour, in addressing the jury, considered no justification had been proved for the pulling up of this hedge, and the only question for them was one of damages. The jury accordingly assessed the damages at £40 against the defendants Adair and Francis Hagan.

CONFESSION OF FORGERY BY A BUILDER.—At Greenwich Police-court on Saturday Arthur Goddard, 45, builder, of 9, Silverdale-buildings, Sydenham, was charged on his own confession with having fraudulently obtained the sum of £250 from Mr. Dale, manager of the Peckham branch of the London and South-Western Bank, by means of a forged lease of two houses known as Montacute and Mandeville, Burghill-road, Sydenham. The prisoner had no reply to make to the charge, and was committed for trial at the Old Bailey Sessions.

IN RE CHARLES H. EVERETT.—This was an application for an order of discharge. The bankrupt had traded as a builder and contractor in Iverson-road, Kilburn, and he owed £15,401, with assets £447. The bankrupt commenced business about 15 years since, and in 1883 a partnership with Mr. J. Ford, which had existed for about seven years, was dissolved, the latter retiring on the receipt of cash and property to the amount of £1,200. The bankrupt estimated the firm's capital at that time at £3,000. He afterwards continued the business, and entered into contracts for railway, drainage, and building works, to losses on which he attributed his failure. About December, 1885, the bankrupt assigned all his property to Mr. Harry Smith, upon an undertaking to arrange with the creditors on the best possible terms. It appeared that Mr. Smith bought up the debts of some of the creditors who were parties to the arrangement, paying them 4s. in the pound, but other creditors received nothing. The Official Receiver reported that the bankrupt had kept certain books (which he described), but they were not such as sufficiently disclosed his business transactions and financial position. It appeared that the immediate cause of the suspension was the taking possession of the bankrupt's plant by the Finchley Local Board. Mr. Registrar Brougham said the only offence alleged against the bankrupt was that his books did not sufficiently disclose his business transactions and financial position, but in this case it was not a very serious one, and as the bankrupt's examination appeared to have been concluded in April, 1886, the order of discharge would be suspended for one month only.


A MEDICAL WARDS
B SURGICAL WARDS
C INFECTION WARD
D SEPARATION WARDS
E SCHLLERY
F SISTER
G SISTERS BATH ROOM AND W C
H DOCTOR
J OPERATION ROOM
K OPERATING THEATRES
L SPLINTS
M WAITING ROOM
N PATIENTS CLOTHES
O SICK NURSES
P PAY WARDS
Q BATH ROOM FOR SICK NURSES
R NURSES BATH FOR PAY PATIENTS
S DINING AND CONVALESCENT ROOM
T HOUSEMAIDS CLOSET
U MOVEABLE BATHS
V SERVICE LIFT
W PASSENGER LIFT
X BATH ROOMS
Y LAVATORIES
Z W C's
A NURSES DINING ROOM
B LAUNDRY
C ENGINEER'S W C
D WORKING W C
E RECEIVING ROOM
F DELIVERY ROOM
G WOMEN'S ENTRANCE TO LAUNDRY
H LINEN ROOM
J NEEDLEWOMAN
K LADY SUPERINTENDENT'S DINING ROOM
L MEDICAL OFFICERS SITTING AND BED ROOMS
M VALETS ROOM
N MEDICAL OFFICERS COMMON ROOM
O MEDICAL OFFICERS DINING ROOM
P SERVING ROOM
Q COVERED DRYING GROUND
BALCONY
BROWNLOW
A. Waterhouse
Jan 1887

PHOTO-TINT



Alfred Waterhouse, R.A. Architect.

PARLIAMENTARY NOTES.

THE ADMIRALTY AND WAR OFFICE SITES.—In answer to Mr. De Lisle, Mr. Plunket said, on Tuesday night—In the scheme presented by the Committee on the Admiralty and War Office sites, by which it is estimated that portions of the Spring-gardens site to the value of £266,000 will be preserved, provision is made for continuing the Mall in a straight line into Charing-cross with an opening of about 75ft. in width. Such a line obviously must be at a certain angle with the Strand, because the Strand and the Mall do not form one straight line. I cannot give any pledge as to what steps the Government may or may not take in future for securing additional space.

THE CORONATION CHAIR.—Mr. Plunket stated on Friday, in answer to a question, that the old Coronation Chair had not been in any way stained or disfigured, and not the slightest injury had been done to the traces that remained of the ancient gilded work. Misapprehension might have arisen from the circumstance that it was necessary to fit in temporarily some few pieces of tracery which were missing, and to stain these brown to match the colour of the old work. The colour of the old work was not touched, and remained exactly as it was before the ceremony.

STAINED GLASS.

EDINBURGH.—The Lindsay Alexander memorial window has now been completed in the nave of St. Giles' Cathedral, upon the south side and over the font. The window is divided by stone mullions into four compartments in the width, with an upper and lower tier, with tracery all filled with figure work illustrating the life of Moses conforming to the arrangement of Scriptural subjects approved by the St. Giles' Board of Management. The upper groups are in large figures, representing prominently Moses and Aaron amidst the Israelites, delivering the Commandments on Mount Sinai. Four separate groups under these represent the Passage through the Red Sea, Smiting the Rock, the Brazen Serpent, and Moses Viewing the Promised Land. Other selections occur in the tracery, such as the messengers carrying the grapes of Eschol, Moses at the burning bush, two angels holding scrolls inscribed Sinai and Pisgah, and the emblematic Aaron's rod. From an art point of view, this work has a special interest, as it differs from previous windows by the artists, Messrs Ballantine. This is evidently due to recent studies made upon the Continent by Mr. Alexander Ballantine, and also to the influence which the windows by Cottier and Burne-Jones have had in moulding the public taste in the matter of stained-glass decoration. The prevailing dark colours are rich ruby, violet, and slate, which appear in a setting of white and neutral glass. The window indicates a return to older methods of stained-glass production.

CHIPS.

Three more paintings have just been presented to the Art Gallery of the Corporation of London, which adjoins the Guildhall, and is open free every day from 10 till 5 p.m. They are:—1. A painting by Mr. W. Goldsmith, representing "The Thames at Bray," the gift of the Vintners' Company of London; 2. "The Poacher," a painting on panel by E. Bird, the gift of Mr. William Rome; and, 3. "Cymon and Iphigenia," by G. Patten, presented by Sir F. W. Truscott.

A bust of the late Professor W. E. Aytoun, who died in 1865, in white marble, by Park, has just been placed in the Upper Library Hall of Edinburgh University.

The Festiniog local board have resolved to erect a screening house for the purpose of filtering the water supply of the district from Lake Morwynion. The plans, &c., were prepared by Mr. W. G. Owen, the gas and water manager, and the contract for the first portion of the work was given to Mr. R. Hughes, contractor, Blaenau, Festiniog.

Mr. William Watson has been appointed the architect for a proposed new church at Lofthouse, near Wakefield. The church is intended to accommodate 500 persons, is to cost about £3,000, and will be built entirely of stone.

Major Tulloch attended at the Town-hall, Dudley, on Tuesday, to inquire into an application of the town council to borrow £1,500 for street improvements. Mr. Gammage, the borough surveyor, produced the plans, to which no opposition was offered.

The polling of the boroughs of North and South Kensington on the question whether the Free Libraries Act should be adopted has resulted in a declaration in its favour; the figures being, for the adoption 5,630, against 4,112—majority 1,518. It is proposed to erect three buildings, towards the cost of which a large sum of money has already been subscribed.

Our Office Table.

WE regret to hear of the death of Mr. George Barnes Williams, F.R.I.B.A., of Frederick's-place, Old Jewry, E.C., one of the senior members of the profession practising in the City of London, which occurred on Sunday last. Mr. Williams had held the lucrative appointment of district surveyor for Plumstead and Eltham under the Metropolitan Board of Works since 1856, and was also surveyor to the Mercers', Coopers', and Vintners' Companies. One of his later buildings was the block of premises in Cheapside, in Renaissance style, containing the new hall of the Mercers' Company, and occupied on the ground-floor by Messrs. Benetfink. He was formerly in partnership, at the same address, with the late Mr. George Smith, F.S.A., the architect of Old St. Paul's Schools, facing the Cathedral, and of Whittington's Almshouses, Highgate. Mr. Williams joined the Royal Institute of British Architects in 1848 as an Associate, and in 1856 became a Fellow. Some years since he served on the council of that body.

WHEN the City Corporation substituted the late City Architect's commonplace and costly street-refuge for Temple Bar, many persons believed that the stones of the old gate so solemnly numbered would prove as troublesome a white elephant as the columns of old Burlington House. The event has justified the expectation, and after having lain in an obscure rubbish heap near Farringdon-road for seven years, the old materials were given by the Court of Common Council last week to Sir H. B. Meux, who wishes to re-erect them at the entrance to Theobald's Park, Cheshunt. Feeble and ineffectual protests were raised against the proposal by two or three members, and were met by assertions which it is difficult to reconcile; a Mr. Beck said the stones were so broken that it was impossible to reconstruct or preserve them, and the lead had been melted into medals; while, on the other hand, Mr. George Shaw stated that the stones were all numbered, and could be reconstructed without difficulty. It was further asserted that the rebuilding would cost at least £1,700, and the City Fathers, doubtless feeling that the money might be better spent, say, on balls, feasts, or bogus petitions, agreed by a majority of 42 to let Sir Henry Meux have the old stones at his own price.

MR. CHARLES DYBALL, curator of the Walker Art Gallery, who reported on Monday to the Library and Art Committee of the Liverpool Corporation the results of his recent visit to the art exhibition in London, takes a cheerful view of the prospects of artists. He regards the pictorial art of the season as an advance upon the productions of the past few years, while the large number of works which have found purchasers shows that there is still a wide field for artistic effort. He goes to the root of the lamentations heard as to the decline of the demand for pictures in his remark that "although the *furore* for art which obtained a few years since has considerably abated, there seems even now but little difficulty in disposing of really good pictures; such falling off in patronage as exists is felt by those who, relying upon the reputations achieved by former successes, find it difficult to obtain large prices for works which owe their existence more to financial necessities than to artistic endeavours to excel." A glance at the walls of the Royal Academy shows, he thinks, that English art is in a state of transition, and that the institution itself is being subjected to an ordeal which will tax the exertions of the council to carry it through to a successful maintenance of its prestige. The excellence of the present exhibition is mainly due to the contributions of painters who do not enjoy the privileges of membership. The new school of painters who discard the Academy traditions and teachings are making their influence felt in a most marked degree. The most remarkable collection of pictures now hung is, he says, that at the Grosvenor, where the average merit is higher than anywhere else. Mr. Whistler's arrangement of the pictures at the Society of British Artists, although very satisfactory from an artistic point of view, has caused a great falling off in the attendance of the public, and next season the society will revert to the former system of hanging. Mr. Dyball points out that the public are becoming increasingly intolerant of indifferent productions, and considers the plan of inviting specially selected works is amply justified.

AT length there is a prospect that Parliament-street, which has always inconveniently blocked the access to the Houses of Parliament from Whitehall, will be widened and rendered more worthy of its important position. By the Westminster Improvements Bill, which has passed with certain modifications unopposed through Committee of the House of Commons, four "undertakers," named in the measure, are authorised to double the present width of Parliament-street by the removal of houses for the whole length of the western or parkward side, necessitating the abolition of King-street, to construct an entirely new street from opposite the carriage entrance of the India Office to the Broad Sanctuary at Westminster, and to lay out afresh the whole area between the Government Offices and Great George-street. The weakest point in the Bill is the clause providing that the new buildings in Parliament-street, Charles-street, and facing Parliament-square-gardens, "shall be of handsome architectural design, in harmony with the Home and Foreign Offices, and approved by Her Majesty's Commissioners of Works." The recollection of the utter failure of a similar provision in the Bill for the formation of Northumberland-avenue, in which the Institute of British Architects managed to insert powers to "approve" the designs for new buildings in that thoroughfare, raises grave doubts whether the Chief Commissioners will be likely to do more than obstruct and irritate architects who prepare designs for buildings in the new streets, while the grossest offenders against good taste and architectural amenities will go unchallenged.

THE Shropshire Archæological Society has received a unique and valuable gift from the Rev. E. L. Barnwell, of Melksham House, Wiltshire, in the form of 300 camera-lucida sketches of ancient buildings, and pre-historic remains in North and South Wales and the bordering counties, made by Mr. Worthington G. Smith, F.L.S., &c., from 1875 to 1885. They are substantially bound in seven folio volumes, each sketch being mounted on thick cardboard, and arranged in counties. The views of buildings, &c., are all carefully coloured, and the prehistoric remains, comprising cromlechs, kistvaens, inscribed and sculptured stones, are all drawn to scale. These invaluable volumes will be deposited at the request of the donor in the Free Reference Library at Shrewsbury.

AT Winchester Cathedral on Friday, in preparing a place for the stone inscribed with the name of Edmund, eldest son of King Alfred, the receptacle of the heart of Bishop Nicholas of Ely, 1279, was uncovered and examined by the Dean. In a block of stone, protected by a plate of lead and an upper slab of grey marble was found the case containing the heart. The case, which was presumed to be of pewter, was sewn up in a napkin of silk or damask. The vessel was not uncovered, and was carefully reinterred after Mr. Baigent, the antiquary, had taken drawings. Bishop Nicholas, of Ely, was Lord Chancellor and Lord High Treasurer of England before he became Bishop of Winchester.

AT the sitting of the Select Committee of the House of Commons on town holdings on Tuesday, Mr. J. J. Stockall, Grand Master of the Manchester Unity of Oddfellows, and Mr. J. Holmes, a former Grand Master, testified to the prevalent desire of working men to become possessors of their own dwellings and to the objection they felt to expending money in the purchase of property which would pass away from them or their families after a certain number of years. Speaking from experience, they were able to say that the possession of their own freeholds made men better members of society and more careful of the condition of their dwellings and surroundings. The committee again adjourned.

THE twenty-fourth annual meetings in connection with the Gas Institute are being held this week under the presidency of Mr. W. Foulis, of the Glasgow Corporation Gas Works. The proceedings were begun with a business

meeting in the Corporation Galleries, Sauchiehall-street, on Tuesday, at which the annual report was adopted. The president afterwards delivered his inaugural address, in which he urged that rule of thumb should be abandoned in every detail of gas manufacture, which ought to be based on scientific analysis. In the afternoon the members visited Broxburn Oil Works. Wednesday morning was devoted to the reading and discussing of papers and communications, and the afternoon to going over the Dawsholm Station of the Glasgow Corporation Gas Works. Yesterday (Thursday) the reading of papers was continued, and the business part of the programme concluded. In the evening a reception and conversazione by the Lord Provost and Corporation was to be held in the Corporation Galleries. To-day (Friday) is set apart for an excursion to Inverary Castle, and as supplementary to the meeting, the members of the Institute are to be permitted to inspect the Forth Bridge. Papers and communications have been read by Mr. D. R. Stewart, Broxburn; Mr. R. Fish, London; Mr. C. E. Jones, Chesterfield; Mr. W. J. Warner, South Shields; Mr. G. Livesey, London; Mr. W. H. Y. Webber, London, on "Gas-holder Framing"; Dr. Stevenson Macadam, Edinburgh; Mr. F. Lux, London; Mr. G. Anderson, London; and Mr. J. Head, London.

THE Chicago Auditorium will be a vast structure, from all accounts. The building will cover the ground on the north side of Congress-street, between Michigan and Wabash avenues, and will have about the area of the Grand Pacific Hotel. It is to be ten stories in height, or 144ft., and near one corner there is to be a large square tower, 81ft. higher. The design is to be modelled after the Palazzo Vecchio at Florence. Forty feet of business rooms will adjoin the theatre on three sides; the hotel will occupy two sides. The theatre is to seat 5,000 persons; the seats will be arranged in circular rows upon the ordinary plan. There will be also a rehearsal-hall on the seventh floor to seat 480 persons. Six elevators are to be provided on all the sides, one in the tower, which will be utilised as an observatory and place of popular resort. The design shows a bold treatment in the Florentine style and a variety in the fenestration. The external dimensions are 187ft. towards Michigan-avenue, towards Congress-street, 361ft.; the height of tower is 225ft. There are to be fifty boxes open to all in the theatre, the scenery will be lifted out of a well under the stage, and there will be three galleries.

A Select Committee of the House of Commons on Tuesday passed the preamble of the London Parks Bill, which provides that Victoria Park, Battersea Park, Kennington Park, Bethnal-green Park, Westminster Bridge, and the Thames (Chelsea) Embankment, which have hitherto been maintained by the Commissioners of Works, shall now be maintained out of the local rates. In the petition of the Metropolitan Board of Works against the Bill it was mentioned that the transfer of the parks would entail a burden on the rates of £19,000 a year.

The annual *soirée* of the Royal Academy took place last (Thursday) evening.

Mr. John Cowper, for many years clerk of works to the Birmingham School Board, died last week in the general hospital in that town in consequence of injuries to his hand and hip, received on April 25th, by falling against the propeller of ventilating apparatus which had just been fixed and started in a new school.

An exhibition of needlework and embroidery is being held, by permission of Lord Amherst, at 43, Grosvenor-square, and will remain open till Monday night, under the patronage of the Princess of Leiningen and other distinguished ladies. The prizes for embroidery and designs will be adjudged by Sir Frederic Leighton, P.R.A. The proceeds of the exhibition will be devoted to the training of women as skilled needlewomen, and also to the instructing of working women in the making of their own clothes.

A new supper room has just been added to the Rougemont Hotel, Exeter. It has been erected from the designs of Mr. C. Ware, of Exeter, by Mr. J. Trevena, of Plymouth, at an outlay of several thousand pounds. Mr. Algar, of Exeter, executed the decorations.

A new school has just been completed in Wilton-road, Hackney, for the London School Board. Designed by Mr. T. J. Bailey, architect to the board, the contract has been carried out by Mr. C. Cox for £12,276.

Trade News.

WAGES MOVEMENT.

DUNDEE JOINERS' WAGES.—At a mass meeting of joiners held in Dundee last week, the wages question was discussed, and reference was made by several speakers to the want of a standard rate of pay in the town, and the necessity that existed for a uniform rate being established. It was resolved that the employers should be approached with the view of getting the wages equalised to a standard rate.

STRIKE OF DUNDEE MASONS.—On Saturday the Dundee masons came out on strike for an increase of wages. Some time ago the men made application that the standard rate of wages should be raised a halfpenny per hour—from 7d. to 7½d., but the masters refused to grant this increase, and at a meeting of builders, held on Monday, it was resolved to resist the demand. The secretary reported the receipt of a letter from one of the largest firms in Glasgow, stating that the standard rate of pay was 7d. per hour, the same as in Edinburgh and Leith.

CHIPS.

The *Standard* states that among the measures which the Government intend to bring in and press through this Session is the Bill to make permanent and extend the application of the Employers' Liability Bill.

A new church is about to be built at Walsham, near Bury, Lancashire, as a memorial to the late Jesse Haworth. Mr. Lawrence Booth, of Manchester, has been appointed the architect.

A new highway bridge at Mertoun, N.B., said to be the flattest bridge in Scotland, was opened on Monday. The arches, five in number, have each a span of 70ft. 6in., with only a rise of 6ft. 8in.

Mr. John Aird, the contractor, has accepted an invitation to contest in the Conservative interest the vacancy in the representation of North Paddington caused by the death of Mr. Lionel Cohen.

A carved oak pulpit, with freestone base, has been erected in the parish church at Burlescombe, Devon, as a Jubilee memorial. A brass plate is fixed on the pulpit bearing the following inscription:—"This pulpit is placed here to commemorate the Jubilee of Queen Victoria, D.F., 1837-1887." Two new polished brass bracket-lamps have also been fitted to the pulpit. The whole of the work has been executed by Messrs. Luscombe and Son, carvers and artworkers, of Exeter.

The Leicester School Board have accepted the tender of Messrs. T. and H. Herbert at £3,977 for the execution of additions and alterations to the school in Belgrave-road.

Messrs. W. L. Newcombe and Knowles, of Newcastle-on-Tyne, are the architects of a new Presbyterian church which is in course of erection in the suburb of Jesmond.

Mr. A. Bruce Joy has just completed a small sketch model for the full-sized statue of the late Alexander Balfour which Mr. Joy has been commissioned to execute for erection in Liverpool.

Major Tulloch, R.E., held inquiries at the Guildhall, Walsall, on Tuesday, with reference to two applications on the part of the corporation. The first was for permission to utilise an unexpended balance of certain loans, amounting altogether to £64,510, which they have been authorised to borrow for the purposes of sewerage and sewage disposal, in the execution of other works of the same character. The second was for permission to borrow a further sum of £15,000 for the purposes of the gas undertaking. The town clerk (Mr. Cooper), the borough surveyor (Mr. Hardwicke), and the gasworks manager (Mr. Tindall) explained the proposals.

The memorial-stone of a Primitive Methodist Chapel, Belle Vue, near Wakefield, was laid on Saturday week. The new building is entirely of stone, 47ft. 6in. by 34ft., and will seat 300, including the Sunday-scholars. The roof is open timbers, wrought inside, and ceiling divided into panels; the fittings are entirely of pitch-pine. The cost is £860 6s. 9d., exclusive of some of the stone, which is given to the committee. The architect is Mr. William Watson, of Wakefield.

Sir Frederic Leighton and some other artists support an appeal in the daily papers for funds for the extension of the Free Art Gallery and Library movement in Battersea. The purpose is to "remove the intellectual poverty of South London." The President of the Royal Academy states that working men themselves give their time and money to it, and he wants a similar gallery in the south-eastern district. He is supported by Sir James D. Linton, P.R.I., Mr. Burne-Jones, A.R.A., the Hon. John Collier, Mr. Walter Crane, and Mr. G. F. Watts, R.A.

The memorial stone of the principal office of the London and South-Western Bank was laid on Thursday last by Sir George Prescott, Bart. The new buildings will have a frontage in Fenchurch-street and also in Gracechurch-street. The architect is Mr. J. S. Edmeston, of 47, Old Broad-street; the builder, Mr. W. Shepherd, Bermondsey; the clerk of works, Mr. Tookey; and the foreman, Mr. Walden. The contract is £32,700. The men on the works enjoyed a supper in the evening at The Bell, in Bell-yard.

We are pleased to hear that all opposition to the Bill for securing to the inhabitants of Stoke Newington Clissold Park as an open space, by purchase from the Ecclesiastical Commissioners, has been withdrawn, and that the Bill will proceed as an unopposed measure.

Holloway's Ointment and Pills are infallible for curing bad legs, varicose veins, swelled ankles, erysipelas, scaly skin, and every variety of skin disease. Over all disorders Holloway's remedies exert a quick and favourable action, and where cure is possible gradually but certainly arrive at that consummation. They are invaluable in the cure of scrofula and scurvy.

BEST BATH STONE.

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RANDELL, SAUNDERS, & CO., LD.,
CORSHAM, WILTS.

BATH STONE.

PICTOR'S MONKS' PARK. CORSHAM DOWN. BOX GROUND. FARLEIGH DOWN. COMBE DOWN. STOKE GROUND. WINSLEY GROUND. WESTWOOD

PICTOR and SONS, BOX, WILTS.

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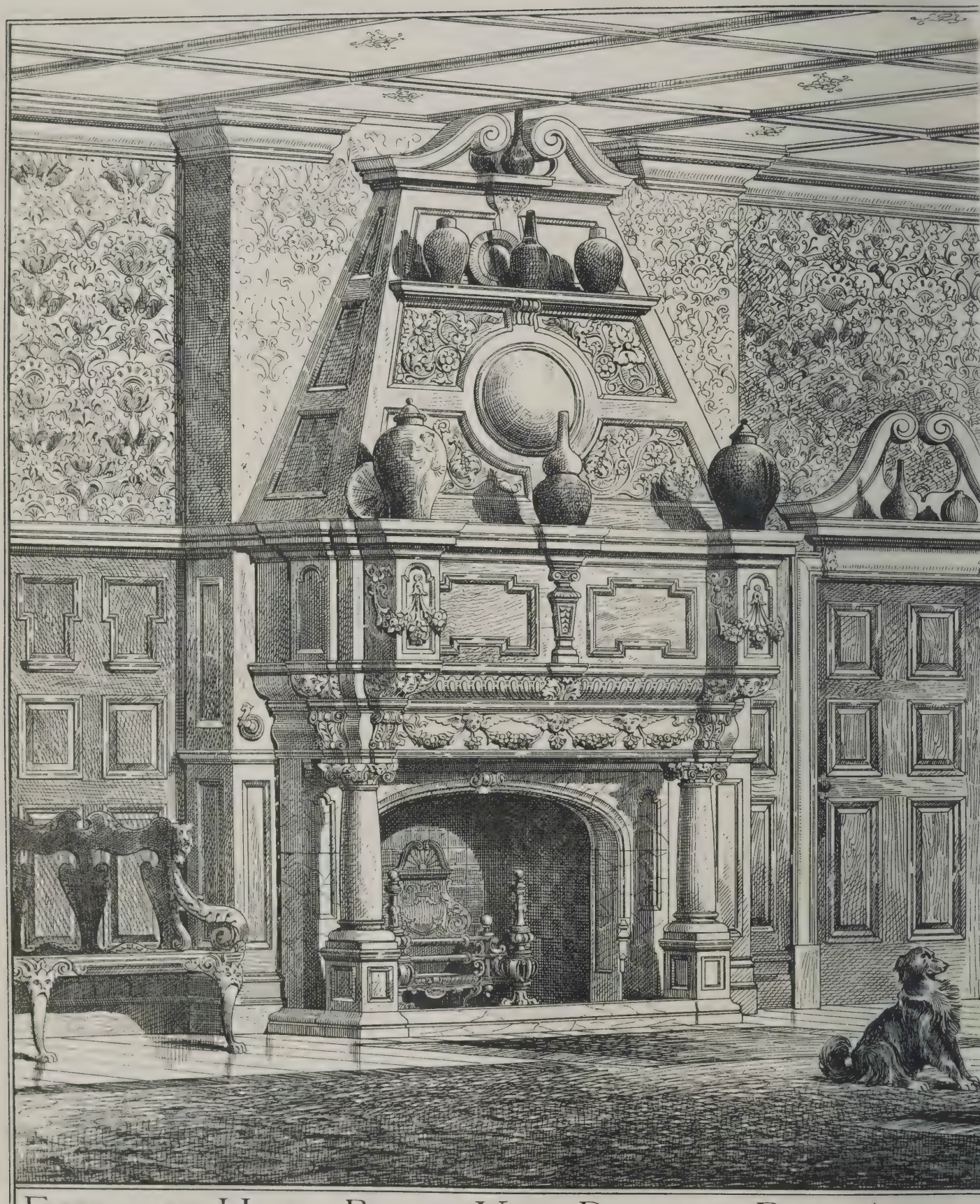
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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

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McWilliam and Son...	£2,823	0	0
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Hoare, F.	2,700	0	0
Hoare, W.	2,685	0	0
George and Harding	2,594	0	0
Jenkins and Sons (accepted) ...	2,537	0	0



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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LII.—No. 1696.
FRIDAY, JULY 8, 1887.

RIVAL FEATURES OF ARCHITECTURE.

AN analysis of the architecture of the day reveals three or four distinct features which are just now struggling for supremacy. Viewed quite apart from the question of style, for they have really outlived it, and they are common to all phases, it may be interesting to inquire into their claims to be regarded as distinctive elements of architecture. The first two, the entablature and the arch, are as old as the art itself; ever since men practised an art of building, one or the other of these systems has prevailed, and a perpetual change of one for the other has taken place. The succession of styles has been, in fact, chiefly the mutation from one of these methods of structure to the other. We now use the concrete terms of entablature and arch to express the systems known under the wider denominations of trabeation and arcuation.

We consider the two together because they are opposite systems of accomplishing the same purpose—that of covering or spanning spaces. Every student and architect is acquainted with the origin and development of these two systems from the earliest Egyptian and Greek to the latest style, and therefore it will be superfluous to say anything on the historical evolution of the entablature and the arch. Our purpose is to point out that the two systems are practically still struggling, although our requirements have multiplied a hundredfold, and our new methods of construction and materials have been increasing in the same ratio. At one time, not long ago, we all thought the entablature had taken its departure as an effete element of archaic building—that it was passing into oblivion with the remnants of Greek temples. The arch was everywhere triumphant, not only in churches, but in houses and factories, and the reign of arcuation seemed to be a lasting one, and the system to have taken a firmer hold than ever; but it was not for long. Even church architects, the most wedded to the system, began to tire of pointed windows of equilateral proportions in aisle and clerestory; the proportion of the arch underwent a change of form, it was no longer acutely pointed as it had been; the 12th-century French influence made our architects adopt a form in which the centres for striking the arcs were drawn nearer and nearer together in the centre, till we had almost the Early Transitional and Norman form, known as the "drop" arch; the lancet and equilateral had entirely disappeared. The segment-pointed offered advantages in some positions; but latterly the arch has become still more depressed, and church architects are using, in pursuance of an "irony of fate," the not long ago contemned, flat, semi-elliptical arch of the Debased-Gothic or Jacobean period, in which the point is lost altogether. Change of style from Early to Late Gothic was no doubt the apparent influence in this substitution of the flat for the acute form of arch; but behind it there was the general preference for flat-headed openings. Architectural taste was reverting again to square forms and horizontal lines. The entablature was beginning to reassert itself. The Free Classic, delighting in the forms of High Dutch and Late Georgian, re-established the square-shaped opening and flat arch, though there was more than mere style at work. Practical common-sense and social habits had something to do with the change. The pointed arch could never fit comfortably under flat ceilings, or adapt itself to convenient sashes and internal hangings; moreover, the girder and the trussed beam had been invented, and could not be turned to account. A hundred other practical necessities favoured the introduction of the entablature. A square window was cheaper than the arched; the glass could be cut easier, sashes could be fitted to open by degrees, unlike casements, which could not be partially opened for ventilating purposes. Materfamilias was not compelled to hide the pointed arch by drapery, or to invent some hanging in lieu of her favourite valance and fringe; mullions and painted glass she voted tiresome when there were sights to be seen. All these and more were instrumental in changing the style. Stronger reasons prevailed; floors had to be marked so as to indicate the division into stories, and thus we have repeated what was done in many European countries during the Renaissance in the 15th century, the substitution of horizontal Classical cornices and pillars to mark the stories. And so long as architecture lasts we shall have the columnar ordinance—sham it may be called by some who look upon it as a mere mask, but just as much the expression of the story as the buttress was of the vaulted bay of the cathedral.

Next we have as a rival to the entablature the round arch. No feature has gone through more changes to meet building necessities, notwithstanding that it still maintains its popularity amongst architects. Some years ago the arcuated style was all the rage. The palaces of Florence and Venice were placed under contribution, and several important buildings were designed in which the windows were all semi-circular, architraved, or moulded. The arched opening proved troublesome and expensive in commercial buildings: the semi-circular apertures had to be sub-divided by shafts and minor arches; carving was necessary in the heads, and massive piers were needed at the angles to give apparent stability. On the contrary, the round arched Italian possessed a degree of lightness and vivacity, and lent itself readily to sculptural decoration. It was capable of florid effects. We have examples in the Carlton Club-house, from Sansovino's Library of St. Mark, in the fronts of the Home and Colonial Offices. Very often the "orders" were combined, as in the Venetian and Roman examples: the horizontal lines of entablature are very dominant, though the meaning and expression of the arch lose something by the association. One of the most elegant adaptations of this treatment is Palladio's arcades round the Basilica of Vicenza, which has been largely imitated and varied. The arcade is open, and the intercolumniations wide; the principal order is happily employed in accentuating the piers and floors, and the subordinate order under the arched openings enables the whole space to be given to the windows. Another variety is noticed in which the arched windows are grouped together in twos and threes, or more. When the side windows are smaller and lower than the centre one, the effect has an awkwardness about it, and the internal finishings of the heads become as troublesome as they do externally, where perhaps each arch has an architrave member round it, and each arch a keystone, which in some cases is made to reach to the horizontal member or cornice above as if it was necessary to give every arch a deep wedge, and to load it heavily—an unmeaning kind of architecture which is affected because it looks a little fussy and pretty. There are other ways of employing the arch effectively. Mr. Waterhouse has done so at the Natural History Museum, where he has given us a modernised Romanesque. Where light is important a series of arched openings, moulded or with double reveals, may be employed. Near Chancery-lane is an example of a front with arched apertures of this kind, a sort of half-Gothic treatment being given to one of the tiers by tympana of pointed form over the arches carved in relief; the piers between the arches have a horizontal springing course carved with foliage representing capitals, so that the horizontal lines are strongly marked. The carved capital course is a feature that has been very often effectively combined, especially in rows or series of arched windows where the intervening piers are narrow; but it is rather meaningless when used on wide solid piers to connect the arches, as it does not accentuate any constructive feature. The value of the arched aperture is mainly in giving variety to a façade; one entirely made up with round-headed windows looks more monotonous than the trabeate treatment.

The "pier" or "vertical strip" is another predominating feature in modern buildings. Perhaps it was as a protest to the horizontal entablature and order that architects took to it. It was a contrast at first, and it has grown immensely. Whatever motive first prompted the use of the pilaster-strip, it is obvious that the Gothic architects took to it as a kind of compromise when called upon to surrender the pronounced verticality of Gothic. It is a strong Renaissance feature, as we see in the buildings of the François Premier period in the châteaux like those of Chambord, Berri, and other domestic works. Architects of this school delight to cut up their wall surfaces with pilasters and horizontal stringcourses, producing a series of blank rectangles; but it can be carried to excess. The design suffers from want of breadth and dignity, and the repetition of vertical features and bays divides the façade into narrow vertical slices. In a long front the effect is that of a row of houses. The vertical is as much emphasised as the horizontal members, creating distraction and want of unity. The architect may pander to this caprice till he finds he has no architecture worthy of the name left. Then the multiplication of stringcourses, one level with the heads and another with the sills of the windows, and perhaps two or three lines of entablatures or cornices one over the other, or in the course of the height of a window, is a sort of redundancy that can only be compared to similar repetitions of words conveying the same meaning, or pleonasms—a sort of tautology quite as mischievous to good architecture as it is to written language. The pilaster strip or panelled stile has its value in accentuating piers, and in red brickwork and terracotta it has been employed with effect. The rule seems to be to use it for accentuating the piers or jamb lines of superposed windows as pilasters to a wall. So the horizontal stringcourse should be employed to give breadth, or as framings for sculptural relief; whenever it is used without reference to these objects, it is wrongly employed and mischievous.

There is also the gable. This is certainly another Gothic feature of value in domestic architecture, but very often misemployed in large public buildings—we mean in the way of repetition. It is now common to break up a long roof by a succession of gables of precisely similar pattern, dividing the length of the façade in an objectionable manner, and making it appear that the façade is composed of a number of separate parts or houses. We can hardly conceive anything so inimical to breadth and dignity; but it has become fashionable, and so it is done. We can admire the picturesque treatment of the gables in Mr. T. G. Jackson's new quadrangle of Trinity College, Oxford, which we illustrated last week, though not the repetition of them in his otherwise clever design for the Imperial Institute. A series of gables, with the means provided for the discharge of rainwater between them, if other objectionable vertical features are not

introduced, cut up the façade into a number of vertical parts. Continuity of line is maintained by the employment of the cornice, and it must be remembered that the cornice and gable are irreconcilable features, and the one has developed at the expense of the other. The architects of the great Hôtels de Ville of North Germany perceived the value of the uninterrupted horizontal lines, the dormer being reduced to tiers of small gabled openings in the high roofs ; but it has been left for English modern architects to break this rule by omitting the cornice, and thickly studding their roofs with gables. The cornice and the gable are just now opposing elements of architecture, though the principle ought not to be lost sight of that each has its value in certain situations, and an ascendency of one can only lead to a very short-lived supremacy.

BUILDING CASUALTIES AND CONVERSION.

THE sudden overturning of a wall in York-street, Walworth, attended by the death of two persons, through the piling of a quantity of manufactured iron against it, adds another to the list of catastrophes of this nature. We lately referred to the fall of a wall at Sheffield from the same cause, and we may yet have others to record before legislative action is taken to make it impossible that accidents of this sort should occur. It has only been after repeated failures attended by fatal consequences that the law has interfered in these matters, and now we have had so many recent cases of collapsing walls through carelessness on the part of those who store iron and other weighty materials against them, it seems time that the local authorities should inspect storage of material in warehouses, no less than see that the building is substantial. Without supervision of some kind the warehouses and stores in thickly-populated parts become a source of positive danger in our midst. With the increased value of storage room there is always the danger of our warehouses becoming overtaxed, to which cause must be assigned these frequent accidents. The Western Association of Architects in America some time ago agreed to a very desirable step being taken in their own and the public interest. They drew up a form which every architect was to hand to his employer, in which the purpose and destination of the building is clearly stated, the load to be placed on each floor of the building, and the strength of each beam. The employer was to sign the statement of particulars, and a copy was retained by the architect for his own protection in case of any failure or change of purpose of the building. The specified particulars would show distinctly the object of the structure, and for what use it was designed, so that if the employer turned a house, after it was built, into a warehouse, and overburdened the floors with a greater weight than was intended should be placed on them, and an accident occurred, he could not hold the architect responsible for the failure. Why may not a statement of the intention of every builder or occupier of buildings be required by the local authority, and an agreement binding upon all who built or occupied warehouses be drawn up requiring that no loads should exceed a safe weight, and that walls should not be subjected to lateral pressure by storage of heavy and unsuitable masses of material against them. When once the rule was initiated, there would be no difficulty in carrying out the arrangement. In the case of every building used as a warehouse or store, there might be a written undertaking given by the owner that the building was capable of carrying a certain maximum load on each floor, and a similar undertaking by the occupier not to exceed the weight. This statement ought to be certified by a local authority at stated intervals, and such a certificate of strength would be a guarantee to the tenant and to the public. Of course, an inspection would be required to see that the certified strength was not exceeded, and a penalty enforced for non-compliance therewith. If legislation made it compulsory to require a certificate of structural qualifications for every building of this kind, we should hear of fewer of these sudden and fatal accidents. How many hundreds of warehouses are at this moment overburdened by loads far in excess of anything they were designed to carry? We should be astonished, probably—if we only knew it—at the number of thin and tottering walls which are in the same condition as that which fell at Walworth, loaded by piles of iron or scaffold poles and other materials. Few but those employed in warehouses or stores know anything about the great risk to which the walls are hourly exposed by being made retaining walls. An accident happens, and a person is buried in the *débris*, and then the error is found out. There is little evidence published about the Walworth warehouse ; it was used for iron, and was situated at the back of what had been a parish school which is being altered into a hospital. The place was being partly pulled down, when the wall of warehouse collapsed. Long bundles of tire iron were stacked against the wall of a shed adjoining the late school-house, when suddenly it fell, burying two persons, whose bodies have been extricated. Possibly the disturbance caused by pulling down the adjoining building and taking away some support was the immediate cause of the accident, but whatever can be assigned, there appears little doubt that the stack of iron had exceeded the conditions of safety. As we have pointed out, a quantity of scaffold-poles or iron bars laid against a wall in a direction parallel to it, is very unstable ; the stack is piled up high, the heap acting like a wedge or prism of wet earth against a wall, and the slightest disturbance or vibration is apt to cause a motion of the mass on its natural bed.

We may also draw attention to another origin of serious danger in building operations which does not receive the attention it merits. The conversion of a building intended for one object to quite another purpose is attended with consequences often of a dangerous character. We drew attention to the collapse of a shoe warehouse at Manchester the other day. It appears the proprietor of a shoe warehouse had added together for the purpose of his trade a few small shops, and had for this purpose removed some of the division walls. The original state of the shops appears to have been of a flimsy kind, the division walls were only a half-brick thick, and the timber of the floors was inadequate. A telegraph-pole on the roof had been lately added to the weight which the walls had to carry, and sundry alterations were going on in the lower part of the premises, the upper part being temporarily supported. On a sudden the building collapsed burying two or three, killing two women, and injuring several others. The throwing together of a number of shops or houses is an operation that goes on every day in every large down. London establishments are often a collection of separate houses—an absorption of shops—and we can name several establishments used for furniture and drapery where a dozen or twenty adjoining houses have been joined together by the partial removal of the party walls of the lower stories. Such operations are safe enough when the adjoining houses are soundly built and due care is taken to shore up the floors and to support the upper portion of the divisional walls ; but they become dangerous whenever these conditions are wanting, and the risk increases with the number of houses that are connected. Building acts and by-laws are rather weakly framed to meet this kind of internal conversion ; the operations are left to the builder, who receives little attention from the surveyor. When we consider the effect of removing or pulling down party walls to make a continuous shop, the weakening of the external walls which results from the removal of supports to the floors and roof, it is not to be wondered at that accidents happen. When the upper portions of the division walls are left and carried on girders, a stress is laid on walls which are incapable of carrying an addition to their own weight ; even if columns are introduced they are sparingly inserted, and their load is concentrated on a much smaller area of footing than is often safe. Then it must be remembered the upper stories are often used for storage of goods, thereby increasing the load coming on the floors that were only designed to carry ordinary bedroom furniture. The loads and stresses are reversed, they are carried on fewer walls or columns chiefly on the outer walls, and the structure and its contents make a top-heavy arrangement very different to that first intended. The sections of the Public Health Act dealing with the structure of walls, foundations, roofs, and chimneys refer to new buildings ; the schedule of wall thicknesses applies to new buildings of the domestic or warehouse class, and, what is more remarkable, the only section referring to conversion (Sec. 159) deals simply with conversions of any building into a dwellinghouse. Nothing is defined with regard to the structural conversion of a number of houses into one large trade establishment.

MARBLE AND MARBLE WORKERS.—XI.

By ARTHUR LEE.

PRACTICAL.

THE information contained in the preceding chapters would be incomplete without some consideration of the manner in which it may be best turned to practical account. Improved modes of transit by land and by sea have given to architect and to marble worker a selection of material which a generation ago it would have seemed impossible to obtain. At the same time, and partly for the same reason, the item of cost has been vastly reduced, and as a consequence a most serious obstacle to the use of marble as a decorative material has been removed. The marbles of the whole world are to-day at the disposal of the architect. The practical question for his consideration is where and how to use them.

In northern climates the use of marble is almost entirely confined to indoor purposes. The beauty of the coloured marbles does not appear until they are polished, and no marble will retain a polished surface for long under exposure to the weather. As a general rule, therefore, marble is unfit for outside work. The principal exception is that of the hardest Sicilian marble. The beauty of this stone is not dependent upon its retention of a polished surface, and if due care is exercised upon its selection it will bear exposure very well. The best Sicilian for outdoor purposes is of a perfectly even texture and colour—so hard as to emit a clear ringing sound when struck and of highly crystalline formation. Veined Sicilian should never be used in situations in which it will be exposed to the weather. A decided vein marks the line where disintegration will commence.

To make the most and the best of veined and coloured marble, a great deal depends upon the way in which a block is cut. It should be so sawn that the figure is displayed to advantage. These marbles are, however, usually employed in thin sawn slabs, and a buyer has little difficulty in finding that which best pleases his taste. With Sicilian and statuary,

which are frequently required in masses and in block, the selection becomes more difficult. Never select blocks in bright sunshine. The best time is on a cloudy day after a shower of rain, and early in the morning. If a block can be "looked into" at all, it will be then. In selecting blocks of statuary, a sharp look-out should be kept for yellow spots or veins; they are less likely to be noticed than black ones, which are more easily discovered. Much of the statuary imported from Italy is unfit for sculpture at all. It is very white, with a bright sparkling crystal and a taking appearance; but it crumbles under the chisel, is of a soft sugary substance, and very quickly decays. The best blocks are hard and close-grained, and if of uniform tint are none the worse for a slightly yellowish cast; they work evenly under the chisel, and are not too transparent.

The best white marbles of Italy are eminently suited for sculpture. In no other material is it possible for the conception of the artist to be reproduced in permanent form with such satisfactory result. The hardness of these marbles, and the fineness of their grain give effect to the most delicate touches of the chisel. The purity of white marble is in itself an aid to the grace and beauty of the composition. It has one distinct advantage over bronze or any material which requires to be cast. The last touches in marble are those of the artist himself; in all cast work they are perforce those of the founder and his men. Polished marble will not harmonise with a material which presents a rough surface. It does well with glazed tiles, burnished metal, and polished woodwork. It is very suitable for the ornamentation of fireplaces. For this purpose an unpolished stone is apt to become dirty, and the employment of wood is attended with danger. In all situations in which bare stone is left to be touched or brushed against, marble is the only material to be tolerated. It is not enough for the architect to see samples of the marbles which he means to employ. He should be careful to inquire into the soundness of the material, and of the size of the blocks which can be procured. He should also see samples which are of sufficient size to give a good idea of colour and effect. Some marbles may be obtained in which colour and texture are fairly average throughout large slabs or blocks. In others there is an entire difference in the space of a few inches. Some marbles are only to be obtained in small blocks, and it is useless to specify them for situations in which single pieces of large size are required. Some marbles are so full of earth cracks and vents that they are quite unsuitable for any work in which they are required to give support, as, for instance, in the matter of columns. It is not long since that the columns of a new church built in Paris were constructed of a marble which was unfit for this particular purpose. The result was that even before the building was completed weakness was exhibited in the shape of several formidable cracks in the columns, and in the end the whole of the work was taken down and rebuilt. A vast amount of trouble and disappointment may be saved by a little inquiry before a specification is decided upon.

It will be found that the adoption of this step will almost always result in a very considerable saving of cost. Of two marbles which produce a similar effect, the one may cost in working three times as much as the other. In some situations it may be an advantage to build up intricate mouldings out of thin slabs. Working out of the solid may mean the spoiling of a design or a cost which becomes prohibitive. The selection of the marbles with which different parts of a design are to be carried out is of more consequence in the matter of cost than appears at first sight. Other factors being equal, it is well for the stone which is most easily manipulated to be employed in those portions of a design in which there is most work. Too frequently the consideration of these matters is left until after a plan is made and a specification prepared. In such cases money is thrown away which might have been usefully employed in another direction, the work is altogether abandoned, or the inquiries which should have been made first are made last, at an expense of time and trouble which might have been easily saved.

The harder marbles afford excellent material for the construction of steps and staircases. A flight of marble steps is not only beautiful in appearance, but it is calculated to withstand an enormous amount of wear and tear. In selecting marble for this purpose, it should be remembered that the effect of a flight of steps depends upon the regularity and evenness of the lines, and the simple alternation of light and shade in the tread and riser. Coloured marbles with strong markings or veins are not suitable. The self-coloured marbles or one of the dull grey varieties should be employed. The even colour of Sicilian, Correblanchien, and of Istrian marbles makes them especially useful for this purpose. The effect which should be produced by a fine flight of steps is ruined by the employment of a marble in which the veins run obliquely and distort the horizontal lines, or in which waves of colour disturb the effect of simple breadth of light and shade. These remarks apply equally to moulded work. Heavily-veined marble destroys all the beauty of the lines of mouldings. As far as possible, work of this description should be carried out in plain black, white, or grey. Generally, finished work in marble is polished. The effect of reflection from a highly-polished surface should be carefully borne in mind, otherwise it will be found that some members of a moulding will be completely obliterated in certain lights.

The variegated marbles should be reserved for flat surface decoration. Due care should be taken that the size of the panel or slab is sufficient to display the variety of the markings. If this is not done, half the beauty of the marble will be lost. In small panels, a marble which has close, fine markings should alone be used. The only exception to the general rule as to the employment of veined or variegated marbles is in the case of columns. The smooth cylindrical face of a column shows off the beauty of the markings as well as, or better than, a flat surface. If the column is fluted, the objection to these marbles again returns in full force.

Marble may be most usefully employed for the paving of halls and passages and of rooms in which much traffic is expected. A floor of marble mosaic is one of the most beautiful and at the same time one of the most durable which it is possible to construct. Marble tile floors are very common in churches and public buildings in Continental Europe. Their cost as compared with tiles made of clay has operated against their employment in England. Modern machinery and competition have now removed this obstacle, and marble tiles can be obtained which very little, if at all, exceed the cost of the ordinary encaustic tiles. If a clay tile pavement which has been much used is examined, it will be found that each tile is worn more or less hollow in the centre. A similar traffic over marble tiles produces scarcely perceptible results.

Some most useful rules with respect to the employment of marble have been laid down by Mr. T. Graham Jackson. They are as follows:—

"1. Decorative carving in marble—as, for instance, in cornices, capitals, and friezes, where high relief and bold design are required—should be severe and conventional. Naturalism is forbidden by the stubbornness of the material except in the highest subjects, such as the human figure, which repays the expense of labour, or else in very low reliefs, where the labour of execution is reduced within moderate limits.

"2. Sculpture should be in white marble, or if in alabaster, only in such as is free from veins or stains of colour.

"3. Moulded architectural features, such as vases, bands, strings, cornices, architraves, and abaci, should be either in white or some uniform colour, without markings or veins.

"4. Variegated marbles should be used only for panels or columns, or, in other words, on plain smooth surfaces, either flat or curved, so as to display the beauty of their markings to the utmost, without interfering with any of the structural lines of the architecture.

"5. Coloured marbles should be used with moderation, too great a variety being avoided, and those of the quieter and more harmonious tones preferred for general use.

"6. Strong contrasts of colour on a large scale are dangerous, and generally incline to vulgarity.

"7. Strong contrasts on a small scale, as in mosaics and inlaid work, are necessary.

"8. Stone and marble should be kept apart as much as possible."

ADDITION TO THE NATIONAL GALLERY.

WE were invited last Saturday to inspect the new rooms that have been added to this institution, which were opened to the public last Monday. Last week we referred briefly to the additions that have been made to the gallery, and have published illustrations of the grand entrance and staircase (April 29th last). We may now speak of the design as a whole, and of the rearrangement of the pictures that has been made under the able directions of Mr. Charles L. Eastlake, the keeper and secretary. To Mr. Shaw-Lefevre is due much of the successful accomplishment of this important work, and in the arrangement of the preliminary negotiations as to the site and plan he displayed untiring zeal. As we stated last week, the plans and design were prepared by Mr. John Taylor, of H.M. Office of works, and they have been carried out under his superintendence by Messrs. Mowlem and Co. and Messrs. Stephens and Bastow, of Bristol, the latter firm having contracted for the second part of the undertaking. The marble work, which is a handsome feature of the design, has been intrusted to Messrs. Farmer and Brindley, and the mosaic floors to Messrs. Burke and Co., of Newman-street, Oxford-street. The additional galleries number five in all, and have been arranged on the axis of the principal entrance; they include a large gallery in a line with the main stairs and vestibule running north and south, two small lateral rooms forming with it a cross in plan, and opening from it by doorways, a small end room of similar size, and in the rear a large gallery running transversely, and forming, with the old gallery No. VII., the northern block of the building. The new north vestibule at the top of grand stairs opens by a triple archway of three doorways. The shafts of columns dividing them are of Rouge Etrusque Numidian marble — a deep, rich, reddish-veined material quarried near the coast of Algiers. These stand on bases of Pavonazetta marble, which same transparent and handsomely-veined marble is employed in the engaged pilasters to the triple archway. The capitals of the columns are Corinthian, and are carved in alabaster. The tympana of the arched heads of the three doorways are treated as bronze, with heads in relief of celebrated painters, the three inside the gallery representing Rubens, Titian, and Rembrandt, those facing the vestibule including Raphael and Da Vinci. Entering the Gallery No. 1 we find a spacious, well-proportioned room with raised skylight in the centre, coved ceiling divided into ribs, a cornice and frieze, the decoration of which is subdued in colour, and in keeping with the style. A Greek fret runs round the frieze, and gilding is discriminatingly introduced. The walls are hung with a deep, rich, red-toned flock paper. In this room and in the lateral room III., Mr. Eastlake has very successfully arranged the pictures of the Tuscan schools. A fine altar-piece,

with predella, by Filippino, occupies a good place, representing Virgin and Child, St. Jerome, and St. Dominick; a Sarto, and a Da Vinci of the same subject, the Virgin kneeling, painted on panel on one side. We next come to a work by Michael Angelo, a Madonna and Infant Christ, St. John the Baptist, and angels; other works are by Bronzino, an allegorical composition, and Botticelli; on the other side of vestibule doors is a large painting by Michel Angelo; an unfinished picture, representing the Entombment; one by Pallaiuolo, showing the Martyrdom of St. Sebastian. A fine "Assumption of the Virgin," by Botticelli, and a picture of Uccello, a battle piece, are hung in the small side gallery, No. III. In the large gallery, VI., which is similarly treated to the first, the masters of the Umbrian school are represented. Pictures by Forlí, representing Rhetoric and Music; two fine pictures by Pinturicchio, illustrating "The Story of Griselda," the Separation and the Restoration, are noticeable. We also find a triptych by Lorenzo, representing Virgin and Child, with Saints, of very great interest and merit. On the long wall are pictures by Perugino—one, the Virgin adoring the Infant Christ, and the Archangel Raphael, and Tobias, in three compartments. In the centre is placed the celebrated recently acquired picture by Raphael in a massive gilt frame, with side pilasters and cornice, the subject of which is the Virgin and Child, attended by St. John the Baptist and St. Nicholas, known as the "Madonna degli Ansidei." This picture was purchased from the collection of the Duke of Marlborough. The architectural background and throne and canopy on which the Virgin sits, has appropriately suggested a centre position for this fine picture in the centre axis of the new galleries; it is therefore visible from the north vestibule through the doorways. Other pictures by Perugino and Raphael are hung on this wall. At the east end of the room is a work by Signorelli, one of the Circumcision. In Gallery V. is a fine Pieta by Francia, the Dead Christ, with Virgin and angels weeping. Other works are by Benvenuti, Tura, Grandi, and Tisio. Gallery II. contains works of the Siennese school, &c., Gozzoli, Rosselli, a fragment, heads of nuns, by Lorenzotto, Lippi, Giovanni, &c.

Mr. Eastlake has shown considerable skill and discrimination in the arrangement of these grand pictures, many of which were originally hung in the other old gallery VII. They are placed in a single row round the walls, and, as far as possible, have been arranged with an eye to symmetry. Many nice points as to style, chronological order, and balanced distribution had to be considered. In the old rooms the pictures have been rearranged with much care, and the result will be a gain to all students of the great masters, and must be appreciated by the public. The overcrowded state of the walls now no longer exists. The rooms are connected by doorways, with moulded architraves of the Rouge Etrusque Numidian marble, and wrought-iron doors, hung to rails above, slide into spaces in the thickness of the walls. The new vestibules on each side of the stairs, screened by columns of the Numidian marble, with bases of New Zealand marble, are effective, and from them spring the coves, surmounted by a domical lantern. We notice the very handsome square pilasters of Cippelino, from the Simplon Pass, a beautiful variety of veined marble in single blocks, with capitals of Carrara statuary marble. The decorations have been carried out by Messrs. Crace. Mr. Dyer has acted as clerk of works.

THE LARGEST PAINTING BRUSH FACTORY IN THE KINGDOM.

THE well-known firm of Hamilton and Co., which has been established in Greek-street, Soho, for sixty years, has just removed into new and commodious premises at No. 96, Clerkenwell-road, E.C. The new building is more central and convenient, being within a few minutes' walk from Farringdon-street Station of the Metropolitan Railway, and directly in communication with the Midland, Great Northern, Great Western, and Chatham and Dover railways. Externally the building is of deep red brickwork, with Portland stone entablature and dressings, and has a frontage of 65ft. in the new thoroughfare, and a side front towards St. John's-square. The internal arrangements are of a very complete character, and the aim of the proprietors has been to economise the time and labour of those engaged in the manufacture. With this view every new appliance has been called into requisition, and the introduction of the electric light, a hydraulic lift, and heating arrangements have added much to the comfort and convenience of the employés. On the ground floor are situated the offices, showroom, and stock-room. The centre entrance is wide, and a narrow-gauge tramway is laid down for the conveyance of goods and materials into a yard at the back, where the engine-house and stores are situated. In connection with the tramway at the side of entrance is a commodious hydraulic lift. Besides the steam-boiler and an engine for driving a dynamo, we noticed a circulating boiler for the supply of hot water to the several floors, and for heating purposes. It would be impossible within the space at our command to convey any adequate notion of the details of the manufacture and the number of operations required in the production of the numerous kinds of brushes and tools for painters, grainers, and decorators turned out by Messrs. Hamilton and Co., who have achieved a high reputation for the quality and character of their goods. On the ground floor is the shaping-machine room, in which the new patent ferrule of the firm is partly carried out. In the basement we noticed the bristle store, a large well-lighted room, with lavatories and closets fitted with Bostel's apparatus; and box room. The ground floor is laid with Duffy and Son's "Acmé" solid block flooring on concrete and pitch tar; there is a tinman's shop for making the tins for graining tools. The suite of offices are fitted with dadoes of polished teak and oak floors; a Shannon filing cabinet and copying machine, with electric lights, and a self-winding clock by which the movement is wound every hour by means of a small battery. On the other side of entrance are show-rooms, a stock room for finished goods fitted with racks for the boxes, and a packing room for delivering goods. Ascending the stairs is a foreman's room, a graining-tool room, with small washing room on the half landing level. The first floor is devoted to the domestic offices and rooms, a patent varnish brush room fitted with winding machines for winding the wire bindings, and a "grinding" room with lead safe floor. On the second floor the operation of dressing the bristles is carried on, in connection with which is a receiving room where the materials are weighed and delivered; also a handle store-room, where every variety of painting-brush and graining-tool handles may be seen. Some idea of the extent of the manufacture of brushes may be gained when it is learned that no fewer than 70 different kinds of handles have to be made, chiefly of beech wood. The third floor is devoted to the manufacture of painting brushes, where several varieties of brushes may be seen in a finished state. In connection with these shops are a bleaching room and a well-ventilated drying room arranged in racks, with coils of hot-water pipes under open gratings in the floor, and air inlets, by which currents of warmed air can be made to pass through the racks of brushes. The floor is admirably lighted, and ventilated at the top and sides.

Messrs. Hamilton and Co. have perfected the manufacture of painting brushes and graining tools. Their patents are now fully appreciated. C. A. Watkins' (1879), oval bevelled varnish brushes surpass any other in the market for wear. The improvement consists of tying the bristles to the handles with wire by a patent machine, and afterwards forcing them by compression into ferrules. These are distinguished from the other wire-bound brushes by a trade mark of a screw machine with the word "Compression" across it. Another valuable improvement is a copper-wire binding round distemper brushes; the copper wire is secured with a pair of Watkins' patent copper fastenings. Each is a solid piece of copper with a shoulder at one end, and nailed on each edge of the flat handle; the wire is wound over them and the whole soldered, forming a solid mass of metal instead of the notches cut in ordinary brush handles. Various other improvements in brush-making have been patented by Messrs. Hamilton and Co., including a patent copper-band distemper brush, which is a considerable advance on the wire-tied brush; a stippling brush, hog-hair over-grainers, and other specialities in varnish brushes and oak grain-finishers.

The construction of the new building is substantial, the floors are of solid timber beams and joists; iron columns are introduced, and the structure is the largest and most complete in the kingdom erected for the manufacture of painting brushes. The building has been carried out by Messrs. E. Laurence and Son, of the City-road. Messrs. R. Waygood and Co. supplied the hydraulic lift, which is worked from the mains of the Hydraulic Power Company.

APPLIED ART.

I BELIEVE that I am responsible for first making use of the term "applied art" to art in connection with the manufacturers, and in the same sense as we speak of the "applied" in relation to the "pure" mathematics; but I soon perceived that the term "applied" could not be consistently used in this special sense, because "pure art" in an analogous sense to "pure mathematics" is not painting and sculpture, but the theory of art existing in the mind. Now, this pure theory is as applicable to painting and sculpture as it is to the art manufactures, so that all works of fine art are examples of applied art. It would be more correct, therefore, in the special sense referred to, to speak of "applied painting," and of "applied sculpture," or of the "applied arts," than of "applied art." Having determined that whatever is perfectly adapted to its purpose, either possesses no beauty at all, or as much as in the nature of things is coincident with that fitness, a clear course is left open for the determination of the extent to which "applied art," in the sense of "art appliqué," is permissible; for it must be quite clear that whatever embellishments we may please to confer on the fitness which possesses none, or on that which possesses some, these must to all intents and purposes be merely appliqué. It may be asked, "If it be admitted that the gratification of the sense of sight is a purpose in itself, may we not embellish, overlay, with fine art to any extent we please?" The answer is, "No!" for the cultivated taste, good taste, is a judicial faculty that recognises a right and a wrong—a moral limitation in these matters, beyond which lies ornateness, excess. Dufresnay very aptly says:

> "Right reigns its stated bounds between,
> And taste, like morals, loves the golden mean."

We may, then, be met with another question, "Well, but the French do not recognise the hard and fast line you would have us observe in the application of art to the manufactures. Should we not, therefore, as their competitors, commercially, do likewise?" All that I can say is that, if this be necessary, take care that you let the English artisan know that there is a better way, a way to lead the world, a way to true national greatness, even in the art-manufactures.

Cannon, rifles, pistols, swords, bayonets, &c., have been bedizened with art "appliqué," merely to gratify the eye, and without contributing one iota to the "fitness" of these weapons. Indeed, they may be made very pretty in this way, and be totally unfit for their several purposes. What would become of the War Minister who should propose that the guns, rifles, and swords of the army should be ornamented for the encouragement of "art appliqué?" The promoters of "art appliqué" may probably look forward to the ornamentation of the cylinders, beams, cranks, and connecting-rods of steam-engines. In opposition to the argument of adaptation of purpose conferring on all creations either of nature or art so much beauty as is consistent, it may be urged that an ecclesiastical edifice could be perfectly adapted to its purpose without the assistance of painting and sculpture; this was not the opinion of the great thinkers of the great art epochs, when architecture was regarded as the "setting" of the more illustrative arts of painting and sculpture. An architect of those times would not have deemed his monumental edifice perfectly adapted to its purpose, in every respect fit, without the sculpture and the painting.

We may safely conclude, therefore, that "art appliqué" can only be in any measure satis-

factorily indulged in but within very moderate limits, and in such wise as neither to impair the fitness of the utilities to which it is appliqué, nor to offend good taste. What shall we say, then, to art appliqué in the form of life-sized portraits on plates and dishes, and of a certain ware of Italian sanction housed in our museums? We know not whether it be for imitation or for warning; its design and elaboration being, as it is, an insult to common sense. W. CAVE THOMAS.

UNIVERSITY COLLEGE PRIZES.

ARCHITECTURE, Prof. T. Roger Smith, F.R.I.B.A.—Fine Art. Donaldson Silver Medals, equal. E. Hellicar of Bromley, H. S. Wood of Hereford. Third Prize. H. R. Appelbee of London. Certificates, 4*. H. Hutchinson of London. 5*. E. H. Dawson of Lancaster. 6*. Horace Helsdon of London. 7*. J. Borrowman of Godalming. Second Class. W. D. Claridge of London, G. P. G. Hills of London, H. C. Lander of London, T. H. Winny of London. Third Class. C. E. Bateman of Birmingham, T. H. Hitchin of Nottingham, A. B. Jackson of Putney, E. H. Sim of London, B. E. M. Towne of London, F. J. Waller of Greenhithe, W. W. Wilson of Leytonstone.——Science. Donaldson Silver Medal. L. Martineau of London. Second Prize. E. Hellicar of Bromley. Certificates, 3*. H. Hutchinson of London. 4*. E. A. Rüntz of London. 5*. G. P. G. Hills of London. Second Class. W. S. Douthwaite of Sydenham, R. J. Durley of London, W. C. Kerr of Blackheath. Third Class. G. Baker of Oakham, C. E. Bateman of Birmingham, E. H. Dawson of Lancaster, R. C. T. Gordon of London, A. Griffin of London, R. S. Maynard of London, G. Roberts of Portmadoc, F. C. Stainton of London, T. H. Winny of London, A. B. Yeates of London.——Modern Practice. Prizes, equal. R. C. Gordon of London, Alfred Griffin of London. Certificate, 3*. E. A. Rüntz of London. Second Class. E. J. Slow of London, T. N. Turner of London. Third Class. A. B. Clement of London, L. R. Ford of London.

We are requested to state that students can obtain their worked papers of answers on application to the professor at 10, Lancaster-place, Strand, within the present month (July).

* Obtained the number of marks qualifying for a prize.

ENGINEERING POPULARLY CONSIDERED.*

THE author has tried to make the theme of his book interesting, and he has to some extent succeeded. But can engineering ever be made popular? We very much doubt if it can; there are so many technicalities to master, and these cannot be so familiarly explained or converted into plain English like they can in other subjects. Mr. Haldane narrates in a pleasant manner his experience as an engineer; a brief sketch of steam navigation, canals, and railways introduce the reader to the early history of engineering enterprise. The experiments of Fairbairn and Hodgkinson, on the Britannia Bridge calculations, are briefly noticed; and the great engineer, Sir Joseph Whitworth, and his work is spoken of; but the chief chapters of the book are devoted to a kind of personal narrative of marine engineering from 1852, when our author had been apprenticed to Denny and Co. Much of interest will be found in this recital of personal experiences and events, though some of the chapters read more like an autobiography than a popular book on engineering. Mr. Haldane describes several establishments and the business carried on in them; such as the Birkenhead Ironwo ks, in which he was engaged. He also points to the difference between the workshop practice of 30 years ago and that of to-day. Then manual dexterity was required, whereas now machinery has taken the place of manual skill. The drawing office is the only means of getting on in the higher ranks of engineering. Very useful advice to the intending student will be found scattered through the volume, that will help him to form a proper judgment in the adoption of engineering as a profession. Very much like that of architects, it is overstocked, and many young men obtain admission who are either worthless or are quite incapable, but who get taken by firms through influence or money. The premium system has its failings in engineering as in architecture; it encourages mediocrities, while it is unfair towards the really energetic and studious; the pupil is favoured at the expense of the real working assistant. The author enters rather fully into the subject of apprentices, the different kinds of young men, how they are installed into works, and the favour shown to those who have paid premiums. The chapter on "Civil Engineering" deals with sundry questions. "How I Commenced Private Practice" is an interesting record that may be usefully perused. The author advises the young engineer to acquire some knowledge of other branches besides that in which he has been chiefly brought up; thus railway engineering is more extended and gives more scope for employment than locomotive engineering. "How Competitions are Conducted" is the heading of a chapter; another is on "Clients," a third on "Professional and other Books, and a Retrospect of the Art." Mr. Shone's hydro-pneumatic ejector for raising sewage and liquids is mentioned as one of the chief applications of compressed air. The work is illustrated by photographic and other views, and contains in a gossipy form much general information.

* Engineering Popularly and Socially Considered. By J. W. E. HALDANE, C.E., M.E. London: E. and F. N. Spon.

JUBILEE MEMORIAL FOUNTAIN, ST. MARY'S BUTTS, READING.

[SEE ILLUSTRATION.]

THE foundation is of concrete, which is taken down some distance below the road, to allow space for a subway, which is constructed from one side to the other, so that access can be had to any portion of the interior when required. A separate pipe and tap is used for each water supply, and the water can be drawn out of each pipe and basin and the whole left dry before the commencement of winter to prevent the action of frost. The lower basin is oval, and occupies the whole of the space allowed. The north and south ends are paved with Wycombe paving, and at each of the four corners are red granite guard piers. It is the intention of the Corporation to place eight additional granite guard posts, with iron railing and gutter, to protect the fountain from being damaged by cattle, &c.; but owing to the great difficulty in obtaining the granite in time the posts are not yet fixed. The moulded plinth coping, &c., is of solid Portland stone, and at the north and south ends drinking basins are sunk in the coping, and provided with cups and chains. The overflow from the basin is used to supply a stone trough for dogs below. From the centre of the lower basin is raised a block of masonry, the external portion of which is composed of alternate bands of red Mansfield and white Portland stone, the central band having carved ornamentation representing the English rose, and the upper band water lilies in various stages from the bud to the flower. At equal intervals round the central block are eight polished Peterhead red granite columns, with carved capitals, each one being of a different design, the whole supporting a beautifully carved and moulded frieze, which forms the second basin; running round the frieze in bold relief letters is the following inscription:—"Erected to commemorate the 50th year of Her Majesty's reign, 1887." Above the inscription is a carved band representing the Shamrock and Thistle; at equal intervals between each column are eight carved gargoyles or grotesque heads, each one of a different design, and from the mouth of each a flat sheet of water is discharged into the basin below. From the centre of the second basin is raised a small oval block composed of bands of red Mansfield and Portland stone, surrounded by four small columns of polished granite, with carved capitals supporting a solid oval brown Portland stone, which is surrounded by 20 small water jets, each one playing up the stone and falling back over the edge below. This stone is encircled by a band of carving representing the British oak. On the top of the stone is placed a single polished red granite column; this is surmounted by a carved capital on which are two lions back to back, each with a shield, one bearing the Royal Arms and the other the Borough Arms, the side spaces being filled up with carved water lilies, bulrushes, &c. From the centre of the lions rises a white stone carved finial, which is finally surmounted by a beautifully carved crown and coronet, from the centre of which is the top water jet. A strong copper pipe is carried up the centre, so that the wind cannot affect the stability of the upper portion.

The whole has been carried out from the designs and under the superintendence of Mr. G. W. Webb, A.R.I.B.A., 14, Friar-street, Reading, whose design took the first place in the competition. The contractors were Messrs. Wheeler Bros. The fountain was opened on Saturday, June 18th.

ARTHUR HAYBALL.

THE Sheffield papers announce the sudden death, upon Monday, the 27th ult., of Mr. Arthur Hayball, of that town, architectural woodcarver, at the age of 64 years.

Mr. Hayball was the son of a builder of that name, who carried on business in Rockingham-street, Sheffield. His tastes were intrinsically and pre-eminently artistic; so, being too delicate to follow the ordinary routine of his father's bench, he was allowed to pursue the bent of his inclinations, and thus it came about he occupied his youth in modelling and carving. When of age he joined the then recently-formed School of Design, to which, both as student, and afterwards as a master, he continued to be more or less intimately attached for the succeeding 43 years of his life.

For many years Mr. Hayball's studio was in Hanover-street, Sheffield, and it was there the writer of these lines, some 30 years or more ago, first went as an ambitious apprentice to learn "the mystery and craft of a carver." Mr. Hayball at that time was not only an accomplished sculptor in wood, but was also no mean artist in photography, and in the latter pursuit (he did not touch portraits) was far ahead of most knights of the camera. His mechanical, as well as artistic, genius was also conspicuous, in that he, as a rule, always (in those days) made his own tools; often apparently wasting hours of valuable time in forging little chisels or gauges that the expenditure of a few pence might have bought at the nearest ironmonger's.

His work is scattered throughout England, Ireland, Scotland, and Spain, and with the Roman Catholic section of the Christian Church in particular, he found great favour. The good old firm of Messrs. Weightman, Hadfield, and Goldie, architects, of Sheffield, kept him almost continually going in their time; and amongst his innumerable works that are, at the moment, recalled to one's mind, the cleverly sculptured oak stalls at Mr. Goldie's famous church of St. Wilfred, at York, may be mentioned as typical of the recently deceased artist's skill. He also did a deal of work for successive Dukes of Norfolk, and the fittings in their chapel at Arundel are by him. About 20 years ago he built extensive premises, and a residence adjoining, in Cavendish-street, Sheffield, and there he stayed the remainder of his life. HARRY HEMS.

BOOKS RECEIVED.

Building Estates: a Rudimentary Treatise on the Development, Sale, Purchase, and Management of Building Land, &c. By Fowler Maitland, Land and Engineering Surveyor. 2nd Edition, revised (London: Crosby Lockwood and Co.)—The second edition of this little book, which we have before noticed, has been revised. Mr. Maitland writes as a practical man, and brings to his subject the necessary information on legal and other matters. We cannot share in the opinion that the immense growth of towns is due to industries. The increase in house-building is far more than necessary to meet the demand of tenants, as may be seen in the suburbs of London, where only about 20 per cent. of the new houses are tenanted. It is more to the point to say that house-building is a business in which the house agent, the landowner, and the speculative builder are interested, and the demand for building-land is much greater than the demand for dwellings. The purchase of land is too often regarded

as a profitable speculation. The author has written a well-arranged treatise, and gives a summary of the provisions of the Public Health Act bearing upon new estates, which will be found useful. The by-laws issued by the Local Government Board for the guidance of urban authorities are important to the surveyor engaged in developing estates; the clauses referring to the deposit of plans and sections by persons intending to lay out streets and in the preparation of drawings, the sufficiency of space about buildings, &c. Under these provisions no house shall have less than 150 square feet of yard space at the rear free from any erection thereon above the level of the ground except a water-closet, earth-closet, or ashpit. The distance from every part of such house to the boundary of any lands or premises opposite or adjoining to be not in any case less than 10ft., and to be regulated according to height. The author also refers to the clauses amending the Metropolis Management Act, by which a sliding scale is adopted, the open space varying with frontage. We have pointed out the unreasonableness of this rule, which gives the house with narrow façades the same depth of area as those with wider frontages. The mode of laying out the land, and suggestions for the preparation of the plan of the roads are discussed. The question of deciding upon the size of the plots is one of more importance than it is often considered to be; the greater the value of the land, the less area being given. The effect of this principle is to overcrowd suburbs and to drive the wealthier classes farther out. Some useful advice is given on laying out plots to avoid monotony and straight streets, and the engravings illustrating laying out roads and hilly ground are worth notice. Many new estates are irretrievably spoiled by inattention to levels and contours which can never be properly studied in the plan or on the flat surface. Surveying operations, construction of roads and sewers, land tenure agreements and leases, prices and valuations, and an appendix in the book containing clauses for leases, forms of agreement, and other useful information, a specification of streets and sewers will be found.—— *Practical Solid Geometry*, by William Gordon Ross, Major Royal Engineers, &c., Royal Military Academy, Woolwich (London: Cassell and Company), appears to be a well-arranged compendium for elementary study embracing the more practical problems. Having entered upon the definitions of orthographic projection, lines, and planes, the author explains the method of vertical indices—a principle of orthographic projection which deals with only one of the co-ordinate planes, the other information with regard to the other plane of projection being obtained by means of a series of numbers or "indices." Thus a straight line is fully determined if the planes of two points in it are figured; so also the inclination of a line to a horizontal plane is obtained by taking the difference of the indices of any two points on it, and comparing the difference in level with the horizontal distance given on the plan. The more useful problems of solid geometry, sections of solids by planes, and interpenetration of solids are dealt with. Problems relating to irregular surfaces and the defilading of works of fortification; isometric projection, shading, and hints for draughtsmen are among the other subjects referred to by Major Ross—— *Illustrations of Old Ipswich*. By John Glyde, author of "Suffolk in the Nineteenth Century," &c. Part IV. of this work has reached us. The subject of description and illustration is the Old Coffee House in Tavern-street—one of the finest specimens of half-timbered residences of the middle of the 16th century, which still existed up to the beginning of the present century; indeed, as late as 1815. The autogravure representing the old house is taken from an old sepia drawing, and gives a fair idea of the carved angle-post, which formed so prominenta feature of the building. Mr. Glyde's description of this house is worth quoting. He says:—"While half-timbered houses of the 15th, 16th, and 17th centuries are to be met with in other parts of England besides East Anglia, very few examples are known in which the ornamentation compares with that of the structure under notice. That which most closely resembles this old coffee house is the 'Market House' at Hereford, bearing the date 1621. . . . Like the Ipswich building, it has three stories and three gables, the latter having deep barge boards carved with the familiar vine leaf, and without either hip knobs or pendants. The return gable at the end of the house, as at Ipswich, is more highly ornamented, and on the first floor over the shops are bay windows of exceedingly slight projection filled with diamond quarries. This indicates the original treatment at Ipswich. The pitch of the roof is nearly the same, and from it springs a brick chimney. The half-timbering, as usual in the West of England, is more pronounced than in East Anglia." The author minutely investigates the question of date to be assigned to this carving. Taking into account the rather high pitch of the gabled roof, the character of the barge boards, which are straight-edged, decorated with the vine leaf, the form of the doorheads, and other details, he arrives at the conclusion that the Old Coffee House was erected in the middle of the 16th century. The angle-post was, it appears, a peculiar feature of Ipswich, many of the houses having been once enriched by it, and some still remain. Other examples are to be seen at Lavenham and Coventry. The carvings on this particular angle-post are rather coarse, and represent four tiers of figures of grotesque character. The Three Graces and a Bacchanalian figure above occur in each story, the former being grouped standing on pedestals. This fine example of 16th-century architecture was demolished to make room for street improvements. Mr. Glyde's narrative is interesting.

CHIPS.

The foundation-stone of St. Martin's Episcopal Mission Chapel, Polmadie, Glasgow, was laid on Saturday afternoon. Designed by Messrs. M'Kissock and Rowan, architects, the building is 12th-century Gothic, simply detailed. It is seated for over 200 persons, and is arranged as nave, choir, and sanctuary.

The New Zealand Government intends to borrow £2,000,000 to complete the main railways of the colony.

On Saturday a demonstration by the trades and societies of Coatbridge took place in honour of the opening of the new public park, 23½ acres in extent, situated at the east end of the town, and presented to the burgh by Mr. William Weir, of Kildonan, as also the inauguration within the park of a bandstand raised by public subscription, and of a drinking fountain presented by the trades of the town.

The cemetery at Elswick, near Newcastle-on-Tyne, is about to be enlarged from plans prepared by, and under the superintendence of, Messrs. Stockwell and Spicer, of Barras-bridge, Newcastle.

The church of Tansor, near Oundle, a structure of the 12th and 13th centuries, which had been restored under the direction of Mr. Ewan Christian, at a cost of £1,900, has been reopened by the Bishop of Peterborough. Mr. Wade, of St. Neot's, Hunts, was the builder.

The parish church of Burley, Hants, built fifty years ago, was rededicated by the Bishop of Winchester on St. John the Baptist's Day, the anniversary of its opening, after having been added to and altered, at a cost of £1,600. The new chancel is 16ft. by 15ft., the organ chamber 11ft. by 8ft., and the vestry 14ft. by 10ft. The decorations of the walls and roof of the chancel are chiefly handpainted. A new pulpit of oak and walnut, with a base of Portland stone, has been provided, as have also new choir stalls. The east window is a two-light one, filled with Gothic tracery. The architect is Mr. W. Butterfield, of London, and the builder Mr. Joseph Norris, the work having been carried out under the superintendence of Mr. J. S. Shiner.

The Executive Committee of the Brixton Liberal Association have unanimously recommended Mr. James Hill, of Clapham-road and Queen Victoria-street, president of the association, well known to our readers as a lock merchant, as the Gladstonian candidate, subject to his acceptance by the Liberal Four Hundred. Mr. Hill has consented to stand should his candidature be approved.

At a special assembly of the Society of British Artists, held on Monday evening, Mr. Alfred Stevens was elected a member.

On Saturday last the corner-stones of a new Conservative Club for New Mills, near Manchester, were laid. Messrs. J. Brown and Co., Hyde, are erecting the building on Union-road, a central situation between New Mills and New Town, from the designs of Mr. H. Wyatt, architect, Marple. It is expected to cost about £1,000.

OUR COMPETITORS' COLUMN.

THE response to our sixth invitation, to "name the leading British architect," has been remarkable for the almost unanimous voice with which our readers have responded. Rather more than 90 per cent. of the suffrages are for Mr. Alfred Waterhouse, R.A., and it is evident that his popularity as *primus inter pares* is as extended as, we venture to add, in our own poor opinion it is well deserved. The papers sent in giving a summary of his works are comparatively few in number; but they are all characterised by a warm appreciation of his character and abilities, if they are somewhat unequal in their criticism of his work. Altogether, we think the best is by

Mr. Wm. Eaton, 10, Botham-street, Moss Side, Manchester,

to whom we award the prize.

A further prize of One Guinea is offered for the best series of

HINTS ON ARCHITECTURAL DRAUGHTSMANSHIP

to be sent in by Friday, July 8.

Another prize of One Guinea for the best

SUGGESTIONS TO ARCHITECTURAL SOCIETIES

for sessional papers next year, with hints as to subjects most appreciated by members, illustrated, if desirable, by references to and comparisons with past papers.

To be sent in by Friday, July 15.

And another prize of One Guinea for the best short essay, naming the architect who, during the past thirty years, has

MOST DECIDEDLY INFLUENCED ECCLESIASTICAL ARCHITECTURE IN ENGLAND.

To be sent in by July 22.

THE LEADING LIVING BRITISH ARCHITECT.

Although many great architects have been removed from our midst during the last few years by the hand of death, yet still we may claim to have some remaining who, by the magnitude and number of their works, have proved themselves to have been worthy of the great praise bestowed upon them, not only by the architectural profession, but by the public in general.

Foremost among these we must class Mr. A. Waterhouse, R.A., who, by his design for the Manchester Town Hall and other works of importance, must certainly rank as our greatest living architect. There may be architects who have produced better designs in a certain class of work, or who may have made certain buildings their special study; but, taking the works of our great architect as a whole, it must be admitted he is at present without a rival. Take the Manchester Town Hall, for instance, as a Gothic building, and it must be acknowledged that there is no public building in England, in the same style, which will compare with it, both in magnitude and beauty of design. Certainly, there may be defects in the composition of its elevations—though what façade is there but which professional critics think they could improve upon if they had it to design?—but, take the building as a whole, it must be admitted as a splendid composition, while, considering the awkwardness of the site, the plan is excellent, and shows that great thought and trouble have been expended upon its production. In the interior, the elegant staircases, which have open and arcaded well-holes, are greatly to be admired; while the angle elevation at the junction of Princess-street and Albert-square, with its projecting oriel, shows effective treatment, and is undoubtedly one of the best features in the whole composition.

Of other public buildings in Manchester, the Assize Courts, designed in 1862 and finished three or four years later, ranks foremost among the Gothic buildings of the day, and although rather different in design to the town hall, is quite as effective in its way, and does great credit to the able designer, Mr. Waterhouse. Owens College, Manchester, was commenced in 1871 and completed two or three years later. The buildings are in the Gothic style, and are excellently arranged, showing a thorough mastery of the arrangements and details necessary for such a college, and few buildings adapted for such purposes can compete with it. Mr. Waterhouse has shown that this style of building need not have that gloomy and monastic air so inseparably connected with it, as we see at Oxford and else-

where. The new portion now erecting, but not completed, fronts Oxford-road, and is a fine piece of architecture, the skyline being well broken, and the whole façade being enhanced by a bold and well-designed tower, very picturesque in appearance.

The Natural History Museum, London, shows what may be accomplished by the use of terra-cotta, and as a Romanesque design, will bear comparison with any building in England of its class. Its main entrance is singularly grand and noble, whilst the building itself swarms with creatures as full of vigorous life as the sculpture of a Mediæval church.

The National Liberal Club, London, recently completed, is in the Early Renaissance style of architecture, the breadth of treatment in the design being admirable, the façade being well emphasised by balconies, which are arranged between projecting bay windows.

The BUILDING NEWS, in 1874, criticising the architecture at the Royal Academy, and alluding to Mr. Waterhouse's design for additions to Eaton Hall, says :—"We now come to what will be, in the eyes of architects at least, the most remarkable drawing of the year. Mr. Waterhouse is a master of the art of planning, and it is no wonder he has chosen to show this specimen of his skill. The architect's style is a well-known one, and his peculiarities are strongly traceable here. The skyline is admirable, except perhaps a clock tower, which, to our notions, presents very unstudied forms. The treatment is Gothic, with a very sparing use of cusps, and the whole aspect of the work does not seem inconsistent with modern uses and nineteenth-century ideas."

St. Elizabeth's Church, Reddish, near Manchester, which was erected some few years ago at the expense of Sir W. H. Houldsworth, Bart., M.P., is a masterly design of Mr. Waterhouse's, in the Romanesque style, and is faced for the most part with brick.

Of other important works erected by Mr. Waterhouse must be mentioned the New Technical Schools, Kensington; St. Paul's School, Kensington; Shire Hall, Bedford; Yattendon, Newbury; the Prudential Assurance Company's Offices, London and Liverpool; Turner Memorial Hospital, Liverpool; Seamen's Orphanage, Newsham Park, Liverpool; New Courts, Lincoln's Inn, London; New Buildings, Balliol College; Gonville and Caius College, Cambridge; University Club, St. James's, London; Hampstead Congregational Church; Station Hotel, Liverpool; New Bank, Leighton Buzzard; and Yorkshire College, Leeds.

Not only has Mr. Waterhouse created a great name (which will be cherished for ages) by the production of magnificent designs for our public buildings, but his repeated appointment as judge or assessor in most of our recent large competitions is a proof that his name is held in high esteem and honour, not only by the greatest men in our land, but also upon the Continent.

WM. EATON.

10, Botham-street, Moss-side, Manchester.

CHIPS.

The foundation-stone of the new Victoria Jubilee buildings at the Hospital for Incurables at Dublin was laid on the 29th ult. by Prince Albert Victor. The buildings are to be on the pavilion system, and will include special accommodation for patients suffering from phthisis and other affections of the respiratory system. The wards will be sheltered on the north and east, and will be heated by hot-water pipes as well as by open fireplaces.

A bell, for which the claim is advanced that it is the largest in the world, has just been christened at Berlin by the Archbishop of Cologne in the presence of the civil and military authorities of the district. It is hung in the cathedral, and is called the "Emperor Bell." It received the name of "Gloriosa" at the christening.

A memorial drinking fountain in the centre of the village of West Coker, near Yeovil, was opened on Coronation Day. It is constructed of Ham Hill stone, and consists of a canopied spire of Somersetshire type. Messrs. C. and C. B. Benson, of Yeovil, were the architects; and Mr. Eli Williams, of Montacute, was the contractor; the carving and sculpture were carried out by Mr. Harry Hems, of Exeter.

The first sod of a new lock on the Yorkshire Ouse at Naburn was cut by the Lord Mayor of York on the 30th ult. Mr. John Fowler is the engineer of the lock, and the contract has been taken by Messrs. Nelson and Son.

WAYSIDE NOTES.

THE discovery of the Great Temple of Bubastis, in Lower Egypt, is an event of somewhat similar interest to that of the finding of the Temple of Diana at Ephesus, brought to light by the researches and excavations of the architect, Mr. J. T. Wood. The size of the Egyptian edifice appears to have been enormous; somewhere about 800 or 900ft. long, and 150ft. broad, and in general it is said to verify the description of it given by Herodotus, about three-and-twenty hundred years ago. Vast quantities of huge columns and statues of granite have been cleared of sand, and these include two colossal figures, the eyes of each measuring 7in. wide. The interest of watching excavatory works such as those now being carried on in Egypt must be most intense and absorbing to enthusiastic archæologists. It is indeed difficult to conceive anything more pleasant of its kind than standing by whilst a wealth of old granite columns are being unearthed, bringing to view handiwork that, possibly, may not have seen light for a score of centuries.

There is a very able article on this discovery in the *Times* of the 1st inst., which should be procured by all interested in old Egyptian architecture. And who is not interested, more or less, in the ruins of ancient Egypt? To myself there is no country that appears more fascinating in its history and architectural remains; and a stroll through the galleries in the British Museum, devoted to old Egyptian art, at all times affords me infinite pleasure. I like to linger before the old statues with their austere countenances, which may be perhaps described as the very embodiment of the abstract qualities of uncomplaining endurance and relentless determination, even as, in a like manner, the pyramid in the desert embodies the abstract attributes of solidity, endurance, and eternal durability in architecture. Certainly, a pyramid exhibits to perfection that principle of unity, the attainment of which has ever been the aim of all true builders.

Egypt is, perhaps, relatively less visited now by the architect than it was in the days when the "grand tour" was considered an essential part of his education. This is to be regretted, as such a visit cannot but greatly benefit architects, especially those given to depending too much on their detail for the appearance of their buildings, and who may never have awakened to the greater nobility of relying for effect on "broad sunshine and starless shade," as Mr. Ruskin has it. Of course, it is but the favoured few that will ever see the Pyramids and temples of the desert plains. Still we may all live in hope.

Anyone, however, who may be contemplating a visit to Egypt will be glad to learn that the newly-discovered Temple of Bubastis is very accessible. It is said to be about half a mile from Zagazig station, and within a few hundred yards of the railway that connects Cairo with Ismailia. Unfortunately for those who have the will and means to go to the country, it is a considerable distance off, and, moreover, there is something in its semi-tropical climate that is not altogether attractive to anticipate, although one ought to have been lately seasoned to high temperatures. Besides the heat, too, there is doubtless some risk just now in going amongst a people whom we have recently, as a nation, been slaughtering by their thousands; so, however tempting it may be to read about the unearthed ruins of the magnificent temple, it is probable that we shall not, many of us, rush off to "Cook," to be personally conducted to see the "fine squatting statue in black marble of Prince Menthuherkhopeshef."

On Monday last I took the first opportunity of inspecting the new staircase and galleries at the National Gallery. As regards the vestibule as now arranged, one can only conclude that the authorities have further plans for the future, since all must be struck with the decidedly unsatisfactory nature of the main entrance. By contrast to the grand new staircase, this now appears mean and too small for the purpose; and on "high days and holidays," as an official pointed out, there would be a very uncomfortable crush at the doors to the side staircases. Could the three small walls that form the entrance hall be done away with, a fine architectural effect would be made by the three flights of stairs. Apparently the only sacrifice necessary to obtain this effect would be that of two little nooks for taking sticks and umbrellas. As, however, such an arrangement must have been evident to all, it was probable that it was not considered so practical and convenient.

Pilgrims to the great work of Raphael, lately purchased at such an enormous cost, have now a more impressive approach to their shrine. The picture ranges with the new staircase and centre doors of the galleries that intervene between it and the main entrance. There appears to be now a good deal of space to spare on the walls of the altered National Gallery. Many of the old remaining rooms, by contrast to the new work, appear to sadly want cleaning and redecorating.

In the matter of pictures, I regret to see that Mr. Editor fears the little black and white reproductions of the more notable pictures of the year's R.A. exhibition do not meet with the universal approval of readers. I trust that a more extended poll of subscribers would not confirm the suspicion. For there must be many of us who keenly appreciate such charming little sketches as "An April Day," and, indeed, all the others that we have had. We all know that it is the thoroughly practical nature of the BUILDING NEWS illustrations that has won the journal such world-wide renown, and we like to find drawings and plans of buildings when we take up a building journal. Many of us, doubtless, feel somewhat irritated if, when we expect practical information, we pull out of our papers a yard or more of figure drawing that would be all very well in an artist's (pure and simple) or decorator's paper, but which soon brings a feeling of surfeit on the average and mortal architect. But the BUILDING NEWS appears to have ever guarded against this sort of thing. Long may it continue to do so!

It is probable that we all like best carefully measured drawings of old work, and the larger the scale of these the better; and we could also do with more geometrical drawings of new work. Of course, we cannot expect to be always having old measured work, and practical pans, elevations, and sections, and it is difficult to see why an occasional, and at the most a weekly, page of pretty and artistic black and white drawings should not be duly appreciated. I, for one, should be sorry to see the practice discontinued.

Coincident with the re-opening of the National Gallery was the laying of the foundation-stone of the Imperial Institute. The ceremony appears to have been pretty and interesting. There seems to have been considerable dissatisfaction expressed at the result of the competition—that is, as far as the selected building goes; but as to the selection itself, I have not seen many actual complaints. This is not surprising, considering the eminence of every member of the committee that had the awarding of the prize. It is seldom that persons of such repute decide competitions for the profession. Most of the ordinary building committees are composed of none more capable of judging the merits of a set of plans than local tradesmen.

I would point out to the young competing architect that the exhibition of the designs at Kensington was most instructive as regards planning. There were three varieties of plan—the monumental plan, the business-like or common-sense plan, and the undignified or domestic plan. Messrs. Deane's design exhibited the first class, as it evidently sacrificed convenience to appearance. Mr. Collcut's plan, which was unquestionably the best and simplest, and by reason of its studied symmetry retains an air of monumentalism, typifies the second class of plan. Messrs. R. Row and Anderson's and T. G. Jackson's exhibits are examples of undignified planning, however convenient they may be in working. Moral for competitors:—Of two plans, equally convenient in working, submit that which to the eye appears most beautiful.

GOTH.

Building Intelligence.

DARLINGTON.—The new station at Darlington was opened on Saturday, when a new branch of railway from Darlington to Fighting Cocks was utilised for passenger traffic. The plans for the station have been drawn by Mr. W. Bell, the architect to the North-Eastern Railway Company, the contractors being Messrs. W. Scott and Co., Newcastle, and James Thompson, Leeds; and for the ironwork, Messrs. Butler, Stanningley. The roof is of three spans, each 60ft. wide and 1,000ft. long, and supported by iron pillars. The station is on the "island" principle, with dock at the south and bays at the north end. The block of buildings includes offices for station master and assistant, waiting rooms for the various classes of passengers, large booking hall for porters, guards, &c., refreshment rooms, offices for telegraphy, &c. Lavatories are at each end. The principal front of the station is to the west, and a lofty clock tower faces Victoria-road. Carriage entrances are there and at the north end, where there is a large covered cab-stand.

DROITWICH.—St. Andrew's brine baths were opened on Tuesday week. The building is a parallelogram on plan, and consists of an elevated central hall, 55ft. by 27ft. 3in. (in which is the plunge bath), with private bath and dressing rooms ranged on either side, one side being for ladies, the other side for gentlemen. Architecturally, the building is of an Renaissance character. It is faced externally with pressed buff-coloured bricks, the plinth being of red pressed bricks, and the gables of half-timber construction, framed in oak. The sides of the plunge bath hall are carried up and finished as clerestories above the roof of the adjoining bath and dressing rooms. The architect is Mr. John Cotton, of Birmingham and Bromsgrove, the contractors being Messrs. Huins and Sons, of Redditch.

ELLAND.—The corner-stones of the new Town Hall were laid last week. It is about to be erected from the designs of Mr. C. F. L. Horsfall, Halifax, who, it will be remembered, was awarded the first place in the recent competition. The style is Classic, and the building will occupy a position of vantage at the junction of Southgate-road with Huddersfield-road. The large hall will be 100ft. long by 46ft. wide, and 30ft. high. There will also be a gallery 46ft. wide and 20ft. deep. The total accommodation will be for 1,050 persons. The scheme also includes shops and a hall-keeper's house. The accepted tenders amount to £5,666, the work being let to the following:—Mason and bricklayer, Mr. T. Pickles, Luddenden Foot; carpenter and joiner, Mr. Joseph Wilson, Elland; plumber and glazier, Mr. Joseph Aspinall, Elland; plasterer and slater, Mr. A. Anderson, Brighouse; ventilator, Mr. B. Hainsworth, Halifax; ironfounder, Mr. James Mackrell, Elland; painting, Mr. Jonas Binns, Halifax; and heating, Messrs. S. and W. H. Jagger, Elland.

HAMMERSMITH. — The chancel, morning chapel, lower part of tower, and the vestries and organ chamber of this church, which is one of the largest and most imposing of modern ecclesiastical buildings in the diocese, have just been completed from the designs of Mr. Hugh Roumieu Gough. The consecration took place on Saturday last. The building is now complete, with the exception of the upper part of the massive and lofty tower, and this is in the course of erection, and will, if funds permit, be finished about the end of the year. Messrs. Chamberlin Bros., of Hammersmith, have been the contractors. The church, which measures externally 183ft. in length and 67ft. 6in. in breadth, with a height of 76ft. from ground to nave and chancel ridge, consists of nave, with an octangular western baptistery, 18ft. 6in. diameter; north and south aisles, each having large porches towards the west end; chancel, with large morning chapel on the south side with accommodation for about 70 worshippers; organ bay and tower on the north side, a clergy vestry being provided in the ground-floor of the same; and a large choir vestry, 34ft. by 14ft., at the east end. The materials employed are red Mansfield stone externally and Ancaster internally. Boxground and Corsham stone is used in the dressings, supplied by Messrs. Randell and Saunders, and Mr. Yockney furnished the blue Bath stone for the arches of the arcades, &c. The moulded columns are of polished Belgian "granite," and the caps and bases of the same material. Leopold marble, from the Luxembourg district, has been used for the chancel screen, as also for wall lining in the chapel and for choir steps, &c. Some very beautiful specimens of polished Devonshire marble are employed as steps in the sanctuary and in the columns of piscina and sedilia, these latter being the gift of the architect. This marble is from the quarries of Messrs. J. and E. Goad, of Plymouth, who have also supplied the whole of the columns for St. Cuthbert's Church, Kensington, in course of erection, also from Mr. Gough's designs. The paving of the gangways in nave and aisles, porches, &c., is of Rust's vitreous mosaic, and in the chancel and chapel of Homan's Venetian marble mosaic. The seating throughout the nave and choir is of teak. The iron roof, which has more than once been noticed in our columns, is not seen, being above the barrel vault. It is of novel construction, and was introduced by the architect as an economical and efficient means of avoiding tie-beams. The ornamental ironwork has been supplied by Messrs. Jones and Willis. The church will accommodate nearly 1,300 worshippers, and the cost, when complete, with its furniture, &c., will be between £20,000 and £25,000.

LONDON.—The council of the Royal College of Surgeons of England decided last week to expend at present not more than £50,000 of the Erasmus Wilson bequest. The report of the committee on the extension of the college premises approved and adopted at the previous meeting was confirmed. It contained the following recommendations:—"That the library be enlarged by pulling down the house No. 39, Lincoln's Inn-fields, at present occupied as a residence by the conservator, and that the space thus gained be added to the library, in the manner suggested by the architect, at an approximate cost of £2,500; and that the house No. 38, Lincoln's Inn-fields, now occupied as chambers on annual tenancies, which is in a most unsatisfactory condition, be also pulled down and be converted into a residence for the conservator." The report of the colleges' land committee, consisting of delegates of the two colleges, on the question as to the desirability of utilising the vacant ground adjoining the examination hall for "scientific purposes," under the control and management of the two colleges, was approved and adopted. It was as follows:—"1, That a central theatre for lectures and demonstrations should constitute a part of the proposed additional buildings; 2, that the central theatre should be built so as to contain seats for an audience of about 250 persons; 3, that the plan submitted by the architect be, in its general arrangements, adopted; 4, that a sub-committee be appointed to investigate and report within four months upon the best arrangements at present existing in scientific institutions in the construction of a lecture theatre and laboratories."

OLDHAM.—New buildings for the use of the Salvation Army in Oldham have just been inaugurated. They are situate in Union-street, and the accommodation comprises a large main hall to seat 3,000 persons, a smaller one intended for week-night services capable of accommodating 900 persons, a shop, several retiring rooms, bandsmen's rooms, boiler house, heating chamber, and the usual necessary appurtenances. The front is of red brick, with stone dressings, with a tower running up each side of the main hall, finished with battlements. Tudor Gothic has been adopted for the architectural treatment. The contractor was Mr. Councillor Holt, of Cheetham, Manchester. The brick and stone work was carried out by Mr. Thomas Whitehead, of Failsworth, Manchester. Mr. J. Williams Dunford acted as assistant architect. Mr. E. J. Sherwood, of 101, Queen Victoria-street, London, E.C., was the architect. The entire block covers an area of 12,250 square feet, and the cost has been about £5,570.

PEMBROKE. — The parish church of St. Michael was reopened on the 14th ult. after a complete re-casting of the body of the church, which was rebuilt some 80 or 90 years ago, and was about 40ft. wide and covered with a tie-beam roof and flat plastered ceiling. Opportunity has been taken of the walls being sound to create two naves of equal width, the north being a restoration of the 14th-century one, the foundations of which were discovered in forming those of the arcade piers. A new and handsome constructional chancel has been formed of its eastern portion. The dual naves have met with the approval of the Bishop and Church Building Society, and the result has proved very satisfactory both as regards sight and sound. Two new porches have been built and other improvements effected, the total cost being £1,800, the contractor being Mr. H. Edwards, of Milford, and the architect Mr. E. H. Lingen Barker, of London, Hereford, and Swansea.

RINGLAND.—The Church of St. Peter, Ringland, Norfolk, was reopened on June 29th, 1887. The nave roof has been repaired, the aisle and porch roofs renewed, and the leadwork relaid. The seats in the nave are of oak, and the floors of pitch pine. The original glass in north clerestory, representing donors and the figures of Gabriel, St. John the Baptist, and the Virgin Mary, have been refixed. The tower is now being repaired, and when the pulpit, reading desk, and chancel seats are complete the entire cost will be about £2,000. The works have been executed by Mr. Wegg, of Norwich, from the designs of Mr. E. Preston Willins, diocesan architect.

SWINDON.—The memorial stone of the Victoria Hospital was laid at Okus on Tuesday week. The hospital is designed in the Late Gothic style, and will be built of brick with Bath stone dressings. The exterior will be plain but substantial. The portion which, on the erection of another, will be the centre gable, has a panelled centre, whereon will be placed a bust of her Majesty on a pedestal. It is intended at first to provide an accident ward, an operating room, and ten beds, another wing being added hereafter. At present the hospital will contain on the ground floor an entrance hall, waiting-room, medical officers' room, kitchens, offices, space for lifts for accidents, nurse's room, ward scullery, bath room, and a ward for five beds. The first floor also has provision for five beds, operating room, and accident ward. The wards will be laid with Lowe's wood block flooring, and lighted with the Wenham lights. The means of heating will be by open fireplaces. Mr. W. H. Read, M.S.A., of Swindon, is the architect.

WASHFORD PYNE, DEVON.—The chancel of the parish church was reopened on Wednesday week after restoration. The chancel has been restored on the old lines, and the east window (the only original window remaining), dating from the 13th century, has been retained. A new roof of oak, boarded and ceiled internally, and reslated externally, has been put on the chancel, and a new two-light window inserted on the south side. The choir seats are of oak, and the chancel is laid with Maw's tiles. The nave and transept were rebuilt, and the tower restored and raised, some four years since. The contractor for this portion of the work is Mr. J. R. Gibbard, of St. James's, Exeter, who also did the rest of the church; and the architect for the whole is Mr. R. Medley Fulford, F.R.I.B.A., M.S.A., of The Close, Exeter.

WIMBLEDON.—The Roman Catholic church of the Sacred Heart, Edge-hill, Wimbledon, has just been opened. It will consist of nave, aisles, chancel, side chapels, sacristies, organ chamber and choir school, and will be completed at the west end by a large and massive tower. Only the nave alone is at present built, the arches of all four sides being temporarily closed by brickwork. This portion of the building is 100ft. long by 29ft. wide and 67ft. high from floor to ridge of roof. It is divided into eight bays with clustered columns and moulded arches, which will open into the future aisles. The spandrels between the arches are alternately filled by niches for figures and sunk and moulded trefoils. Above is a range of three light flowing tracery windows with internal stone arches and angle columns. Engaged wall shafts support the arched principals of the roof, the boarded ceiling of which is divided into panels by moulded ribs. Supporting the wall shafts to the roof are a series of angels displaying the instruments of the Passion of our Lord. Across

the chancel arch is carved the beam supporting the rood, on which stand figures of our Lord, the Blessed Virgin, and St. John, together with St. Mary Magdalene at the foot of the cross, and two seraphim on either side. A temporary chancel is formed in two bays of the nave. The permanent high altar is temporarily erected against the bricked-up chancel arch. It is of plain stone with dark marble slab for the table, while the candle ledge, super-altar, and benediction throne are of white alabaster. When the altar is permanently erected it will stand under a stone baldacchino, supported upon four clustered grey marble columns. The seating is of unvarnished pitch pine specially designed; and the floor consists of an oak block pavement. The style is Decorated, and the materials used are, externally, knapped flints for walling, with Ancaster stone for the dressings, while the interior is almost entirely carried out in Beer stone. The roof is covered with Broseley tiles. Mr. Frederick A. Walters, F.S.A., of Great Queen-street, Westminster, is the architect, Mr. Wilson is the clerk of works; the contractors are Messrs. Goddard and Sons, of Farnham and Dorking, and the carving and sculpture are by Mr. J. McCulloch, of 384, Kennington-road. The church is heated by Grundy's hot-air apparatus. The cost so far has been £8,000, and the accommodation is for 400 persons.

CHIPS.

The parish church of Wellington, Salop, was reopened on Tuesday week after restoration effected at a cost of over £1,500, the working including reseating in pitch-pine over oak block flooring and reconstruction of the roof. Mr. Nicholson, of Hereford, was the architect; and Mr. Cullis, of the same city, the contractor.

Major Tulloch, Local Government Board Inspector, held an inquiry at the Guildhall, Worcester, on Friday, with reference to an application of the town council to borrow £5,336, for purposes of street improvement. The inspector was informed that £1,650 was required for purchasing some property for widening St. Swithin-street, and £3,680 for laying pavement, kerbing, and channelling a number of streets, many of them being in the area brought into the city by the Extension Act. There was no opposition to the application.

The Hastings town council have accepted as a Jubilee gift from Lord Brassey the building and reference library known as Claremont, and estimated to be of the value of £15,000. It is suggested that the library should form the nucleus of a free library, and the building used for municipal purposes as an adjunct to the new town hall.

The Bournemouth improvement commissioners have obtained the sanction of the Local Government Board to a loan of £17,000 for various purposes, including £9,000 for carrying out the scheme of watering the roads and flushing the sewers by means of sea water.

The Duke of Buccleuch is about to erect a memorial of his son, the late Earl of Dalkeith, on the spot on the hillside at Achnacarry, Invernessshire, where the young man lost his life in the autumn of last year. The monument, the execution of which has been intrusted to Mr. Dodds, sculptor, Dumfries, is to be of granite, in the form of a Celtic cross, from a design supplied by Sir Herbert Maxwell of Monreith, M.P.

The Ottley local board have been seeking for a further supply of water by cutting into a hill in Ellar Gill, and have struck a spring of water yielding 35,000 gallons per day. The water having been satisfactorily reported upon by an analyst, the board are laying down pipes to connect it with the town's supply.

The documents and coins under the foundation-stone of the Imperial Institute are secured in a copper casket, massive and air-tight, 18in. in length by 7in. across, and of nearly similar capacity in depth, lined with velvet. It was locked by a golden key, specially designed for the purpose, which was handed to the Queen on Monday. The lid of the box has surmounting it the Royal and Imperial Arms with supporters, crest and motto, all blazoned in proper colours, the shield on the reverse bearing the inscription. The casket was made by Messrs. Chubb and Son.

A stained-glass window has just been placed in the chapel of Fettes College, Edinburgh, by old Fettesians, to the memory of the late Mr. David Alexander Bannerman. The window is in three lights, the tracery is filled with angelic figures, and the Scriptural incidents selected are from the life of David, and are typical of youth, strength, and friendship. The work has been carried out by Messrs. Ballantine and Son, of Edinburgh.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

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G. S. FRENCH. (You don't expect us to insert an anonymous letter like yours, do you? You must sign your own name to it, and give the name of the person you refer to, if you expect us to take any notice of it.)—A. B. C. (Submit your idea to some enterprising publisher, and see what he thinks of it. We really do not see our way to undertake it, especially with the inclusion of the illustrations of our contemporaries.)—CANTAB. (Not at all compulsory; but it would certainly be a great advantage to have passed the examination of the Institution of Surveyors.)

Correspondence.

PROPOSED ARCHITECTS' AND ENGINEERS' REGISTRATION ACT.

To the Editor of the BUILDING NEWS.

SIR,—The necessity of the proposed Registration Act having been questioned by one of your correspondents, perhaps you will allow me to call attention to the case of the recent fall of a building in Manchester, reported in the *Morning Post* as follows:

THE FALL OF A BUILDING IN MANCHESTER.—The inquest on the bodies of the three persons who were killed by the fall of a building in River-street, Hulme, on the night of Saturday, the 11th June, was continued yesterday before the deputy city coroner, Mr. S. Smelt.—Mr. John Reavy, the owner of the premises, who carried on the business of a boot and shoe merchant, deposed that originally the building was five separate shops, and that he had at different times had them all knocked into one. He was in the shop on Saturday night when the building fell, but escaped without injury. Before the building fell he heard a noise, and ran out with the customers and assistants. They afterwards re-entered the shop, and in another minute the building collapsed.—Patrick Mooney, a plumber, said he undertook about four years ago to superintend the alterations effected to Mr. Reavy's premises by a man named Davis. When the division wall was removed beams and columns were put in. He made no calculations as to what weight would be upon the columns.—Mr. F. H. Oldham, architect, said he had examined the ruins of the building. The materials that had been used in making the alterations were of good quality, but altogether too light. The cause of the collapse was the giving way of the supports on which one of the iron columns rested. The column rested upon an ordinary brick wall in the cellar, which was altogether inadequate.—Similar evidence was given by Mr. John Holden, architect. The jury returned a verdict of manslaughter against both Reavy and Mooney, the one for employing an incompetent person to make important structural alterations, and the other for undertaking duties he was not competent to perform.

A perusal of the above shows that a *plumber* undertook, and was engaged to act in the capacity as architect, to superintend some important structural alterations, which has resulted in the fall of the building and a lamentable loss of life. Comment is needless.—I am, &c.,

EDGAR FARMAN.

39, King-street, Cheapside, E.C., July 1.

HOME OFFICE, WHITEHALL.

SIR,—The balustrade finishing this building terminates at the angles facing Whitehall. Judging from the construction of roofing at these points, the original intention was to have the angles higher than the main building. I hope Her Majesty's Commissioners of Works will have this put right when the improvements in the neighbourhood are carried out.—I am, &c.,

CHARLES F. MOXON.

PUBLIC WORKS.

SIR,—The mean, cheeseparing economy exercised in respect of our public buildings is fatal to the interests of architecture, the which should fittingly display the nation's wealth and importance. Money is freely spent on everything but architecture! Note the cutting down of the designs for the Law Courts, Scott's Foreign Office left unfinished, the disinclination to complete the possession of the Admiralty site, and still more recently the additions to the National Gallery and the decision in respect of the Institute competition. As regards the Gallery, the new staircase and entrance are done in a pinched and mean manner. There ought to have been a large entrance hall, required in every public building; but here, like a common dwelling, you enter and find yourself on the stairs at once. The entrance hall should have been carried up the two floors and been finished with a dome, the outer dome or covering being made a feature outside in place of Wilkins's petty affair. If I mistake not, this was portion of Mr. Barry's design, and part of the design having been executed, it should have been further adhered to. Now, the possibility of getting a fine building by degrees is rendered impossible. Of course, it may be said that such would have been costly, and interfered with this and that; but great works, whether material or moral, cannot be done without sacrifice. The new work is a botch. Though superior to Wilkins's, it is inferior in quality to Barry's.

As regards the "Institute" building, the Dublin design, double in dignity to any of the others, was generally approved of, the purposes of the building needing a grand and monumental display. It has unhappily been set aside for something cheaper, but much less stately. This is a great pity. Modification, where needed, might just as well have been applied to the first design as to the second, and any difference of cost would have been worth the money. The chosen design, in spite of its Dutch dress, reminds one too much of the neighbouring Natural History Museum, and the genuine strength of Waterhouse becomes a milk-and-water house in the to-be building. Certainly, the animals flanking the dormer windows of Institute should be omitted. However appropriate to the Museum, the copyism is too utterly utter, and the zoology out of place at the Institute.

Two notable things in respect of the Institute are worth recording: though the press have deferentially abstained from adverse criticism, yet the British public think the thing a mistake, and doesn't give its money freely, and that the support comes chiefly from India. If this latter is a voluntary and free-will offering, it is interesting.—I am, &c.

M.

WORKMEN'S COTTAGES.

SIR,—In your last issue I notice that one of your correspondents makes a statement to the effect that a wash-house is not necessary in a workman's dwelling, except it is used by two or more tenants, and that the pump shown in my design is in an angle. I might state that my plan shows the wash-house common to two houses, and is not divided into two, as Mr. Thorneloe evidently thinks, and that the pump stands with its back only against the wall.—I am, &c.,

AUTHOR OF 1ST DESIGN (LOIDIS).

AN EXPLANATION WANTED.

SIR,—Can any of your numerous readers explain this? At an empty house, where

repairs are being done, there are three or four workmen. On entering the place, all is quiet as a church, but as soon as I am seen, or my footfall heard, there arises a deafening clattering of hammers, banging of boards, shouting out "Hillo Jim," &c., that I can scarcely hear in the place. If this had occurred once only, I should not have noticed it; but it is so frequently the case as to be quite observable. Will some reader kindly explain it? If a British workman will do so, I should value it more than from a professional.—I am, &c.,

M. P.

THE NUISANCE FROM SEWER VENTILATORS.

SIR,—Another instance of the utter uselessness of stack-pipes as a means of ventilation to sewers came under my notice yesterday, which may interest your readers.

At Tottenham, many of the sewer ventilators being a nuisance, the Board, instead of putting up shafts, decided to make other alterations to abate the evil, and on taking up an offensive grating opposite Green Lanes Station, Wood Green, found that a 6in. ventilating pipe was already attached, running under the road some 30ft., and carried up the house adjoining, the outlet being half-way up the chimney. According to theory, a current of air should be going up this pipe to relieve the sewer; but, in fact, the air was almost stagnant, giving the appearance of a pipe choked. On testing, this pipe was found clear; but the portion running under the ground contained sewer-gas heavier and of a lower temperature than that of the grating or atmosphere of the street. This acted like a plug, choking the pipe, and preventing any ventilation taking place, except through the grating. After rarefying this heavy gas in the inlet pipe, the smoke ascended the pipe similar to that of an ordinary chimney. Is it not natural that sewer ventilation should prove a nuisance during hot weather when, by the action of sewer-gas passing through these cold pipes, an effectual stoppage of ventilation takes place, and that at a time when good ventilation is most needed? In cold weather, when the air in pipes underground is warmer than that of street, an uncertain current is set up; but in summer it is quite the reverse.—I am, &c.,

R. H. REEVES.

Cedardale, Putney, June 30.

IMPERIAL INSTITUTE.

SIR,—I am glad to find that a dome is recommended instead of the high tower, which I do not pretend to criticise, but venture to express an opinion that in this otherwise beautiful structure or design a rare opportunity occurs for crowning it with that most noble feature, a fair proportioned dome, especially as the building is likely to be increased, and so be even more desirable to have a bold spreading central object—e.g., there is nothing in all London of more striking effect than the dome of St. Paul's. The great Victoria Tower will not compare with it for grandeur.

Probably the architects who have only shown small domes in their designs may have considered them as large ones, or as much greater works than they need be; but now we have such excellent materials as good Portland cement, terra-cotta, &c., it becomes with appliances more easily attainable than for such a construction as at St. Paul's. The conical kiln-like internal structure shown in Messrs. Deane's design is not necessary, nor any timber, as all could be constructed to endure till an earthquake opens *terra firma* beneath; such is the opinion of—

Yours, &c., JAS. PULHAM.

P.S.—The late Sir Gilbert Scott wrote that he longed for the opportunity of introducing a great dome.

DRAINAGE AND SANITARY FITTINGS.

SIR,—The long letter from Mr. Bruce on pp. 982 and 983 of June 24th issue is full of mistakes and fanciful or manufactured assumptions, and as these, unless corrected and pointed out, might mislead some of the readers of this journal, I respectfully beg leave to expose them, more especially as the "desperate effort" he has made to attack me shows how the want of discrimination in a person will make him as blind mentally as defective eyesight does in disabling some people from distinguishing between the colours of a green gooseberry and a red rose.

Mr. Bruce asserts—"There is not the slightest reference to a stilted machine in Spencer's patent of 1848." Now, this patent, No. 12,115, is for "Machinery," and he claims "the method of forming or making 'stilts and feet,' and burning the tubes or pipes thereon." So that the stilts were part of the machine or apparatus used in firing the pipes.

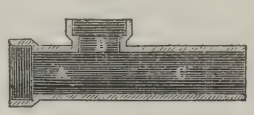
I am much obliged to Mr. Bruce for the diagrams 1 to 4 on p. 982. No. 3, showing my 1879 style of "feet," is no more like Francis and Waters's 1810 (Fig. 1) style than is the green gooseberry like the red rose. F. and W.'s "feet" are in reality *collars* in two halves encircling the junctions of the pipes, the pipes being stuck *end to end*, with a half collar below the joint and another half on top. If Mr. Bruce thinks highly of this antiquated plan he is quite welcome to prefer it to my style, only he should not, with the slightest respect for the truth, say the one style is similar to the other.

The pipes illustrated in Stiff's "Provisional Protection" only, No. 3,028, Dec. 7th, 1857, are in two halves, with serrated edges at the junctions; and his "standards" consist in simply making the bottom of the pipe about ½in. thicker than the top, and making the bottom broad and flat. There is not the slightest resemblance here, either to my style of feet, which *raise up* the pipe about 2in. or so, and, *inter alia*, allow the hand of the workman to get round below the joint.

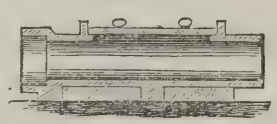
For his own ends, Mr. Bruce would like to be able to prove that the access openings in



Shoebridge's 1853 Round Opening.



Buchan's 1877 and Bruce's 1885 Round Opening or Eye "B."



Buchan's 1879 Longitudinal Opening.

the pipes referred to in Shoebridge's Provisional No. 1,335 of A.D. 1853 were not simply round holes or "openings" with lids (said openings being no larger—whatever smaller—than the diameter of inside of pipe), but longitudinal openings, longer than the diameter of the pipe, and says that I fail to explain how Shoebridge got at the interior of the drain with facility to remove impediments through "round" openings. Now, in regard to this, I beg to observe that as yet I have no reason to suppose that Shoebridge in 1853 was any cleverer than Buchan in 1877, or Bruce in 1885, and *both* of these latter in their patents then only show *round* openings, same size as the interior diameter of the drain-pipe for "access," "cleansing," and "inspection."

In 1879, I wished to get my head into these access openings to view the interior of the pipe; but finding I could not do so with the 6in. openings or "eyes" in the 6in. pipes, I then conceived the idea of having *longitudinal* openings, which I patented, and I have not seen or heard of any evidence that such openings as those in my 1879 patent were ever made in drain-pipes before those made for me by Messrs. J. and M. Craig, of Kilmarnock, after 24th December, 1879. I defy Mr. Bruce to produce any substantial proof that such were made before then. The long openings are more difficult to make than the round ones.

I here give a sketch of Shoebridge's probable access opening with lid, also of the round eye-pipe style, and of my new 1879 style. It would be interesting to know if it was want of money or the introduction of the eye-pipe that prevented Shoebridge in 1853 from proceeding with and illustrating properly what he intended to patent.

Mr. Buchan did *not* say a double system of drainage was of no use "under any circumstances," but that it was a useless expense, unless it was to serve some useful end. If Mr. Bruce really saw traps with extra branches for side connection for air as well as for water before 1885, why in that year did he attempt to patent such as a new idea? If he will read Buchan's 1878 and 1883 patents and look at the drawings, he will see that these extra branches may be made either in one piece with the trap or in two pieces, and I showed the branches at various angles long before Mr. Bruce in 1885 patented the particular angle of "twenty-five degrees," which I consider the greatest nonsense imaginable, because it limits the distance between the air grating and the trap to about 3ft. or 4ft., whereas sometimes the distance desired is 30ft., and perhaps, as I have at Stracathes House, round a corner, so that of the two styles illustrated on page 898, Mr. Bruce's is anything but an "improvement" on Buchan's prior style.

As to Mr. Bruce's assertion that the right angles in my air passages "are very objectionable," that only shows his ignorance of the subject. To have a rounded turn next the water is a mistake, as tending to conduct the cold air down upon the water in the trap.

Figs. 5 and 7 in Mr. Bruce's patent specification, No. 7,579, A.D. 1885, price 8d., are therefore, in my opinion, faulty in this respect. He shows in same figures the top turn of the traps next the house as rounded, which is all right; but, then, that is the style shown and made by me long before 1885. As to Mr. Bruce's funnel-shaped side fresh-air inlet, shown on pages 733 and 898, I consider it nonsensical, and its slope down into the trap bad. The wind passing over an enlarged mouthpiece such as Mr. Bruce shows tends to draw out the air from the drain, so that for this and other reasons the fresh-air inlet to a drain or soil-pipe should not be larger, but smaller—generally much smaller—than the drain or soil-pipe. Dr. Wallace, Past-President of the Philosophical Society of Glasgow, agrees with me as to this, and considers the idea of enlarging the fresh-air inlet "ridiculous."

Mr. Bruce says his trap "is not with a hollow ogee to retain and show soil," &c. Now, he should know what he made this for; but there is no use in saying the hollow and ogee are not in the trap, for they can be seen in his 1885 trap on page 733, or more clearly still in his 1885 specification, Figs. 1 and 3, while the text speaks of "the upturned, curved breast." Now, in the name of commonsense, what is the use of an "upturn" at the turn-over edge of a water-trap? My traps, long before 1885, were shown with sharp, square, or angled edge. What improvement results from making a hollow behind the sharp edge? Is this hollow the mere modification styled an improvement? And is this the "construction" boasted about as making the trap "self-cleansing"? Mr. Bruce says the breast of his trap is straight across at the turn-over. Mine have sometimes been so made long before 1885; but I did not consider that any improvement. I thought, and think still, the bottom of a drain should be round, not flat.

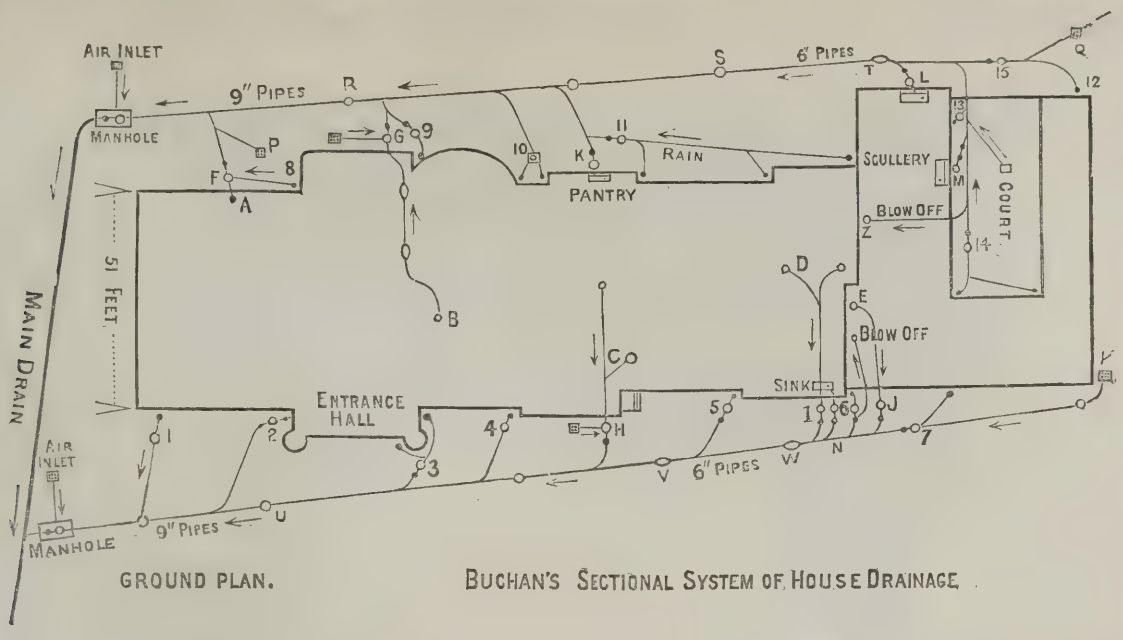
Notwithstanding the various attempts made by other people to improve upon my No. 2 trap, no other person has as yet managed to do so. Various parties have attempted to copy it, and advertised in BUILDING NEWS, &c., *four paid penalties for doing so.* If I find the manufacturers of Bruce's traps are selling traps like mine without proper permission, they may shortly hear from my lawyers on the subject. It is sometimes dangerous for a manufacturer to make certain things, even for the patentee of such, if there is a prior extant patent infringed upon. And I may here ask if it is not the case that the patent agent who took out the provisional protection of Mr. Bruce's 1885 patent cautioned him as to copying Buchan's prior patents rather closely?

Mr. Bruce states at foot of page 982 that I admitted that stinking air accumulated in connection with a Buchan's trap, and sometimes came out at the surface grating, and he then goes on to say that *his* so-called self-cleansing


CLAINES · CHURCH · WORCESTER·
ASTON·WEBB·ARCHT



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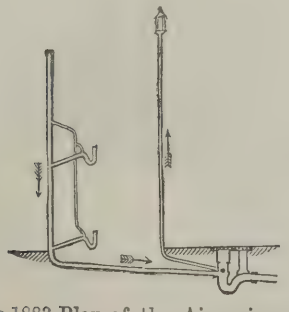


GROUND PLAN. BUCHAN'S SECTIONAL SYSTEM OF HOUSE DRAINAGE.

trap would cure this. Now, he was simply writing what is not true. I did not say that the air that sometimes puffed out at the inlet grating was from the trap, but from the drain or soil-pipe discharging into it. So no real or pretended self-cleansing trap will cure that, hence my 1878 side fresh-air inlet shown on page 898 was invented by me to do so, and which plan Mr. Bruce's "25 degrees" inclination idea is, in my opinion, an inferior modification of. Mr. Bruce seems to claim as a novelty a fall of 2½in. into his 1885 trap. In 1875 I spoke of the fall being "about 2in." or "several inches." He seems to claim as another novelty a water seal of 2 to 4in. The water seal in my traps has ranged from 1 to 5in., according to circumstances. An ordinary drop and water seal in my 6in. traps is 2½in. of each, and I was not aware a real or supposed quarter of an inch of difference of seal or lock would leave room for a new *patent!*

Mr. Bruce attacks the practice of putting up water-closet soil-pipes outside, but how about the Local Government Board Bylaws in England being broken, which say the soil-pipe must be fixed "outside such building," if Mr. Bruce's notions were put in practice? Then, if the L. G. Board Bylaws order the soil-pipe to be outside for safety, and the water-closet to be next an outer wall, it would hardly be consistent to allow Mr. Bruce to put up his soil-pipe or drain ventilating pipe in the inside of a wall *in the middle of the house.*

Mr. Bruce may say what he likes about his plan on page 857 being proof against siphonage, but I do not believe him. The plan is faulty and risky, while leaving, as he confesses, 1ft. 3in. of the top of the soil-pipe unventilated, is *not* a good and safe job.



Buchan's 1883 Plan of the Air going with the Water.

Mr. Bruce writes as if soil-pipes were not often put up without showing them off outside, but he should know well enough that there are thousands of soil-pipes fitted up inside the outer wall without anything outside to tell they are there, and they can be so done, and well too, without adopting Mr. Bruce's foolish plan. Should a client request that the fresh air be drawn *down* his soil-pipe, it could be done with both soil-pipe and blow-off pipe inside the wall, but both being carried up to above roof per my 1883 plan here sketched, or a modification of it to suit particular case.

The Fig. 7 style of fitting up a soil-pipe, published in my 1879 patent specification, but not claimed, is not the style I referred to as freezing the trap or soil-pipe, for this style does not draw in the air *down* the soil-pipe from immediately behind the closets, as Mr. Bruce suggested. I made the illustration to show how to carry out practically certain ideas if it were desired to test them. I do not remember carrying out this style for a closet, but have done so for a bedroom wash-basin.

I must now apologise for the space taken up replying to Mr. Bruce's misleading remarks—he reminds me of the Scotch beadle who went into the pulpit to show his minister how to preach—but these having been so many must be my excuse.

Before closing it may be interesting and useful to give this diagram, illustrating how I have lately improved the drainage of Armadale Castle, in the south of Skye, for Lord Macdonald of the Isles.

The building is a fine castellated-looking mansion house, about 240ft. long over all and 51ft. wide at the approach end. The "main drain" is a stone-built one. It is carried down towards the sea; it is disconnected by two 9in. No. 2 Buchan's traps with separate manhole for each as shown. The drainage of the front of the house is therefore distinct or locked off from the back. The traps 1 to 7 in front and 9 to 15 at back are for rain pipes; A to E are w.c. soil pipes; F and G at back, and H I J in front, are the Buchan's 6in. No. 2 traps for them with side fresh-air inlets. The scullery sink and other sink in front have a Buchan's grease trap. All the traps and pipes were supplied by Messrs. J. and M. Craig, of Kilmarnock. As will be seen from the style the work is done on the sectional system, so that should any branch drain or soil-pipe leak into the house only the air from that particular branch pipe can get out into the atmosphere of the house. The drain pipes inside the house are concreted round. They have access-pipes for inspection, &c., when wished. These were also used on the outside drain for examining the interior of the pipes while the work was going on. Z is a 4½in. strong iron blow-off pipe, red-leaded inside, for ventilating the back drain. The other blow-off is a 4in. iron pipe for the front drain. Both are carried up the high gable to several feet above the chimney cans, and surmounted by Buchan's I.C. fixed exhaust ventilators. Blow-off ventilating pipes or air-pipes for the soil-pipes are carried up to above the roof. The rock for about 150ft. in front from about U to N had to be blasted with gunpowder to get depth for the traps and pipes. Had the main drain not been at the approach end of the house I might have carried up the blow-off pipes from the manholes.—I am, &c.,

W. P. BUCHAN.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

SURREY ARCHÆOLOGICAL SOCIETY. — The annual excursion of this society took place on Tuesday in the Metropolis. The members assembled at the church of St. Saviour (St. Mary Overie), London Bridge, where a paper on the history and architecture of the church was read by Mr. F. T. Dollman. They afterwards went, accompanied by the president, Viscount Midleton, to Lambeth Palace, where Mr. S. W. Kershaw, F.S.A., described the library and furniture, and Mr. J. P. Seddon the chapel. St. Mary's parish church, Lambeth, adjoining the palace, was subsequently visited; and in the evening the members dined together at the Holborn Restaurant.

CHIPS.

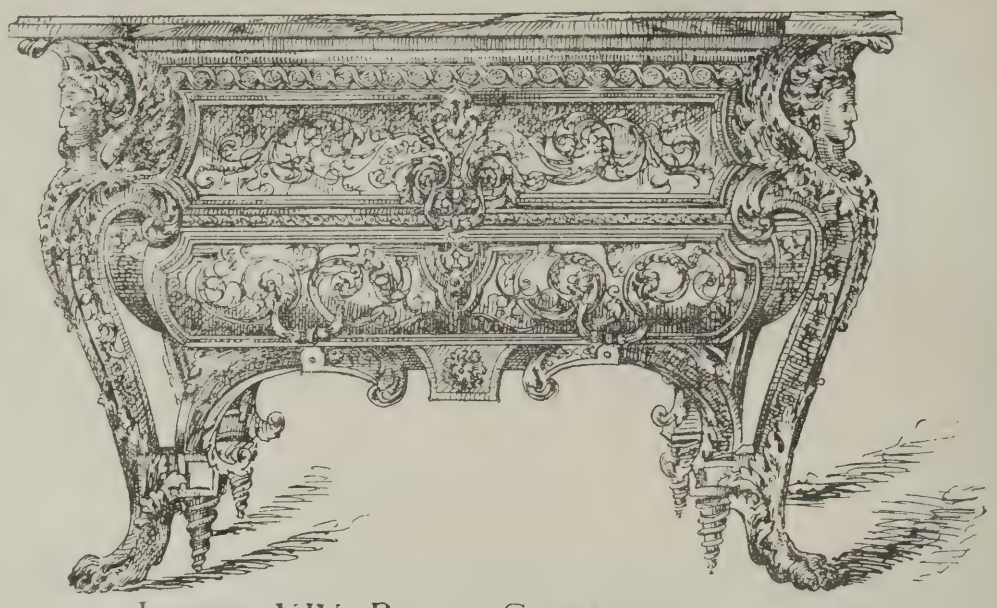
The marriage of Miss Beatrice Brabazon Urmston, third daughter of Colonel and Mrs. B. Brabazon Urmston, of Ardenlee, Maidstone, and Mr. Wm. Howard Seth-Smith, V.P.S.A., eldest son of the late Mr. William Seth-Smith, of Tangley, near Guildford, took place on Thursday afternoon, the 30th ult., at Holy Trinity Church, Maidstone, in the presence of a very large congregation. The Rev. E. J. Selwyn, rector of Pluckley, and the Rev. Robert Bruce, D.D. (uncles of the bride), assisted by the Rev. A. E. Coote, curate of Holy Trinity, officiated. On Friday afternoon Colonel and Mrs. Urmston gave an "At Home," when upwards of 100 local friends were present. The wedding presents were on view, and the town band played a choice selection of music in the garden. On Saturday afternoon upwards of 120 poor people of Holy Trinity parish were entertained to a substantial tea in the garden at Ardenlee, in honour of the event. The wedding presents exceeded 160 in number.

At a meeting of the Matlock local board held on Monday, the salary of their surveyor, Mr. T. Holtom Allen, was raised from £85 to £100 per annum, and Dr. Moxon was appointed medical officer of health.

A new highway bridge at Hundred House, Radnorshire, has just been completed, from designs and under the superintendence of Mr. Stephen W. Williams, of Rhayader, the county surveyor. Mr. Alfred Meredith was the contractor for masonry, and the Horsehay Co. for ironwork.

At a meeting of the Stratford-on-Avon Town Council yesterday, the Mayor, Sir Arthur Hodgson, announced that Lord Ronald Gower had offered to present to the town a Shakesperian monument, designed by his lordship, a plaster cast of which is a well-known feature of the eastern portion of the great transept in the Crystal Palace. The monument consists of life-size figures of Shakespeare's principal characters, with the poet himself in the centre of the group. The council has gladly accepted the gift.

Considerable improvements have been recently made to the fronts of Aston Hall by order of the Museum and School of Art Committee of the Birmingham Corporation. The glass pavilion on the west front has been removed, and the terrace occupying its place has been arranged and planted under the superintendence of Mr. Jethro A. Cossins, architect, of Birmingham.



LOUIS · XIV · BUHL · COMMODE



CARVED · IVORY · PEDESTAL



LIMOGES ENAMEL EWER

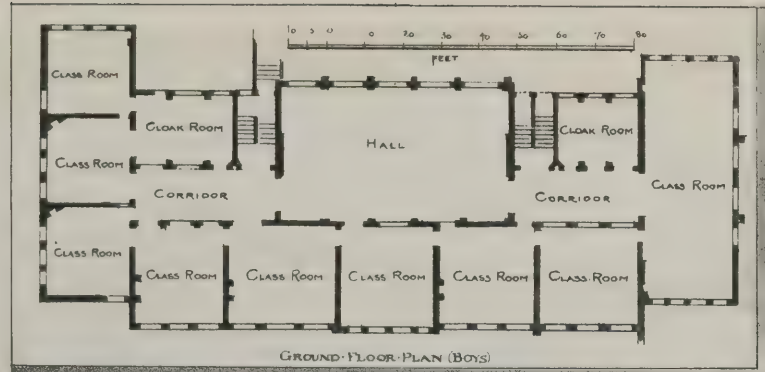
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A · FEW

DECORATIVE · OBJECTS

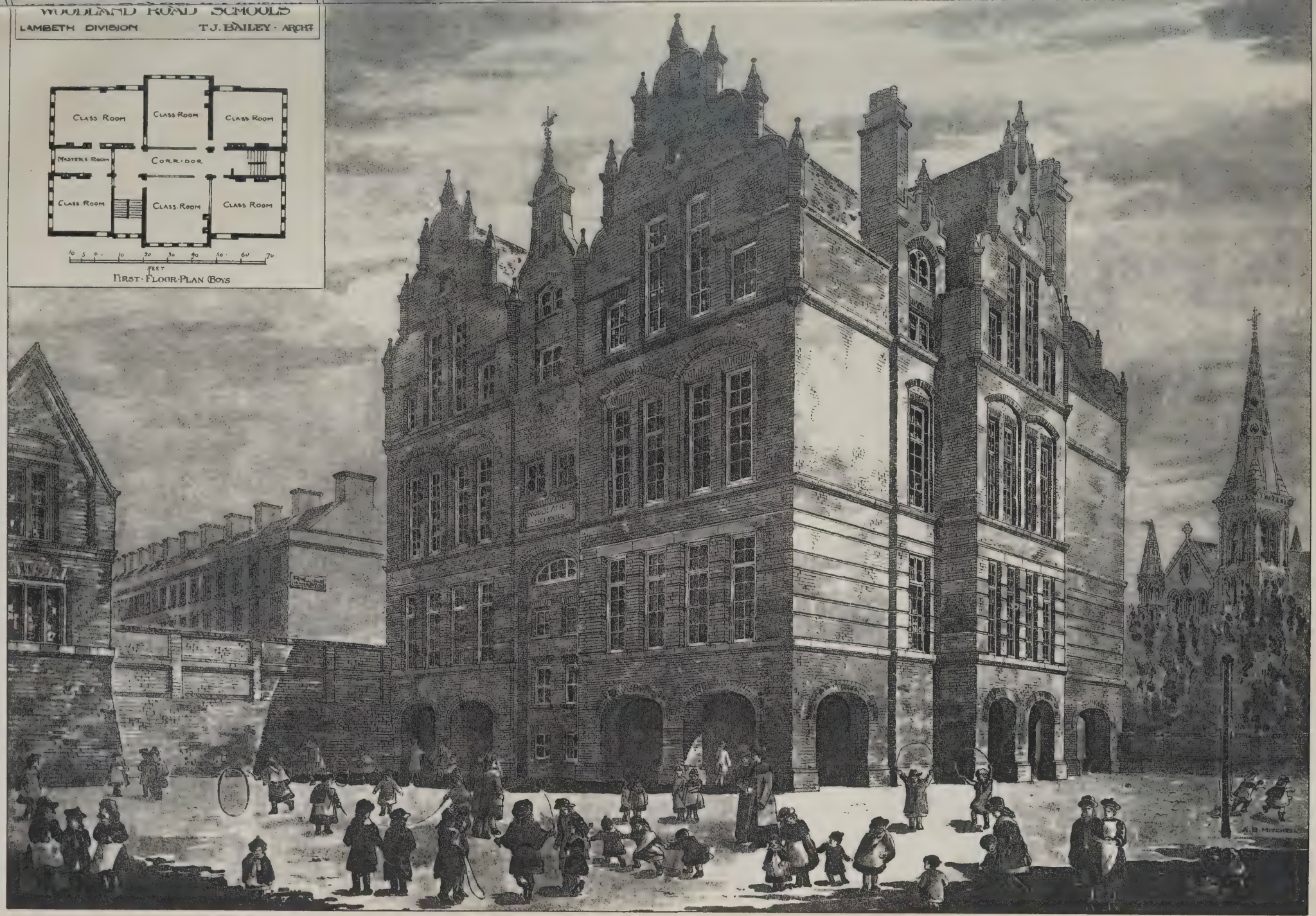


HENRI · DEUX · TAZZA



GROUND-FLOOR PLAN (BOYS)

SCHOOL BOARD FOR LONDON
GOODRICH ROAD SCHOOLS.
LAMBETH DIVISION. T. J. BAILEY ARCH.T



"PHOTO-TINT", by James Akerman, 6 Queen Square, London, W C

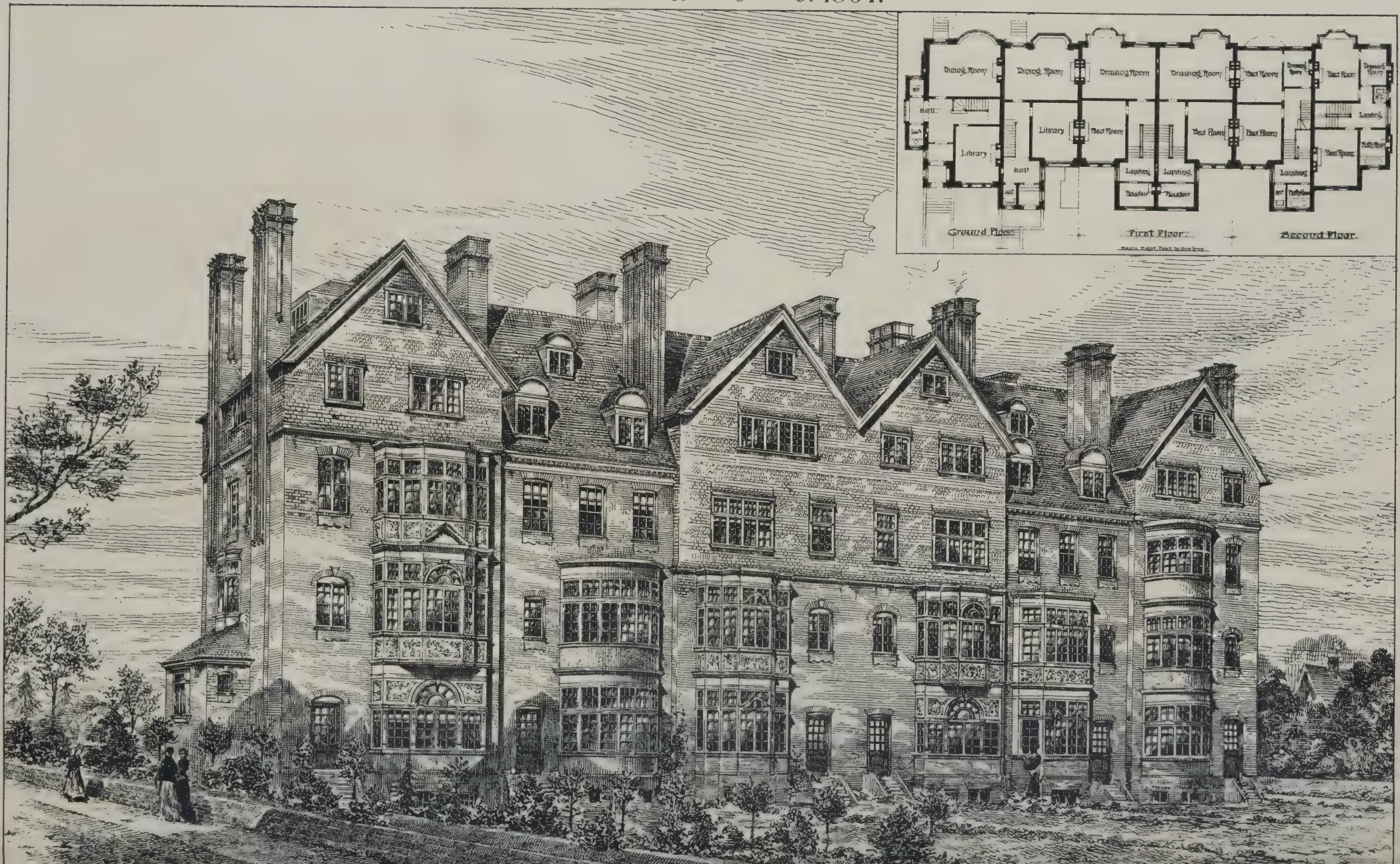
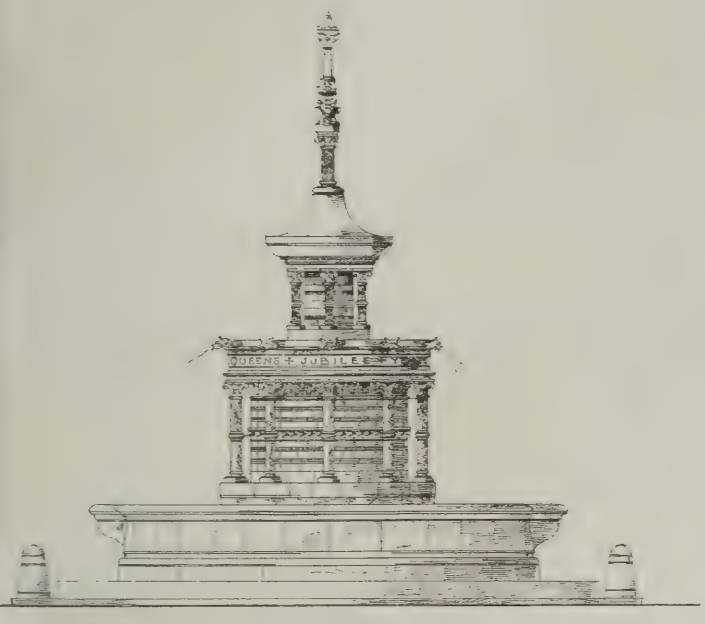

Dining Room
Dining Room
Drawing Room
Drawing Room
Bed Room
Bed Room
Library
Library
Bed Room
Bed Room
Bed Room
Hall
Landing
Landing
Boudoir
Boudoir
Ground Floor
First Floor
Second Floor

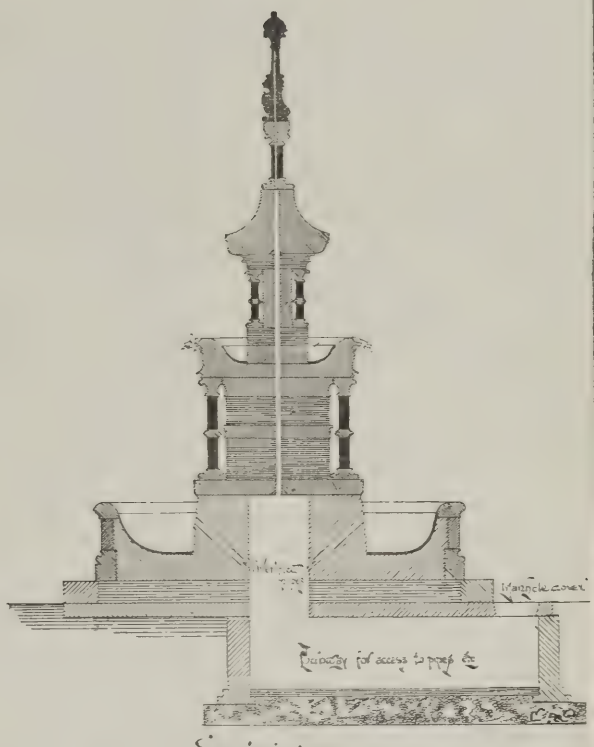


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C

HIGHLAND · GARDENS · ST. LEONARDS-ON-SEA · PHILLIP · TREE · ARCHITECT



Elevation.

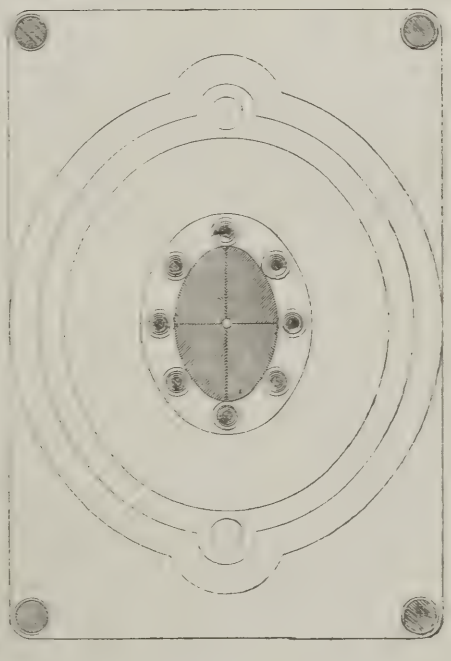


Section.

Jubilee Memorial Fountain, Reading.

Geo. W. Webb, A.R.I.B.A. Arch.
14 Friar Street, Reading.





Plan.

CONTENTS.

Rival Features of Architecture 43
Building Casualties and Conversion 44
Marble and Marble-workers.—XI. 44
Addition to the National Gallery 45
The Largest Painting Brush Factory in the Kingdom... 46
Applied Art 46
University College Prizes 47
Engineering Popularly Considered 47
Jubilee Memorial Fountain, St. Mary's Butts, Reading 47
Arthur Hayball 47
Books Received 47
Our Competitors' Column 48
Wayside Notes... 49
Building Intelligence 50
Correspondence 51
Architectural and Archæological Societies 53
Our Lithographic Illustrations 72
Sketches of Decorative Objects 72
Competitions 72
Engineering Notes 73
Archæological 73
Intercommunication 73
Parliamentary Notes 74
Water Supply and Sanitary Matters... 74
Legal Intelligence 74
Stained Glass 74
Our Office Table 75
Meetings for the Ensuing Week... 76
Trade News 76
Tenders 76

ILLUSTRATIONS.

NEW BOARD SCHOOLS, GOODRICH-ROAD, DULWICH, AND WOODLAND-ROAD, NORWOOD.—CLAINES CHURCH, WORCESTER.—ENTRANCE HALL, BELLE VUE, DOUBLE BAY, AUSTRALIA.— HIGHLAND GARDENS, ST. LEONARDS ON-SEA.

OUR LITHOGRAPHIC ILLUSTRATIONS.

GOODRICH-ROAD BOARD SCHOOL, DULWICH.—WOODLAND-ROAD BOARD SCHOOL, UPPER NORWOOD.

THESE schools have been erected by the School Board for London from the designs of their architect, Mr. Thos. J. Bailey. The amount of contract for the former was £17,170. It contains accommodation for 1,594 children, and the area of the site is 70,280 square feet. The latter school was erected at a cost of £9,879. It contains accommodation for 807 children, and the area of the site is 26,135 square feet.

ST. JOHN THE BAPTIST, CLAINES, WORCESTER.

THIS church had long been in an unsatisfactory condition. The interior was crowded with galleries, which cut across the windows and darkened the church, while the chancel, in addition to the rest of the building, was blocked up by high pews; these, and the galleries have been removed, and in order to provide the necessary accommodation a new north aisle has been added, while a vestry replaces a poorly-built brick one of some 80 years ago. This new aisle and vestry are shown in the exterior view, the aisle windows being the old ones rebuilt into the new wall. The oak roofs, where decayed, have been replaced in oak, the whole of the seating and other fittings throughout being in oak also. The floor of the chancel has a "Jesse tree" designed in mosaic by the architect. The chancel has been restored by Sir Offley Wakeman, Bart., and the remainder of the church by the parishioners. The church has a few interesting monuments, the best of which is an altar tomb to John Porter, 17th century; this had been removed and fixed against an outside wall of the church, with the effigy on its side, but has now been replaced in the chancel; no monuments or slabs have been removed. The drawings from which our illustrations are taken are by Mr. F. G. Knight, and are in this year's Royal Academy exhibition.

ENTRANCE HALL, BELLE VUE, DOUBLE BAY, NEW SOUTH WALES.

THIS house is now nearing completion, and the furniture and fittings for the building are almost finished. The drawing-room, dining-room, library, and morning room, as well as the smoking-room, are treated somewhat differently the one from the other, it being desired to obtain a variety of design adapted to their several uses; but the woodwork and general character of the house agree with the style adopted for the central hall now illustrated. The hooded fireplace was, like other particular features, specially wished for. The chimney-piece is in rich dark mahogany, carved in the solid, and detailed from clay models made from the architect's full-size drawings by Messrs. Hollands. The panelled dado is in cedar wood. The fireplace itself is in red marble, harmonising with the mahogany. The staircase window, in white and canary painted glass, has swags with ruby and green colourings, and Holbeinesque panels representing "Hospitality" and "Friendship," with figure subjects below illustrating "Welcome the Coming and Speed Well the Parting Guest." The metal casements used in all the windows of the main building, containing ornamental quarry lead glazing, were made by Messrs. Burt and Potts, of Westminster. The mosaic paving was carried out by Messrs. Burke and Co. The wall and paving tiles were made by Messrs. Godwin and Sons, of Lugwardine, and the tiles used for the roofs were supplied by Messrs. Burton and Sons, of Broseley, Staffs. The house is of red brick with stone dressings to the main windows, treated in a rendering of the English Renaissance work peculiar to James I.'s reign. The porch is made a feature on the entrance front, and verandahs run round the building for the purpose of shading the reception rooms from excessive light and sun heat. Mr. Maurice B. Adams, F.R.I.B.A., of London, is the architect of the work thus described, Mr. H. C. Kent, of Sydney, being the resident architect. The drawing from which our illustration was taken is now on view at the Royal Albert Hall, Kensington.

HIGHLAND GARDENS, ST. LEONARD'S-ON-SEA.

OUR illustrations of to-day are from drawings now on exhibition at the Academy, and represent a block of houses recently erected on the Highlands Estate, St. Leonard's-on-Sea, the property of Mr. Vandeleur B. Crake, J.P., a favourite residential position adjacent to the Maze-hill, commanding extensive marine and land views. The aim of the design has been to secure utility in plan, combining picturesque treatment of a character pleasantly contrasting with the dreary stucco residences unfortunately so common at this and other watering-places. The houses are built in local red brick of good colour; the road frontage is emphasised with carved and cut brickwork and wrought-iron inclosure; while the south, or garden, front is broken up with projecting bay windows boldly treated in carved wood and enriched hand-worked plaster, the upper portions having additional relief in tile, the high-pitched roof with dormers and chimneys adding an effective skyline. In the interior the detail has received equal consideration. The reception-rooms, with their deeply-projecting bays, specially designed carved wood chimneypieces, purpose-made stoves, and hand-painted tiles, are pleasing features; whilst throughout the general finishing of the houses are of a corresponding character. The sanitary arrangements are in every respect on the latest improved principle. The works have been undertaken and carried out in an excellent manner by Mr. Fred Cruttenden from designs and under the direction of the architect, Mr. Philip H. Tree, A.R.I.B.A., St. Leonard's-on-Sea.

THE IMPERIAL INSTITUTE.

WE postpone the illustrations of the remaining five designs till next week, when we shall give them altogether.

Few places on the North-East coast have within the last few years made greater progress than Whitley, near Tynemouth. At one time a picturesque hamlet, with a handful of inhabitants, later "a village of pleasing rural appearance, containing some costly houses," it has now assumed the proportions of a town. The largest landowner is Mr. J. T. Davison, and part of his estate is now being laid out for building purposes, from plans prepared by Mr. Henry Gibson, architect, North Shields. Care has been taken to classify the property, and to maintain a uniformity of design throughout. Davison-road, which leads from near Whitley Station direct to the coast, consists of a class of large houses, built by Mr. R. H. Nesbit. A terrace of houses will extend from Davison-road to the East Parade, fronting on to what will be known as the Marine-drive, extending from Cullercoats to Blyth—a distance of nearly eight miles. There will be large garden ground in front of the terrace, and room will be provided for coach-houses, stabling, &c.

The contract for the restoration of Upper Helmsley Church has been let to Messrs. Schofield and Abbey, of Claxton, near York, and the plans have been prepared by Messrs. Lewis and Son, of York.

SKETCHES OF DECORATIVE OBJECTS.

OUR illustration to-day is rather an interesting one, as most of the subjects have been in celebrated sales and exhibitions. The sarcophagus-shaped Commode, is of the Louis XIV. period, of black buhl, has beautifully modelled terminal figures at the angles in relief, and on the top a slab of Verona marble. The Limoges enamel Ewer is a beautiful example of a process the art of which is now lost, and consequently every piece of such work fetches a fabulous price. This was originally in the Hamilton Palace collection, and was exhibited at South Kensington in 1862; it has an oval flattened body, painted in grisaille on a black ground; on the upper part are marine deities, and on the lower centaurs and tritons fighting for women. The Tazza of Henri Deux ware has a shallow hemispherical bowl, supported on a massive stem. The exterior is covered with inlaid ornaments of the richest and most elaborate character in red tint. A small medallion in the centre contains the usual device of Henri Deux—viz., three interlaced crescents. This is one of the very few pieces of that celebrated ware in existence. The ivory pedestal is very finely carved, with a Bacchanalian dance, by Fiammingo, and has a capital and base of chased ormolu; this was also exhibited at South Kensington, and was in the Hamilton Palace collection.

COMPETITIONS.

MAIDSTONE.—The Maidstone Borough Lunatic Asylum competition has during the past few days been settled in favour of Mr. Edward William Stephens, architect, of Maidstone. Mr. H. Saxon Snell, F.R.I.B.A., acted as referee, and the following are the terms of his award:—"The conclusion I have arrived at, from a very careful scrutiny of the details of the various plans, is" (there were 42 designs) "that No. 31 would make the most perfect building, and that it is capable of being much lessened in cost by the reduction of some superfluous accommodation." A correspondent writes, respecting this contest: "There were no premiums, and so the magistrates have got nearly a thousand pounds' worth of work out of the profession for very small expenditure on their part. A guinea was charged for the plan of the ground and the levels supplied to each of the competitors. A semi-public exhibition of the designs is reported to have taken place, and the plans have been returned to their authors 'carriage paid.'"

GATESHEAD-ON-TYNE.—A meeting of the Gateshead School Board Plan Committee was held on Monday afternoon to consider the plans sent in for the erection of a Board school at Teams. Thirteen sets of plans had been sent in. After an exhaustive examination, it was agreed to recommend the three following plans, placed in order of merit, for the members to decide upon at their next meeting, and bearing the following mottoes:—"Derwenter" first, "Evolution" second, and "L'Ecole" third.

Brunswick Park, Wednesbury, which has just been completed at a cost of about £6,000, from the designs of Messrs. William Barron and Son, Elvaston Nurseries, Borrowash, Derby, has just been formally opened by the Mayor of Wednesbury (Alderman Williams). Messrs. Barron and Son were assisted in their design of the lodge by Mr. W. H. Radford, of Nottingham. The park is about 25 acres in extent, and is finely undulated. A commanding mound 50ft. in height, which was formerly a most unsightly pit-hill, has been very effectually treated. Two lakes have been constructed, and a cricket ground, tennis lawn, bowling greens, band stands, shelters, &c., provided.

Mr. William Hall, of Bilston, has generously presented the town with 22 acres of ground within ten minutes' walk of the Bilston town hall, as a Jubilee gift for a public park. It was decided to offer two prizes of 20 and 10 guineas for the best design for laying out the same. The first prize has been awarded to Messrs. William Barron and Son, Elvaston Nurseries, Borrowash, Derby, and the second to Mr. W. Milner, Crystal Palace School of Landscape Gardening, Sydenham.

The guardians of Holborn Union have adopted plans prepared by Mr. H. Saxon Snell, their architect, for providing additional buildings giving accommodation for imbeciles and lunatics at the City-road Workhouse, the estimated cost being from £6,000 to £,7000.

Engineering Notes.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.—The annual meeting will be held in Leicester on Thursday, Friday, and Saturday, in next week. The members will assemble at eleven o'clock on Thursday, the 14th inst., in the Council Chamber of the Town Hall, Leicester, when, after a reception by the Mayor, the annual report will be submitted, and the election of officers for the ensuing year will take place. One of the proposals to be discussed is a very sensible suggestion by Mr. Meade, that the present unwieldy title be cut down to "The Association of Engineers." After the delivery of the president's address by Mr. J. Gordon, borough surveyor of Leicester, the following papers will be read and discussed :—"Concrete Cement and Asphalte Footways," by Mr. G. R. Strachan, A.Inst.C.E., and "Refuse Destructors and their Results up to the Present Time," by C. Jones, A.Inst.C.E., of Edinburgh. At 2.30, members will visit the following places of interest and works in the town, manufacturers representing various industries having thrown their establishments open to inspection :—The old Town Hall, the Roman Pavement, the Public Baths, Bath-lane; the Co-operative Society's Boot and Shoe Manufactory, Dun's-lane ; Mr. Fielding Johnson's Spinning Factory, East Bond-street ; Mr. Jessop's Crane Works, Canning-place ; and Mr. Raven's Hosiery Factory, Wheat-street, Wharf-street. The annual dinner will take place at the Masonic Hall, Halford-street, at 6.30. On Friday, the 15th, members will meet in the Council Chamber at 10 a.m., for reading and discussion of the following papers :—"An Examination of the Experiments of W. F. Dibdin, F.C.S., F.I.C., for the Metropolitan Board of Works on Sewage Treatment," by R. W. Peregrine Birch, M.I.C.E., F.G.S. ; "Crematories," by W. Eassie, C.E. ; and "Jennings's and Brewer's Automatic Sewage and Water Gauge," by W. Jennings. At 1 p.m., members will visit various works recently executed and in progress in the borough, including the New Weir and Flood Basins, Freemen's Meadow, Aylestone-road ; New Gas Tanks (now in progress) and Chemical Works (recently completed), Aylestone-road Gasworks, under Mr. Colson, gas-engineer and manager ; New Building Estate, Spinney-hill ; Spinney-hill Park ; Sewerage Works, Belgrave-road ; Abbey Park ; Open Air Swimming-bath at St. Margaret's Pasture ; and Flood Works from North Lock to Braunstone-gate, and at 6.30 are invited to a garden fête at Ashleigh, Knighton, the residence of the Mayor. On Saturday, the 16th, members will assemble at the Town Hall, and leave in brakes at 9 o'clock for the Victoria Stone Company's Works at Groby, where Mr. Griffiths, the lessee, will receive them. Having next seen Bradgate reservoir and pumping station by way of Bradgate Park and Ruins, they will also inspect the well-known Mount Sorrel Granite Quarries, where the members will be received by Mr. R. F. Martin, who will conduct them over the quarries and works. In the afternoon the visitors will proceed by special train, provided by the Mount Sorrel Company, along the company's private line to the new cement works and the Barrow Hydraulic Lime Works of Messrs. John Ellis and Sons, where the members will be received by Mr. W. H. Ellis and other members of the firm. The party will return to Leicester by way of Rothley and Rothley Temple (the birthplace of Lord Macaulay), Thurcaston, and Mowmacre Hill ; Leicester Abbey (where Cardinal Wolsey died), and the Abbey Park.

THE PROPOSED THAMES TUNNEL AT BLACKWALL.—The Bill promoted by the Metropolitan Board of Works for powers to construct a tunnel under the river Thames between Blackwall and Greenwich Marshes came on on Thursday in last week before a select committee of the House of Lords. No opposition being practically offered to the scheme, the committee passed the preamble and proceeded to go through the clauses of the Bill, upon which the London and North-Western Railway appeared in the interest of some property held by them near the entrance to the Poplar Docks. The proposed tunnel, which has now received the sanction of both Houses, will, it is estimated, cost just over £1,500,000, and will be constructed on the pneumatic shield principle, so as to avoid interference with the bed of the river, and to prevent any danger from subsidence of the soil. The total length of the tunnel, including the approach roads, will be 10,853ft., or a little over two miles.

ARCHÆOLOGICAL.

THE BRITISH SCHOOL OF ARCHÆOLOGY AT ATHENS.—The Earl of Carnarvon presided over the first annual meeting of the subscribers to this school, held on Wednesday in the rooms of the Society of Antiquaries, Burlington House. There were present, among other ladies and gentlemen, Sir C. T. Newton, Professor Jebb, Lord Lingen, the Earl of Morley, the Rev. Charles Evans, Sir F. Pollock, Dr. E. A. Bond, Mr. G. Godwin, Mr. Watkiss Lloyd, Professsor Percy Gardner, and Mr. Walter Leaf. The secretary, Mr. George A. Macmillan, read the annual report, which stated that Mr. F. C. Penrose, the director, had, besides directing the work of the students and delivering public lectures on historic sites, conducted excavations on the site of the Temple of Olympian Zeus at Athens, which established the important fact that the temple was octastyle, not decastyle, as had hitherto been supposed. As Mr. Penrose's successor, the committee had secured for two years the services of Mr. Ernest Gardner, the first student enrolled in the school. Lord Carnarvon, in moving the adoption of the report, said that the undertaking had been fairly launched. One thing only seemed to be wanted, and that was money. It came in very slowly, and that, when he looked at the nature of the work, and the probable results, he marvelled there should not be found men throughout the length and breadth of this country who possessed great private and personal means, who were willing to benefit themselves by this remarkable movement, and become associated with the British School at Athens. The report having been adopted, Mr. Penrose gave an account of his work during the past year. He had been able to visit and collect objects of art from Palermo, Oropus, Sicyon, and other places, and in his labours the American and German archæologists had afforded him much valuable help. He had, unfortunately, contracted a fever ; but had been able to give lectures on the Parthenon, the Erechtheum, and other subjects. The students had been doing good work, and had achieved valuable results. Lord Carnarvon moved a vote of thanks, which was heartily given, to Mr. Penrose for the great services which he had rendered the school.

An addition has just been made to the museum of the public library at South Shields. It is the bust, in white marble, of the late William Wouldhave, of South Shields, the reputed inventor of the lifeboat. The bust is the work of the late Mr. Rowe, a South Shields sculptor, and was executed about thirty years ago, from descriptions given by persons who knew the ingenious boatbuilder, and who declared it to be a capital likeness. So far as is known, there is no portrait of Wouldhave in existence. Wouldhave died September 28th, 1821, and was interred in St. Hilda's Churchyard, South Shields, where the tombstone containing the model of a lifeboat is a conspicuous object.

By the new branch railway of the Midland Company up the valley of the Wharfe past Bolton Abbey to Skipton, now nearly completed, some of the most beautiful scenery in Yorkshire is opened up to the tourist and architectural student. Heretofore a journey to the Valley of the Strid, or to the Abbey, whose situation is hardly less picturesque, has had to be performed on foot, or expensively in a carriage. The new railway will provide travelling accommodation much wanted. It is expected that villa-building will proceed apace in the upper part of the valley, as it has done at Ilkley, Ben Rhydding, and Otley.

On Wednesday week the foundation-stone was laid of a new Constitutional Club in Barden-road, Tonbridge. The plans have been prepared by Mr. Geo. Friend, of Maidstone. The new building, which has a frontage from the road of 50ft., will be of red brick with a tiled roof. The ground floor, beneath which is cellarage, will have an entrance hall, bar, billiard room, reading room, and committee room. On the first floor is a large assembly room, 29ft. by 48ft., which can be divided by a movable partition, and above this is a cloak room and offices. The contract for the work was taken by Mr. C. J. Jones, of Tonbridge, at £1,197.

Intercommunication.

QUESTIONS.

[9337.]—**Half-Timber and Tile-Hung Work.**—Can you put me on to a book in which fairly large plans and sections of this work are given ? I want illustrations of modern buildings rather than old.—DAE.

[9338.]—**Northern Sketching Tour.**—I propose spending a fortnight in the South of Scotland. Starting from Dumfries, I would work east to Berwick-on-Tweed, taking on my way Kelso, Jedburgh, Dryburgh, and Melrose. Then south to Newcastle and Durham, then north-west to Carlisle, and back to Dumfries. Can anyone who has been over this ground give me any suggestions as to places worth visiting en route ? I believe there are one or two good abbeys and castles within reach of Dumfries itself.—H.

[9339.]—**Alterations and Additions.**—I shall esteem it a great favour if any reader will kindly give me his opinion on the following :—At the end of last year a relation of mine commenced some alterations and additions to some buildings, I being very ill at the time. An ordinary estimate was given and accepted verbally, and the work proceeded and payments were made on account weekly. Other small contracts were started in the same way. I then being better, was asked to finish this work for the relation, who is now abroad, and I also undertook other contracts in his name in connection, as none of the former works were completed owing to these other alterations. These payments were all made by cheque in the name of my relation, who is abroad, in the principal contract. I stated to do the work for a certain sum according to plans and specifications, which I produced to the proprietor, and also showed him the quantities, which he copies and pays from same. As work progresses, certain alterations and additions are made and prices given for same, and accepted in writing. Now, in addition to these, other works are ordered—draining and similar matters, also extensions to buildings that have not been agreed for in any way. I now claim for these by a detailed account. I may also say these additions are never mentioned in either plan, specification, nor quantities. The owner now refuses to pay, simply on the ground that it was understood to be done, which we deny. I may also add the owner would not employ an architect. My relation, self, and foreman did plans, &c., and the work, as actually executed, amounts to by reliable valuations £55 more than our full claim, the amount altogether being under £400. An early opinion will greatly oblige.—A 12 YEARS' CONSTANT READER AND SUBSCRIBER.

[9340.]—**Surveyors Institute Examination.**—Will any reader say what other books than the following, which I have, are necessary in the Law subjects for the Valuation section of above—non-students' :—Houldsworth's "Landlord and Tenant," Dixon's "Law of the Farm," Hunt's "Boundaries and Fences," Grady's "Fixtures and Dilapidations," and Innes' "Easements."—SUBSCRIBER.

[9341.]—**Legal.**—I should be much obliged if any of your readers could advise upon the following :—A tenant has taken a house on lease, but before signing the landlord assures her that the materials and workmanship are of the best. Upon taking possession the tenant discovers, and informs the landlord, that the plumber's work is defective, and within a year the cesspool is choked full of waste and surface water, although the road drain might have been used for this purpose ; a hot-water pipe to bath, being pressed against an external 9in. wall, burst from frost, and not being over the zinc tray, the water runs down wall—the bath and pipes being inclosed with framed riser without an inspection door. A sitting-room is so damp that it cannot be used. Who is liable for the cost of repairs—the landlord or the tenant ?—LEASEHOLDER.

REPLIES.

[9310.]—**Half-Timbered Walls.**—If Mr. Thorneloe had carried his historical researches still further back, he would perhaps have discovered another precedent for bad construction, called "wattle and dab," which was at one time practised in this country ; but it has not been met with in recent specifications, and was hardly less barbarous, architecturally speaking, than the method of simulating half-timbered walls, which Mr. Rumble has described. I deny to this last—not with a sneer, but in honest criticism—the name of construction ; it is merely applied decoration, and therefore, scene-making. The origin of half-timbered walling was either ignorance of better materials or the lack of them—either entirely, or in sufficient quantity. In either case, economy was necessary ; and if the better materials were entirely lacking, lattice-work, lime, clay, or even mud had to be used to keep the wind away. The great advantage of half-timbered walls was, that with small quantities of material a warm building was produced; and in this result the external plaster had no little part to play. If there be sufficient brickwork to bolt Mr. Rumble's fanciful garniture to, it ought to be sufficient to keep out the wet without that adjunct ; but in merely filling in to constructed timbers, the thickness attainable is insufficient, hence the necessity of the plastering, of which your correspondent so triumphantly disposes. But Mr. Rumble not only provides a thick wall for the purpose described, but he renders it with Portland cement—on the face of which, by the bye, the battens (*vide* p. 939, last volume) are fixed !—and then proceeds to conceal the whole with a sham. I make Mr. James Thorneloe a present of the privilege of imputing to a person whom he does not know the error of writing upon a subject with which he has not made himself acquainted, and of being practically ignorant of the cost of lead—a privilege the exercise of which may fully demonstrate his audacity, but not his ability, his judgment, or his good taste.—F. B. P.

[9322.]—**Feather-edge Joists.—Correction.**—In my reply printed in the last issue, 5th line from bottom, for "tension," read "torsion."—W. STEVENSON.

[9322.]—**Feather-edged Joists.**—It may interest "W." and Mr. Stevenson to know that I have come across an example of the above in the floor of a warehouse to which I am making additions. The room is 58ft. 9in. long

by 21ft. 9in. wide, and has six 14in. by 7in. beams across, with 7in. feather-edged joists, top edges 2in. wide and bottom ones 4in. These are fixed to 12in. centres; therefore the idea is not entirely new.—J. F. WALSH Halifax.

[9331.]—**Fixing Photos.**—For fixing photographs I use starch tolerably thick, spread thinly and evenly over the photo, not wetting it too much, and taking care to remove all lumps, and then rub down as soon as possible to prevent too much expansion. If the photos are mounted separately, I should think pressing would prevent any bulging if the cardboard is good; but in a book it is almost impossible to get the leaves quite flat. I have been very successful with my own books. The photos are not at all bulged, and the edges of the pages only show a slight wavy line when the book is closed.—A.R.I.B.A.

[9331.]—**Fixing Photos.**—The best "paste" is starch. Weight them heavily afterwards, to avoid cockling.—HARRY HEMS.

[9331.]—**Fixing Photos.**—Pure gum, made very thin and freed by straining from all deposit, will be found an excellent material for fixing photos either in an album or on cardboard. The gum should not be used too freely, but great care should be taken to cover the whole surface of the paper in laying it on. In fixing the pictures, it should be smoothed outwards from the centre with a silk handkerchief. This insures its lying flat.—T. K. C.

[9331.]—**Fixing Photos.**—There are several patent mounting (not "fixing") mediums sold by photographic material dealers, which are suitable for small pictures, though the larger sizes are not easily coated with sufficient uniformity, as the solution dries in parts before the print is ready for pressing. The result of five years' practice as an amateur photographer now recommends the use of the ordinary boiling-water starch prepared in the ordinary way, although it is well known that it is apt to become acid, destroying the print in contact with it; but practically there is no danger if it is of the best quality freshly mixed. It should be evenly spread over the whole of the back of the print, the quantity being sufficient to prevent any part drying before the print is ready for pressing. It may be applied with a small brush, though the best method is to pour out the solution with a spoon and spread it with the fingers, as the sensitive nature of these useful articles is sufficient to detect the presence of the least grain of dust that will show through the print when mounted. The prints should be placed between two damp sheets of blotting-paper before the starch is applied. Press the print firmly with a clean piece of blotting-paper, and roll out all surplus starch by pressing with a round roller of any sort, such as a rolling ruler. The bulging mentioned is caused by unequal distribution of the mounting medium.—WILLIAM GRIFFITHS.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—I have had some experience in curing the cause of such complaints as those stated by "Rex," on p. 40, and this experience prevents me from accepting the explanation given by "Rex," and also from joining with him in his wholesale condemnation of the heating as well as the ventilation, especially at this stage. The great complaint is the disagreeable draughts, or down-draughts of air, that are felt. I am inclined to think these come from the ceiling openings "communicating into the false roof only," and before expense is put out upon altering the heating apparatus or anything else, steps should be taken to prevent the air from blowing down from the garret through these ceiling openings. To do this, these ceiling openings (as they are, or as they might have to be altered) should have tubes put in over them to communicate with one or more exhaust ventilators placed above (or under) the ridge, as "Rex" has referred to, and the work so done as that no air from the garret or false roof can blow down into the church. Supposing this done, it sometimes happens with good exhaust ventilators, and often with bad ones, warranted otherwise, that down-draughts take place down through the ventilators and their tubes. To prevent this, I have lately fitted in and supplied for a number of churches, halls, schools, billiard-rooms, &c., self-acting ventilating valve-boxes, which allow free passage to the out-going air, but shut at once against any attempt at down-draught. These were illustrated and described in the BUILDING NEWS of August 6th, 1886. Before anything else is done to the Congregational church "Rex" refers to, the effect of stopping the down-draughts from the ceiling as above referred to should first be tried.—W. P. BUCHAN.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—I would urgently recommend him to put himself in correspondence with Mr. John Grundy, 80, Duncan-terrace, City-road, London, who practically undertakes with his warm air ventilating apparatus to overcome all difficulties and disagreeables mentioned by "Rex," and obtain from him some of his pamphlets, containing upwards of 40 pages of testimonials in favour of his system, many of the signatories giving instances and bearing conclusive evidence of having overcome and removed the same complaints where the hot-water system of heating has been adopted in similar constructions. As the same questions have been often asked and the subject often discussed in your pages, it is not necessary to repeat the many objections to the system of hot-water heating as at present introduced; but I venture to say that the down-draughts are caused principally by the hot-water heating, and will continue to exist as long as the hot-water pipes remain.—FRESH AIR.

A meeting of Newcastle-on-Tyne Gas and Water Committee was held recently, at which it was stated that the reservoir which the local water company, under their Act of Parliament, should have completed by July, 1886, at West Hallington had not yet been constructed, and at the present rate of progress it would probably take another two years. The committee decided to take steps to cause the Water Company to complete the project as soon as possible, in order to increase the storage of water for Newcastle and district.

Wembridge Church, Salop, was reopened last week after internal restoration, carried out by Mr. H. W. Pointon, of Wellington.

PARLIAMENTARY NOTES.

THE IMPERIAL INSTITUTE.—In reply to the Earl of Wemyss, Lord Herschell said before committing themselves to the erection of any building, the committee of the Imperial Institute would have a rough model prepared showing the proposed new building and those adjacent, in order to satisfy themselves that there would be that harmony which the noble lord had desired.

THE HOUSES OF PARLIAMENT.—In Committee of Supply on Monday night, on the vote of £37,735 to complete the sum necessary for the building of the Houses of Parliament, Mr. C. Bentinck moved the reduction of the vote, in order to call attention to the position of the statue of Lord John Russall in the central hall, which was out of harmony with its surroundings; but it appeared that the experiment was to be repeated, consent having been obtained for the placing of a second statue in the central hall—viz., that of Lord Iddesleigh. Sir Charles Barry had provided eight pedestals in the members' lobby for the reception of the statues of distinguished Ministers, and it was there Lord Iddesleigh's statue ought to be placed. Dr. Farquharson called attention to the condition of the frescoes in the upper lobby of the House communicating with the committee-rooms. They were in a tattered and dilapidated condition, and the paint was dropping from the walls. Mr. Plunket said the committee which had decided upon the placing of Lord John Russell's statue in the central hall was presided over by Earl Granville, and Mr. Gladstone, the Earl of Beaconsfield, and Mr. Barry were members. The amendment was rejected by 160 to 87 votes. Mr. L. H. Isaacs urged the necessity of the whole sanitary arrangements of the House being under one central authority, and moved the reduction of the vote by £500, with the view of bringing the matter under the notice of the committee. He stated that when the recent committee inquired into the subject they found things in a state of chaos, not being able to obtain even a plan of the drains of the House. Mr. Plunket could not undertake to propose any better system than that which existed, and which he thought was very successful. Mr. Cremer drew attention to the practice of contracting with Messrs. Mowlem, Burt, and Freeman for the employment of workmen about the House, and asked why they were not employed directly by the Government. Mr. Plunket replied that the system of contracting was found to be more economical. The motion for reduction was then withdrawn.

THE CORONATION CHAIR.—Sir T. Esmonde asked the First Commissioner of Works whether it was a fact that the missing portions of the Coronation Chair had been replaced with new work, the new parts painted brown, and the whole varnished with brown varnish; and, if so, whether the old painting and gilding of the chair had been injured, and who was responsible for this restoration. Mr. Plunket: It is true that certain missing portions of the Coronation Chair were, for the purposes of the recent ceremony, of necessity replaced by new work; but this was very carefully arranged, so that they could be again removed without any damage to the chair, and they have been so removed. It is true, also, that a considerable portion of the chair was slightly darkened. On that point I was in error when I last spoke. That, too, was done so as to be easily capable of being undone; and the chair is now, both as to substance and colour, exactly as it was before it was given into my charge. After communications with the Dean of Westminster and the president of the Society of Antiquaries, I am able to state that they are well satisfied with the careful manner in which the monuments and the structure of the Abbey have been treated by the Office of Works. I am bound in justice to say that the whole of the credit is due to the permanent officials of my department, and especially to my surveyor, Mr. Taylor, whose able and unremitting labours I cannot too highly commend.

The following dissolution of partnerships are officially announced:—E. Carritt and S. F. Monier Williams, Great St. Helen's, City, architects and surveyors; Prestidge and Co., Wharf, Grosvenor-road, Pimlico, builders, so far as regards G. Prestidge; and H. and J. Major, Catford, Lewisham, builders and decorators.

Mr. Albert D. Greatorex, Stud. Inst. C. E., assistant, and formerly pupil, of Mr. John Price, C.E., Assoc.M.Inst.C.E., engineer and surveyor to the Toxteth Park Local Board, Liverpool, has been elected to the appointment of assistant district surveyor for the Northern Division of Manchester under the corporation. There were 40 candidates.

Mr. Charles T. Combe, of Edinburgh, has presented the picture of the Royal Volunteer Review of 1860, by Sam Bough, to the National Gallery of Scotland. This important work—72 by 48—was purchased at Messrs. Smith and Co.'s rooms on Saturday by Mr. Combe for 230 guineas.

LEGAL INTELLIGENCE.

A BIRKENHEAD BUILDER SENTENCED TO IMPRISONMENT.—John Pierce, 45, a builder, who resided at the Woodlands, Birkenhead, was brought up for sentence at the Birkenhead Quarter Sessions on Monday. He was found guilty at the January Sessions for having between the months of February and September, 1886, in incurring certain debts and liabilities unlawfully obtained credit under false pretences, to wit, by the presentation of certain bills of exchange, bearing upon them certain false and forged endorsements. Prisoner had induced his sister, wife of John Owen, a grocer at Anglesea, to get her young son to sign her husband's name on a number of bills of exchange, by means of which prisoner afterwards obtained credit. The prisoner was convicted in January last, and an appeal against the relevancy of the indictment was allowed. The appeal had since been dismissed by the Superior Court and conviction confirmed.—Mr. Lloyd, for the defence, urged that prisoner had been in gaol for six months as a reason why he should be dealt with leniently.—The Recorder, addressing the prisoner, said there was no doubt whatever that his case was a very bad one. The offence he had committed was premeditated, worked out elaborately, and carried out regardless of consequences. Prisoner must be kept in gaol for nine months with hard labour, the sentence to date from the time of conviction, that was, that he should be kept in gaol for three months longer.

STAINED GLASS.

LYDDINGTON CHUHCH, WILTS.—On the 23rd ult., a new three-light stained-glass east window was unveiled by the donor, Mr. R. Large. The subject is "The Crucifixion." The window was designed and executed by Alexander Gibbs and Co., of Bloomsbury-street, W.C., under the superintendence of the architects to the church restoration, Messrs. Arundell and Tarte, MM.S.A.

CHIPS.

At the midsummer quarter session for Devonshire, held last week, it was agreed to increase the salary of county surveyor for the north district from £290 to £330, and that of the county surveyor for the south district from £290 to £300. It was explained that when the present surveyors took office in 1881 there were 192 bridges in the northern district and 182 in the southern district, since then 65 bridges had been added to the north district and 16 to the south.

The Duke of Buckingham's Committee has dispensed with the Standing Orders of the House in the case of the Manchester Ship Canal Bill, and allowed the Bill to proceed.

Messrs. Hardman and Co., of Birmingham, have just commenced the erection of the memorial window to the late Primus (the Right Rev. Bishop Eden) in the nave of St. Andrew's Cathedral, Inverness. The design represents the Last Judgment. The window, which measures 14ft. by 28ft., will cost about £500.

The Vice-Chancellor has been authorised by the Senate to accept the tender of Messrs. Luscombe and Son, of Exeter, for the erection of the new buildings for the University Library at Cambridge. The architect of the work is Mr. J. L. Pearson, R.A., of London.

New Liberal club buildings have just been commenced for the Liberal Association, Sudbury, Suffolk. The premises consist of large assembly or reading-room, recreation, committee, and card-rooms. The contractors for the works are Messrs. George Grimwood and Sons, of Sudbury and Ipswich.

A handsome memorial eagle lectern in brass has been presented to Ashover Church, and one to the parish church of Cannock, both by parishioners. In both cases the work has been executed by Messrs. Jones and Willis, of Birmingham and London.

At the monthly meeting of the Health Committee of the Cardiff Corporation, Dr. Paine, who has been medical officer of health for the town for over forty years, tendered his resignation. The Medical Department of the Board of Trade has on several occasions obtained Dr. Paine's opinion respecting epidemics.

The Metropolitan Board of Works have appointed Mr. Alfred Conder, F.R.I.B.A., district surveyor for Woolwich, to act as temporary substitute in the district of Eltham and Lee, which is vacant by the decease of the late Mr. G. Barnes Williams.

St. John the Baptist's Church, Bedford, was reopened by the Bishop of Ely last week, on completion of restoration after gutting by fire on the 28th July last year. Mr. John Day, M.S.A., diocesan surveyor, Bedford, was the architect, and Mr. S. Foster, of Kempston, the contractor; the cost has been £1,700.

Our Office Table.

THE annual excursion of the Architectural Association is fixed for August 15th to the following Saturday, and the neighbourhood of Bath has been settled upon, with the headquarters at the Royal Pump-room Hotel. The district to be visited will be found in the following maps of the 1in. scale Ordnance, Nos. 14, 19-34, and 35. The principal places included in the programme are Claverton, Hinton Abbey, Fairleigh, Norton St. Philip's, Wellow, Cheyney Court, Corsham, Laycock Abbey, Box, Bradford, Great Chalfield, and South Wraxall Manor Houses, Eddington, Trowbridge, Steeple Ashton, Westbury, St. Catherine's, Marshfield, Cold Ashton, and Humeswell. This Wiltshire trip, with such a list of buildings to be visited as are here enumerated, should prove one of the most successful and popular of the series of A.A. excursions.

THE *Dundee Advertiser* on the 4th inst., published a well-written description of a circular tour in the East Neuk of Fife, just opened up by the completion of the new Tay Bridge and the St. Andrew's line of railway. The article is illustrated by a large scale plan of St. Andrew's city, and by sketches of the villages of Anstruther and Pittenweem, of Broughty, Earlshall, Dairsie, and Balcomie Castles, Scotstarvit Tower, Markinch, St. Monan's, and Leuchars churches, Crawford Priory, Falkland Palace, and other buildings of interest in the district. The number, which is published at a penny at Bank-street, Dundee, will be useful to architectural students to whom the prize essay signed "A." in our "Competitors Column" of the 10th ult. has suggested Fifeshire as the district for a sketching tour.

THE Rev. John F. Kitto, vicar of St. Martin's-in-the-Fields, writes to state that an application having been made by the Metropolitan Board of Works for sanction to improve the southern end of Charing Cross-road by some alterations to the steps of St. Martin's Church, he will be glad if those who are interested in the matter will be good enough to inspect a model of the church and its portico, showing the proposed alteration, which will be on view every day between 10 and 4 o'clock in the vestry hall adjoining the church. Mr. Kitto points out that in the proposal is involved not merely the question of public convenience, but also the far more difficult and delicate question of the effect of the changes upon one of the additional features of the Metropolis. He will therefore be glad of expressions of opinion from those who inspect the model as to whether in their opinion the alterations may be carried out without marring the design of the church.

THE casket in which the burgess ticket will be presented to Mr. Andrew Carnegie to-day (Friday), on the occasion of his laying the memorial stone of the Free Library for Edinburgh, will be of a different design from the usual gold or silver "box" traditional to such occasions. It has been made of oak taken from the old Hope House, removed to make way for the Free Library. At one end of the bevelled lid of the casket is a representation in silver of the Hope House, as seen from the interior of the courtyard, and at the other a view, in repoussé work, of the accepted design, by Mr. G. Washington Browne, for the Free Library buildings. Along the length of the lid on one side is an inscription referring to the Library buildings; on the other the customary inscription setting forth why the presentation was made. The casket is panelled with open Celtic work in silver; at each corner is a lion or unicorn rampant with shield, and on the top of the casket is a bunch of Scots thistles. Messrs. Marshall and Sons, George-street, have designed and executed the casket.

A CROWDED meeting of workmen, convened by the London Trades Council, was held on Thursday, the 1st inst., at the Memorial Hall, Farringdon-street, to formulate a plan for reaching the apprentices in all trades throughout the metropolis, and inducing them to exhibit specimens of their individual work. Mr. George Shipton, the chairman, and Sir E. H. Currie explained the proposal, which was to hold an exhibition of works executed by apprentices in the People's Hall under the auspices of the Beaumont Trustees, during the Christmas holidays. The scheme was unanimously endorsed by the meeting, which pledged itself by resolution to support the project.

PREPARATIONS are being made at Bolton for the tenth autumn Congress of the Sanitary Institute of Great Britain, which will be held this year at the Town Hall of that borough. The Congress is divided into three sections, presided over respectively by Dr. Russell Reynolds, Professor Hayter Lewis, and Dr. August Dupré. The annual lecture to the Congress is to be given by Dr. Arthur Ransome; while addresses to the working classes are expected from Professor W. H. Corfield, Mr. Wynter Blyth, and Mr. H. Law. In connection with the Congress there will be a Health Exhibition, which the mayor of Bolton will officially open, in the Drill Hall. The scope of the subjects for discussion is sufficiently varied, as the respective sections deal with "Sanitary Science and Preventive Medicine," "Engineering and Architecture," and "Chemistry, Meteorology, and Geology." In addition to the several duties of the Congress, a conversazione and excursions are being arranged.

THE town council of Aberdeen seem to be greatly disappointed with the new peal of bells just procured from Belgium and hung in St. Nicholas' Tower. It is asserted that the carillon fails to fulfil public expectation both in point of harmony and volume of sound produced by the individual bells, of which there are in all thirty-seven, the contract price to M. Van Aerschodt, Louvain, having been £2,690, and the total outlay amounted to £3,326. The only partially remedial measure that can be carried out in the meantime is, the town council are advised, the removal of the louvres of the belfry windows, and certain structural alterations in the bell chamber. More serious difficulties will probably attend the regulation of the tone of the bells, several of them being much out of tune. This is considered all the more unfortunate in view of the fact that a deputation, accompanied by a musical expert, Mr. John Kirby, was specially sent by the town council to Louvain, at a cost of £157, to test and accept the peal on behalf of the subscribers. The town council held a prolonged and somewhat acrimonious discussion on Monday on the report of the bells committee, who desired that the council should remit back to them to take steps for remedying the defects of the new peal; but it was decided to consider the matter in committee of the whole council and report to a public meeting.

Mr. WALTER SMITH, of Southport, the well known railway contractor, died at his residence, Aughton-road, Birkdale, on Monday, at the age of 70 years. Mr. Smith had for years been a prominent man in Southport, having been for four years mayor of the borough. When first he went to Southport, nearly 40 years ago, he was a comparatively poor man, but as a railway contractor he was very successful, and at one time it was considered that he had amassed a large fortune. He, however, was unfortunate in the making of the Southport and Cheshire Lines Extension Railway, over which he got into difficulties which caused his failure. He went to Southport in 1849, when he was employed on the Lancashire and Yorkshire Railway extension from Waterloo to that watering place. After this he was frequently engaged by the railway company in repairing the lines and in other work, gradually working his way up, he improved his position, and then got larger contracts. He was a member of the Southport Town Council from 1867 until 1885. During the whole of that time he took a leading part in the improvements in Southport. He was one of the promoters of the Winter Gardens Company, the Southport and Churchtown Botanic Gardens Company, the Southport Tramways Company, the Southport and West Lancashire Banking Company, the Southport and Cheshire Lines Extension, and the Southport Building Society, being chairman of the latter for about 23 years. He was a justice of the peace for the borough and county.

THE Marquis of Lorne visited the Albert Palace at Battersea on Monday for the purpose of formally opening the National Smoke Abatement and Health and Home Exhibitions, which have been arranged within the palace. Lord Lorne said that, although the exhibition was as yet far from complete, there were many excellent exhibits already. Those who visited the 1881 exhibition of smoke abatement appliances would allow that the promoters of the present exhibition had much to congratulate themselves upon. It was not always in the third or fourth year after an exhibition of such a kind that an Act of Parliament was passed going much on the lines of those interested in the exhibition as the Smoke Abatement Act of 1884 had followed the show of 1881. Much had been done by the large manufactories in the adoption of smoke-consuming appliances, a saving of 40 per cent. being in some cases effected. Private hearths, however, undoubtedly contributed largely to the density of the city atmosphere, and yet smoke-consuming grates for private houses could be purchased very nearly as cheaply as ordinary grates. It was impossible for the principle to make advancement, he believed, unless it could be proved that its adoption would be best in point of cheapness as well as in point of warmth. The arrangements are, as usual in such exhibitions, at present in a very backward state, as yet not half the exhibits being in their places—a fact for which one excuse made is the sudden death of the contractor for the erection of the stands.

AN interesting and valuable picture, representing Parliament Close, Edinburgh, as it appeared at the beginning of this century, was acquired by the town council of that city last week for the low sum of one hundred guineas, having been purchased by a town councillor at his own risk in an auction for that figure. The picture, which is painted on a panel, and is 36in. by 26in., was designed by Mr. Thomas MacDonald—a Scottish artist who afterwards went to London in the early years of the century—and represents a collaboration of artistic work such as is rarely found—the names of Sir David Wilkie, R.A.; David Roberts, R.A.; Alex. Fraser, R.S.A. (who died in 1865); John Wilson, and others being associated with it. In the centre of the square are crowded 57 portrait figures of the most noteworthy citizens of the period, clad in Georgian costumes. A letter from David Roberts to Mr. Alexander Bryson, written in 1843, contains the following explanatory statement:—"I am not able to learn at what time it was commenced, but it was long in progress. The architectural portion of it, St. Giles' Church, with the old shops, were from drawings made by old Nasmyth, and drawn in and painted by the late Peter Gibson. The sky and old tower of St. Giles', painted by John Wilson; the figures, most, if not all, were taken from Kay's figures, and painted principally by Fraser—some, but I do not know which, by Kidd. The equestrian figure of Charles, with the pedestal, was painted by Abraham Cooper, R.A., and about sixteen years back I painted over a portion of the sky and background by glazing and toning it—which, previous to that being done, was a little out of harmony from so many different heads as well as hands being at work upon it. There may have been, and very likely, others employed in its manufacture, but these I know to be correct."

MR. JOHN THOMPSON, of Peterborough, the ecclesiastical builder, celebrated the Jubilee by inviting all the men in his employ to spend the day in the meadows attached to his residence, the Lindens, on the Lincoln-road. The grounds were thrown open at ten o'clock, when recreation was provided in the shape of a cricket match, nine-pin alleys, shying for cocoa nuts, jingling matches, &c. At one o'clock a substantial dinner was served in a large marquee, after which the sports were resumed. A band was in attendance, and played selections of music during the day. Between three and four o'clock the wives and sweethearts of the employés were admitted, when a number of ladies and gentlemen, specially invited by Mr. Thompson, arrived, and manifested great interest in the proceedings. About six o'clock the whole assemblage, numbering about 500, sat down to a knife and fork tea, when Mr. Thompson presided, and was supported on his right by Mrs. Thompson, the mayor and Mrs. Gates, and on his left by the Dean and Mrs. Perowne, &c. During the evening a telegram was received from Coventry from 100 of Mr. Thompson's workmen employed in that city, who were enjoying a similar feast.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Liverpool Architectural Society. Annual general meeting. Closing address by President, G. E. Grayson, F.R.I.B.A. 7.30 p.m.

TUESDAY.—Glasgow Architectural Association. Visit to Govan Church. 5.15 p.m.

THURSDAY.—Sanitary Institute of Great Britain. Anniversary meeting. Address by Dr. G. V. Poore on "The Shortcomings of Some Modern Methods of Sanitation," Parkes Museum, 74A, Margaret street, W. 3 p.m.

SATURDAY.—St. Paul's Ecclesiological Society. Whole day excursion to Salisbury.

Architectural Association. Visit to Sutton Place, Guildford, and Loseley Park. Trains from Waterloo, 9.45 a.m. and 2.45 p.m.

ARCHITECTURAL ASSOCIATION, 9, CONDUIT STREET, W.

The 4th Vacation VISIT will take place on SATURDAY, July 16th. Sutton Place, near Guildford, will be seen in the morning, and Loseley Park in the afternoon, under the guidance of Chas. Forster Hayward, Esq., F.S.A. Trains from Waterloo (main line) at 9.45 a.m. and 2.45 p.m., calling at Clapham Junction. Members who intend to go must please send postal order for 2s. 6d and stamped directed envelope to W. J. H. LEVERTON, 15, Whitehall-place, before WEDNESDAY, and state which train they intend to go by.

THOS. EDWARD PRYCE } Hon. Secs.
FREDERIC R. FARROW }

CHIPS.

The will of Mr. Christopher Raper, late of Corn Exchange-buildings, Seething-lane, architect and surveyor, who died on the 14th of June, has been proved, the value of the personal estate amounting to upwards of £86,000.

The Jesuit Church of St. Mary, Horseferry-road, Westminster, was reopened by the Archbishop of Westminster on Sunday week, after internal decoration in colour, designed and carried out by Mr. John Powell, of Bristol.

A Farmers' Exchange Club was opened at Warrington on Wednesday week. The architect is Mr. T. Beesley, and the contractors are Messrs. J. Collin and Sons, all of Warrington.

Messrs. Benham and Frowd (Limited) have erected a handsome brass eagle lectern, in commemoration of Her Majesty's Jubilee, in the church of St. George the Martyr, Deal; also a memorial eagle lectern in the church of Nettledon, Hemel Hempstead, and recently a fine silver gilt set of communion plate, also a memorial, for Rye Church, Sussex.

The new thoroughfare formed by the extension of Arthur-street, East, which opens up a roadway from the Monument to Billingsgate Market, was opened to public use by the Lord Mayor on Wednesday. The new street, which has been constructed by the City Commissioners of Sewers from plans by their engineer, Mr. William Haywood, has so far cost nearly £500,000. It will considerably relieve the traffic, hitherto most congested, of Lower Thames-street, while affording great facilities to other traffic. It is 454ft. in length, and has beneath it a subway 12ft. in diameter and 7ft. 6in. high, in the centre of which is a footway, a tramway being also laid for moving loads by trolley.

The Fraser Memorial Chapel in Manchester Cathedral will be dedicated by the Dean of Manchester to-day (Friday); the recumbent figure on the alabaster cenotaph is by Mr. Forsyth.

A new Welsh Wesleyan chapel at Llandudno was opened on Monday. Mr. Richard Jones, of Llanrhos, was the builder.

A conference of gentlemen interested in the promotion of technical education was held on Friday at the Society of Arts, Lord Hartington presiding, when steps were taken for the formation of a National Association with this object. Commercial and agricultural education will come within the scope of the association.

The Faculty of Advocates of Scotland have resolved to accept an offer made by the Earl of Stair, of a portrait of the celebrated Lord President Stair. The painting will be a valuable addition to the portraiture of the Parliament House at Edinburgh.

The anniversary meeting of the Sanitary Institute of Great Britain will be held on Thursday next, at 3 p.m., at the Parkes Museum. The chair will be taken by Sir Douglas Galton, K.C.B., D.C.L., F.R.S., who will present the medals and certificates awarded to the exhibitors at the Exhibition held at York. An address will be delivered by Dr. G. V. Poore, entitled "The Shortcomings of some Modern Methods of Sanitation."

A new chapel is about to be built on the grounds of the union workhouse at York, from plans by Mr. W. G. Penty, of that city. The chapel will seat 400 persons, and is estimated to cost £1,200.

The church of St. Thomas, in the Liberty of the Rolls, situate in Bream's-buildings, a brick edifice erected in the Norman style prevalent five-and-forty years since, is about to be demolished, together with the cottages on its eastern side.

Trade News.

WAGES MOVEMENTS.

STOCKPORT.—The bricksetters' labourers in Stockport are agitating for an increase of wages from 5d. to 5½d. an hour. They have recently formed an association, and threaten to come out on strike if their request is not acceded to. The members of the Master Bricksetters' Association say 5d. an hour is what is paid in other towns.

DUNDEE.—The strike of Dundee masons still continues. A number of the employers have given the halfpenny per hour of an increase asked, and work is proceeding at their jobs; but the majority of the masters are holding out, and their employés decline to resume work at the old rate of wages. Men are now becoming scarce in Dundee, and several employers who have large contracts on hand are anxious for a settlement. Work in other towns is plentiful at present, and a considerable number of men have left Dundee and got employment elsewhere. A number of the quarrymasters in the district have issued a notice to the Dundee Master Builders' Association which savours somewhat of boycotting those employers who have granted the increase.

Holloway's Pills augment the appetite, strengthen the stomach, correct biliousness, and carry off all that is noxious from the system. As this peerless medicine has gained fame in the past, so will it preserve it in the future, by its renovating and invigorating qualities, and the impossibility of its doing harm.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BEDFORD.—For the erection of a house in Clarendon-road, for Mr. J. Barrand. Mr. R. Lund, architect. Quantities by the architect:—

Haynes, W.	£400 0 0
Smith, J.	343 0 0
White, J. P.	339 0 0
Harrison, G. (accepted)	338 0 0

All of Bedford.

BIRMINGHAM.—For laying gas mains and services, during five years, for the town council:—

Bird and Sons (accepted).

BLACKBURN.—For mason's work in boundary walls at the Blackburn and East Lancashire Infirmary. Messrs. Simpson and Duckworth, Richmond Chambers, Blackburn, architects:—

Woof-Cronshaw, W. J.	£395 0 0
Gregson and Ferguson	332 17 10
Carr, W.	324 15 0
Arkwright, W. and T.	306 10 0
Hindle, C.	300 0 0
Rowland and Williams (accepted)	265 17 8½
Johnson, A.	261 17 1½

All of Blackburn.

For wrought iron palisading:—

Exors of J. Baldwin, Blackburn	£154 0 0
Carr, W., Blackburn	152 10 6
Albion Ironworks Co., Rugely	144 19 0
Ashworth, T., Vulcan Ironworks Burnley (accepted)	110 0 0

BLETCHLEY.—For additions to Holne Chase, for Mr. J. J. Freeman. Mr. J. T. Sloan, Leighton Buzzard, architect:—

Wilford, B. and W. S., Newport Pagnell	£885 0 0
We'sh, H. W., Bletchley	849 0 0
Gardside, G., Leighton Buzzard	823 0 0
Cook, D., Leighton Buzzard*	800 0 0

* Accepted.

COLCHESTER.—For the erection of stalls, loose boxes, coach houses, &c., for the Colchester New Corn Exchange and Cups Hotel Company, Limited. Mr. J. W. Start, Cups Chambers, Colchester, architect and surveyor:—

Dupont, F., Colchester (accepted).

(Six tenders received).

CROYDON.—For additions and alterations at The Homestead, Bedford Park, Croydon, for Mr. A. Walton. Mr. C. Henman, 64, Cannon-street, E.C., architect:—

Colls and Sons, London	£600 0 0
Maides and Harper, Croydon	595 0 0
Garlick, J., London	533 0 0
Goulder and Glasscock, Croydon	517 0 0
Smith, J., and Sons, Norwood	495 0 0

EXETER.—For the erection of the Goldsmith-street arcade and extension to premises in High-street, for Mr. J. H. Newman. Messrs. Wilkinson and Warren, Post Office Chambers, Exeter, architects and surveyors:—

Stephens, J. G., Exeter (accepted).

(Lowest of six tenders received.)

ESSEX.—For new farm buildings at Witham, Essex, Mr. F. Whitmore, Chelmsford, architect:—

Smith, Chipping Hill	£615 0 0
Gozzett, Maldon	562 0 0
Moss, Chelmsford	475 0 0
Diss, Colchester	450 0 0
Ward, Great Totham*	425 0 0

* Accepted after allowing for oak on farm.

ESSEX.—For painter's and plumber's work at "Springholds," Rivenhall, Essex. Mr. F. Whitmore, Chelmsford architect:—

Farrow, Chelmsford (accepted).

ESSEX.—For alterations and additions to the Spread Eagle Hotel, Prittlewell, Southend-on-Sea. Mr. F. Whitmore, Chelmsford, architect:—

Carter, J., Southend (accepted).

FULHAM.—For painting, whitewashing, &c., at the St. George's Union Infirmary, Fulham-road, S.W., for the guardians of the poor of the St. George's Union. Mr. H. Saxon Snell, London, architect:—

Coombe, E. J., London, E.	£485 0 0
Bamford, W., London, W.C.	480 0 0
Sheerman, J., Junr., London, W.	427 5 0
Lilly, W. G., Pall Mall (accepted)	397 0 0

GRAVESEND.—For jubilee memorial clock tower. Mr. J. Johnson, A.R.I.B.A., architect. Quantities supplied:

	A.	B.
King Bros., South Norwood	£848 0 0	£1,043 0 0
Philbey, A.	788 15 1	938 16 1
Falkner, J. W., Old Kent-road	757 0 0	952 0 0
Wallis, W. and E.	753 0 0	893 0 0
Multon and Wallis	649 0 0	727 0 0
Archer, W. H. (accepted)	635 0 0	675 0 0

Rest of Gravesend.

A.—Bath stone facing. B.—Portland stone facing.

GREAT GRIMSBY.—For building chancel and two bays of nave St. Paul's Church, West Marsh:—

Marrows, Grimsby	£2,470 0 0
Leaming, Grimsby	2,456 0 0
Grant, Grimsby	2,049 0 0
Wilson and Co., London	1,890 0 0
Jackson and Son, Hull (accepted)	1,750 0 0

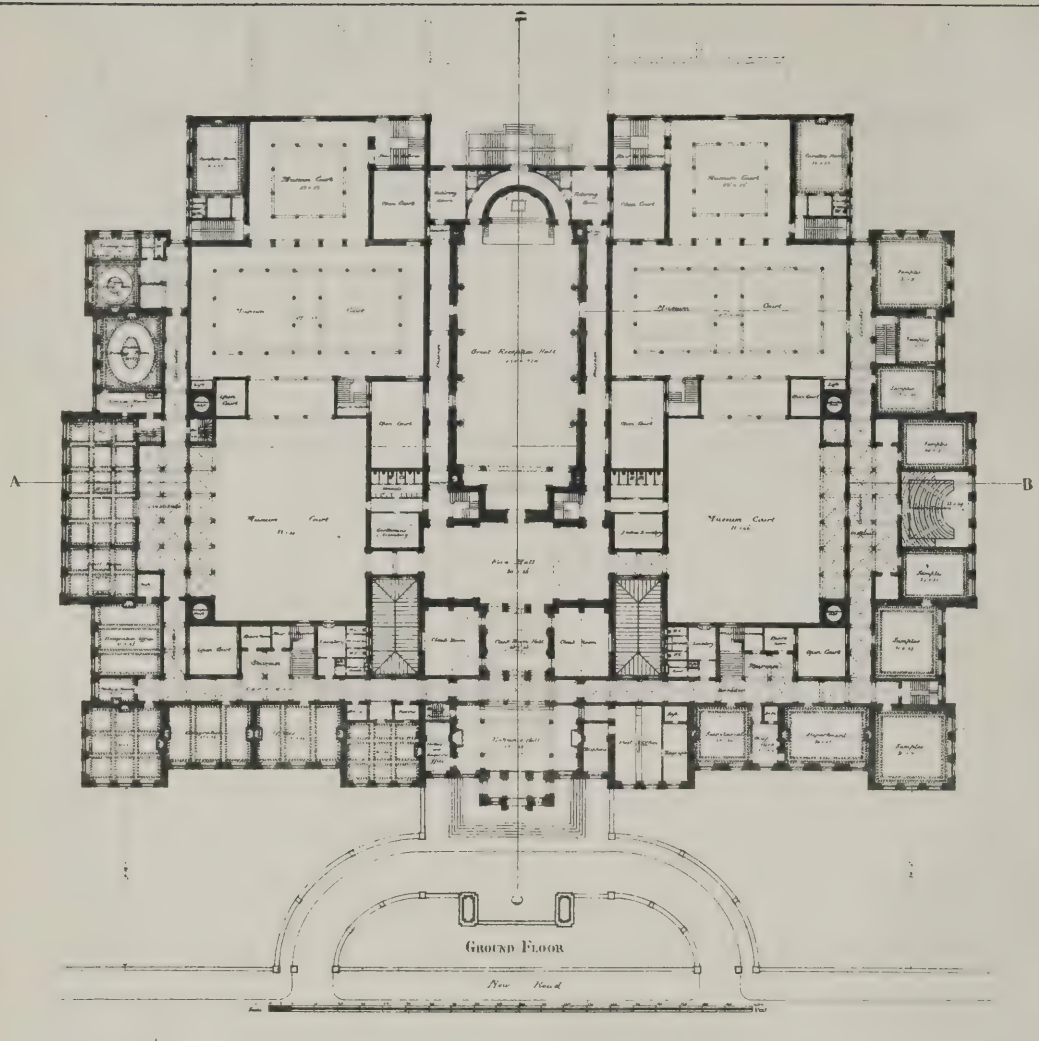
HAMPSTEAD, N.W.—For alterations and additions to The North Star tavern, Finchley-road, Hampstead, N.W., for Mr. Miller. Mr. H. I. Newton, 17, Queen Anne's-gate, Westminster, S.W., architect:—

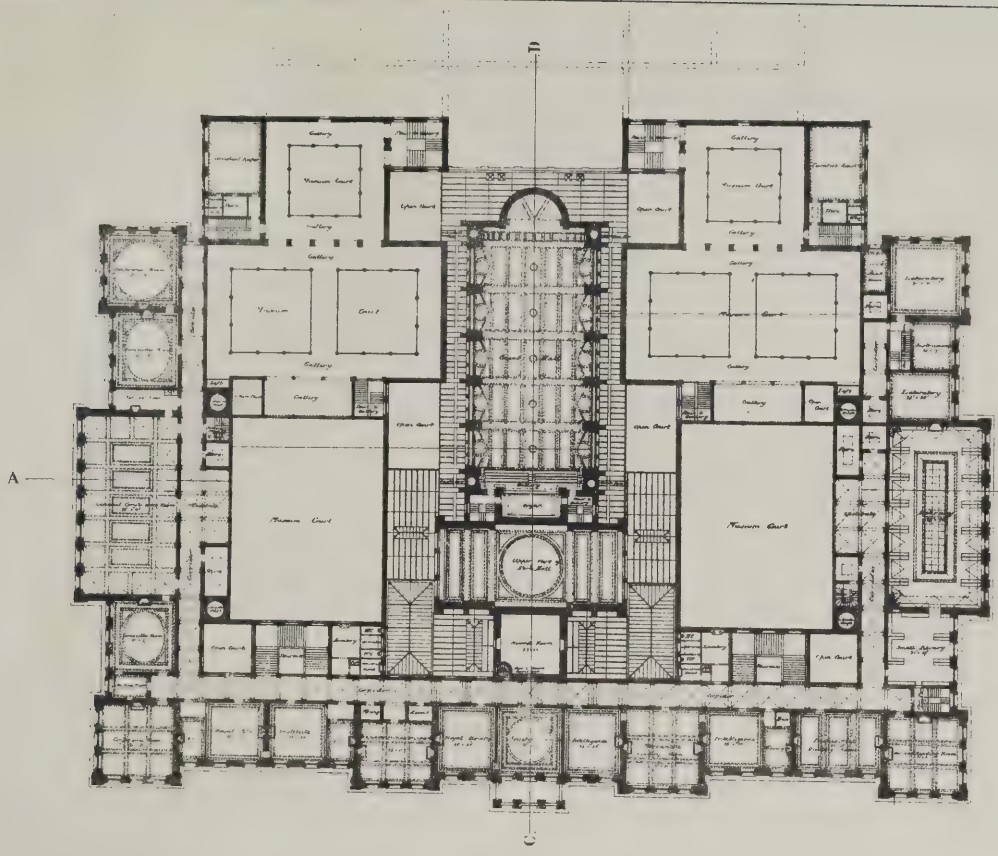
Mark	£997 0 0
Palmer	945 0 0
Burman and Sons	875 0 0
Buckridge	770 0 0
Lamble, Kentish Town (accepted)	717 0 0

HASTINGS.—For new detached villa residence, for Mr. T. Channon. Mr. G. F. Burr, M.S.A., 70, Cambridge-road, Hastings, architect:—

Warman, W. E., (accepted) 900 0 0

(Exclusive of stabling, &c.)


A
B
Museum Court
Museum Court
Museum Court
Museum Court
Great Reception Hall
Lecture Hall
Lecture Hall
Museum Court
Museum Court
Museum Court
Museum Court



FIRST FLOOR



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

N, DESIGN BY Dr R. ROWAND ANDERSON, L.L.D. ARCHITECT.

THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1697.
FRIDAY, JULY 15, 1887.

BUILDING LEGISLATION.

WHEN the Metropolitan Building Act was passed in 1855 the chief intention of its framers was to prevent the erection of combustible structures. That motive arose, no doubt, from the vast number of wooden buildings in London, which was the cause of the Great Fire of 1666. Acts passed subsequently, in the reign of Charles II., in 1667 and 1670, in the reign of Anne (1707), and that of the first three Georges, were all directed to the reduction of risks of fire by party walls. The rules with regard to new streets and buildings in the Public Health Act have been framed after the same model. Very little, as we pointed out the other day, has been incorporated to insure sanitary buildings, an omission that is intended to be partially met by the Registration of Buildings Act. What is equally apparent to everyone engaged in the administration of the Public Health Act is the complete failure of attempting to put all its clauses into operation. In every considerable town there is a great deal of friction; the by-laws, which number 99, cannot be enforced, and the "jerry" builder is still allowed to erect buildings that are unfit for human habitation. The town surveyor has more than he can properly undertake. He has to attend to his daily duties, upon committees, upon sanitary and drainage matters, and a hundred other things, and he cannot be reasonably expected to be able to inspect all the new buildings in his district, and to see that in each case these clauses have been complied with. He would have to employ a large staff of inspectors to keep himself informed of the progress of the numerous private and other buildings, of their foundations, materials for mortar and walls, construction, details of drainage, &c. Nearly every week we record summonses against builders for sundry violations of the Act and by-laws; but there are hundreds of worse instances where the builders have evaded detection which are not reported. Inferior mortar and bad bricks and bonding are very common complaints, though it would be easy to find houses with as bad materials which have been erected and occupied. The machinery for inspection is far from being adequate to cope with the growth of new suburbs and the dwellings of a small class. Many of the by-laws are vexatious and inflict hardship on the builders, as the clauses referring to external and party walls. In some localities hollow walls are very necessary, owing to the porosity of the local materials; but the builder is compelled to follow very exacting rules, or his plans are discountenanced. We have heard of builders being put to unnecessary trouble owing to the want of a properly framed by-law. The regulations for half-timber walls are stringent. The clause requiring that "a thickness of at least four and a half inches of brickwork be placed at the back of every portion of timber, and shall be properly bonded to the brickwork filling the spaces between the timbers," is rather unnecessary if a cavity is made and a thickness of brickwork is placed internally.

The rules as to thickness of walls are rather perplexing to some builders, and we think there should be no party wall less in thickness than 13½in., or a brick and a half. As many of our readers know, the by-law determines that "where a wall does not exceed 25ft. in height, and does not exceed 30ft. in length, nor comprise more than two stories, it shall be 9in. thick for its whole height; if the wall exceed 30ft. in length, or comprises more than two stories, it shall be 13½in. thick below the topmost story, and 9in. thick for the rest of its height"; so that a wall of 25ft. in height of this length may be only one brick thick if there are not more than two stories, but must be one brick and a half thick if it includes three stories. The reason is not very evident for this change of thickness, except that there is greater risk of fire in the three-storied building. Is it not time some provision should be made to regulate the construction of the internal partitions of a house, which may be merely timber partitions covered with lath and plaster or boarding, offering no protection against fire; and also with respect to floors?

Many surveyors find fault with the clause requiring the party-walls to be carried up through the roof, which makes it difficult to keep out the rain, and entails expense in flashing. We are not inclined to recommend the omission of this safeguard against the spread of fire, although it may not improve the architectural appearance in those cases where chimneys are not taken up. We think the objection on this score to the penetrating walls is founded on the idea that a continuous roof gives the appearance of a large building, a not by any means logical conclusion. Why should not a row of street houses appear what they are? These raking parapets admit of being "stepped," and we can see no reason why they should retain a parallel line with the sloping roofs. They may also be made, in fact, rather picturesque than otherwise—an unbroken roof surface has never a very pleasant effect.

All the by-laws we have referred to have reference to the prevention of the spread of fire; there is little provided to insure healthful conditions, except the clauses as to the provision of damp-courses and those referring to drainage. Recent building catastrophes have shown that there are other matters which ought to be made subjects for legislation. One of these is the strength of walls to resist pressure of materials piled up against them. In the schedule for walls of the warehouse class, although extra thickness is prescribed, there is nothing about lateral ties; the thickness of the walls has been regulated solely in respect of fire precautions. If there were a clause preventing the use of warehouses for any other purpose than that of carrying loads on the floors, and another prescribing scantlings of joists and the weights to which they were to be subjected, there could be little to object to; but local authorities have only studied the risks of fire, and neglected all other considerations of safety to human life. Old buildings are entirely exempt from the law. In the conversion of one building to another, it has never occurred to the framers of these regulations that houses are turned into warehouses and shops, and that the requirements of walls and floors for the former purposes are quite inadequate in buildings of the latter class. The law as it stands is very ambiguous about the meaning of a "new" building, for unless the building is new it cannot be brought under the operation of the Act. The section referring to this technical point is by no means clear, and surveyors are puzzled whether a building partially destroyed by fire and rebuilt or largely altered is really amenable to the Act. The section says: "The re-erecting of any building pulled down to or below the ground floor, or of any frame building of which only the framework is left down to the ground floor, or the conversion into a dwelling-house of any building not originally constructed for human habitation, or the conversion into more than one dwelling-house of a building originally constructed as one dwelling only, shall be considered the erection of a new building." As will be seen, there are several loopholes for escape. In the first place, What is the ground floor? Is it the floor level or the story up to the ceiling? Is a partial reconstruction from that level, whatever it is, a "new" erection? Cannot an old building be taken down and rebuilt piecemeal? Old houses are daily converted into new ones without any regard to the powers of the urban authority, who are completely at the mercy of the builder. These are unfortunate circumstances, which hamper considerably the local surveyor, and lead to evasions of the Act in all important points. Stability of construction and sanitary precautions are set aside by all those who can show the building is not a "new" one under the terms of the section. The only way of rectifying the abuse is to legislate for all buildings let for commercial purposes and for habitation, whether old or new, after a certain date; for this purpose the minima of requirements for stability and sanitariness should be necessary conditions. There are those who advocate that danger from fire is a question chiefly affecting insurance companies, and might be very well left to those corporations; safety of human life and public health are things certainly which ought specially to be controlled by local authority.

OUR WATER SUPPLIES.

THE scarcity of water in many parts of the kingdom during the continuance of the present dry weather ought to set the local authorities, urban and rural, seriously to consider the means at their command in dealing with a drought that may be prolonged. In the smaller towns and villages the scarcity is experienced more than in large towns, owing to the power possessed by the latter for procuring supplies of water under the Public Health Act. Geological structure has a great deal to do with the question of supply in such seasons as we are passing through. In the central and southern parts of England the geological strata afford abundant means of obtaining water by boring; but in other parts, as in Ireland, where the rocks are hard and less absorbent and porous, the local water supply by means of deep wells is very limited. The Carboniferous Limestone is, unlike the Chalk, porous, and capable of storing away in its own underground mass a large quantity of the rainfall, and thus well-sinking is uncertain in its results, though even with rock of this sort something can be done in the way of collecting the rainfall or making use of so much of it that passes into the fissures of the ground. In rocky districts, such as those in which there has been a great outcry for water, unless there is a means of collecting the rainfall, the grievance is one of serious moment. In mountainous parts, like Wales, the rock surface resists percolation; the rain seeks a channel or a fissure through which it rushes or disappears, till it finds a permeable bed or soil in a lower or adjacent locality. The lower permeable districts receive their supplies from the high impermeable strata around; in short, the high rocky parts get very little or none of the rain which falls upon them, while the lower permeable districts get it all. This uneven distribution of the rainfall can be obviated by artificial means. In the hilly localities, which have suffered most, springs are numerous, and it would be easy to turn these to account. Within reach of many of the villages that have most complained of want of water, springs are to be found, and these may be readily tracked to their sources, and the water conducted through pipes. Professor Hull, LL.D., a year or two ago at a congress of the Sanitary Institute held in Dublin, read an important paper on the supply of water to villages in Ireland, in which he pointed out that the water-bearing beds or formations of a porous nature, such as the post-Tertiary deposits, sand, gravel, and loam, offer facilities for supply through wells,

and that wells sunk in these deposits are likely to yield wholesome water if they are driven to good depths and the surface drainage into them prevented. The remark applies equally to many parts of England, where, moreover, the Chalk, Lower Tertiary, Upper and Lower Greensand formations are to be found, these being all water-bearing beds.

A few years ago Mr. Bailey-Denton showed by figures how easily water might be stored for seasons of drought instead of being allowed to run to waste. In the BUILDING NEWS of September 4th, 1874, we referred to the subject, and now quote the figures. Mr. Denton estimated that every inch of rainfall on an acre of area is equal to 22,622 gallons, and multiplying this number by 32in., the mean annual rainfall, and by the number of acres in England and Wales, we got the product of 27,019,632 millions of gallons as the average amount of rain falling. Allowing for 25 gallons per head per diem as the quantity consumed for all purposes throughout the country, and multiplying it by twenty-five millions, the population, we obtain 625 millions of gallons per diem. Animal consumption, and the demands for steam and manufacture, increase the amount, but the aggregate does not exceed 1,000 millions of gallons per diem ; in other words, only a 74th part of the total rainfall. In short, if we allow only one inch of rainfall to an acre of surface, a year's supply is guaranteed to about two and a half persons. These calculations applied to the drought in 1874, which, like the present one, was much felt in the Lake district. In Wales and the Lake district the mean depth of water that runs off in the shape of floods is stated at 20in. ; in the East and Midland districts it is about 6in. Mr. Denton points to storage of the surplus water to compensate for these irregularities. The surplus he estimates at an average of 15in. And as to the means : in chalk districts underground tanks can be formed cheaply, lined with a cement facing ; in other less favourable districts, tanks or reservoirs may be constructed with local materials. An ordinary country house and outbuildings may, if provided with proper guttering and downpipes, collect 20in. of water in the year, or 28,280 gallons. Every country house ought to have Roberts's rain-water separator, for storing the pure portion of rainfall. If the villages can combine, a reservoir to hold a month's supply may be secured ; and for agricultural and animal use underground tanks and ponds can be cheaply formed. We hear of several villages and country towns suffering from scarcity of water, which could not have occurred if a combined effort had been made to carry out a system of collection by tanks in the manner suggested. If the Legislature had assisted in such a scheme, by granting large powers to landowners having a life interest in villages to become water contractors, and to construct storage tanks upon their estates by borrowed capital, to be repaid during a term of years by the consumers, the present dilemma could not have arisen. There is now little authority over the watershed areas of the country. The present rural and urban boards are often at loggerheads ; drainage is their chief regard, and water supply is left to look after itself.

As an illustration of the necessity of doing something, we may refer to the condition of the ratepayers of Rawdon, in Yorkshire, who have just memorialised the local board of that town on the inadequate supply of water from the Yeadon Waterworks Company. The town of Rawdon has to mainly rely upon that company for water ; but for weeks past the supply has been insufficient, and, it is said, unfit for drinking purposes. The difficulty of obtaining water, the petitioners say, occurs every summer, and they add if proper provision were made for storage, an abundance of pure water might easily be obtained to supply the whole of the township, even in the driest of seasons. As it is in Yorkshire, so we have complaints from Lancashire and other counties. Swansea, surrounded by water, is in dire distress, and recourse is even had to an old coalpit for water, which is being pumped, carted, and sold by the canful, according to a letter in the *Times*. Like Manchester and Liverpool, and a dozen other towns, Swansea has been handicapped by Act of Parliament, and one-third of their impounded water has to go to supply mills, and if they cannot supply, the town must pay compensation to them. London alone amongst great cities has at present not much to complain of, though the fresh-water supplies of the Upper Thames are getting less every day. The Thames and the Lea each contribute a moiety of the 160,000,000 gallons per day supplied to London, and this quantity during a long, dry season is a considerable abstraction from the resources of a river supply. The growth of population along the river basin, and the increase of buildings and farms yearly, diminish the quantity and quality of the supplies. If complaints of insufficiency of supply were made sixty years ago, how much more have Londoners now to dread a water famine, or, what is worse, a contaminated supply. It is the natural tendency of all sources to diminish as the population increases—a fact which cannot be disregarded. There is a limit, too, beyond which it would not be safe to go. With the increase of towns, pollution increases, and corporations and local authorities are compelled to look at probabilities and to make preparation for any emergency that may arise. Many of the schemes that have been put forward to meet the increasing demands of London have been proposed during the past half-century. In 1834 Mr. Telford proposed to bring a supply from Hertfordshire and Surrey, and a great reservoir was to be constructed at Watford, and another at Clapham Common, thence to be distributed by the existing companies. Robert Stephenson suggested in 1840 a supply from chalk wells near Watford ; other proposals followed for drawing supplies from the Thames at Henley and Mapledurham ; Hawksley proposed an aqueduct scheme to bring water to Hampstead ; Mr. Bailey Denton a scheme for tapping the upper tributaries of the Thames, including the Cotswolds district, the rivers Wey, Colne, Mole, and Wandle contributing. Besides the valley schemes are to be noted the chalk-well schemes, such as that proposed by Mr. Homersham, to supersede the river supplies ; and lastly, though not least, the north-country proposals, as the ambitious scheme of Mr. Bateman, who selected the mountainous districts of North and South Wales, or the Plynlimmon range, which form the gathering grounds of the Severn, the water from which he proposed to convey by conduits and an aqueduct viâ Stourbridge, Warwick, Berkhampstead, and Watford to a large reservoir at Stanmore, near London—a distance of nearly 200 miles—thence to be distributed to the existing reservoirs. Latterly the Lake districts have been proposed. The Thirlemere and Hawes-water scheme is within the recollection of our readers. Ullswater was to be tapped and the water conveyed to London by gravitation. The spoliation of the scenery of the charming Lake districts was a strong objection to this and similar proposals. More practicable and less destructive would be a scheme for supplementing the present supplies by tapping the tributaries of the Thames, and by making chalk wells contributory.

Prince Albert Victor of Wales will visit Woodford to-morrow (Saturday) to lay the memorial stone of the new schools to be erected by the Drapers' Company on the Manor House Estate, Woodford Wells.

THE PROFESSION OF A CLERK OF WORKS.*

By THOMAS POTTER,

Author of "Concrete: its Use in Building," "The Construction of Silos," &c.

(*Continued from page* 9.)

IT is very evident to every one of us that no man can affirm he knows every good and bad point, and how best to perform one and avoid the other of the innumerable details of construction and ornament which together make the sum total of the many trades and occupations necessary for the erection of large and important buildings, and some of which may by accident come within the experience of the clerk of works engaged thereon only once or twice in a lifetime. It is quite within bounds, therefore, to say, and without any discredit to him, that he is never thoroughly proficient in his profession, for even assuming that it were possible to master the ins and outs of all the usual building trades, there are new processes and improvements cropping up daily which are supposed to be included in the category of works to be supervised. I say "supposed" advisedly, for it is only a supposition. Electric lighting, hot air, and other heating appliances, hydraulic arrangements, and the like are, perforce, wholly or partially handed over to specialists of repute to perform, and, assuming such specialities fulfil their purpose, the latter are taken to as satisfactory. What it amounts to, therefore, is this, that a clerk of works should know practically as much about the various processes and details required for the erection and completion of buildings of considerable pretensions as can be reasonably expected of a man who has for the major portion of his life hitherto been engaged in learning and working for this object. Another reason why a clerk of works should acquire as sound a practical knowledge of the various building processes as possible is that the workmen engaged on a building collectively, by a kind of Freemasonry, soon arrive at a verdict as to his capabilities, and "Yea" or "Nay" has a good deal to do with good or bad workmanship even when the workmen are efficient. If he is incapable of telling if workmen are inferior in skill or the materials in quality, the former have no incentive to do their best, for, as a rule, the builder's foreman has no qualms of conscience if the clerk of works is satisfied ! indeed, it has been known for building mechanics to execute their work in an indifferent manner with the simple object of ascertaining how bad it may be done without complaint, making, in point of fact, the quality of the workmanship a test whereby they may fix the clerk of works' standard of efficiency. This idiosyncrasy on the part of certain workmen may appear overdrawn ; but if not a common occurrence, it is, nevertheless, true, and is an important factor in dealing with the views expounded by Mr. Seddon and other experienced architects—viz., that the workmen should be elevated beyond the standpoint of a mere machine, paid to do so many hours' work per day for so much an hour from certain hard-and-fast instructions, and which his hands are to perform without the assistance of his mind—a piece of human clockwork wound up on Monday morning and which runs down by Saturday night—and instead thereof, made to feel he has an interest in the work he is performing and a personal responsibility in the result. Just as the design of a building may be judged by the capacity and earnestness of the architect, so is the stamp of construction and finish set upon it and distinguished at a glance by the building expert, whether it ranks good, bad, or indifferent, by the amount of intelligence and mindfulness brought to bear upon it individually and collectively by builder, foreman, clerk of works, and workmen. On this point, however, much might be said with regard to the difficulties which beset everyone concerned in their endeavour to fix the stamp of sound and earnest construction upon the building in hand. The workmen are aware they must do a certain quantity of work or it does not pay their employer ; the employer's very existence depends on his getting that and other buildings done for certain fixed sums, and whatever may be

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he character of the workmanship the job must nder any circumstances be made to pay ; the oremen know this also, and that a good margin f profit to the contractor is the most likely vent to forward their interests, and if all three lasses pull together to one common end, and nly one—that of making money out of the ontract—the clerk of works may do all he can, ut it would be impossible to obtain satisfactory esults ; more especially is this the case when ie finds the owner of the buildings taking sides n matters of disputation with the builder or is representatives, and leaning towards them nder the false notion that the clerk of works *ust* find fault or he would not be fulfilling his luty. True, this does not often occur, but hen it does it adds to the difficulties the clerk f works has to cope with. Almost the first matter which the clerk of works should lo after having obtained possession of racings of the general drawings is to heck the plans ; that is, to ascertain hat all figured dimensions in detail correspond with the full figured dimensions. For instance, assuming that on the plan of a church the limensions are given of width of buttresses nd the spaces between them, constituting ogether the full length, say, of the nave ; these should be added together, and if the otal is the same as the extreme length, it is evidence of the figures being correct. All plan dimensions of a building should be gone into in this way, and as soon as time permitted, the sections showing heights dealt with in a similar manner ; and the headways of stairs should have considerable attention, for difficulties often crop up in this respect which should have been remedied in time. When the plan is drawn to a small scale it is often advisable, where time permits, for the clerk of works to reproduce on a larger scale, ½in. to a foot at least, a "working plan," and figure thereon all dimensions, whether given in the original or not, which will be required in setting out the work. It should be traced on linen, or stretched or mounted on a deal framed panel, and a light deal cover or flap hinged to the latter with webbing, so as to open and close either way, is advisable, with the view of protecting the plan from rain and dirt. It is not a fact that so much care is taken in architects' offices to prevent errors, that nothing of the kind is possible, for continual interruptions, pressure of work, and the relegation of matters of the kind to junior clerks or draughtsmen, will unavoidably often be the cause of occasional discrepancies in the plans and sections. By taking the very earliest opportunity of calling his architect's attention to these discrepancies, instead of creating offence thereby, the clerk of works will obtain credit for his astuteness in detecting small errors at an early stage of the work, and without the necessity of alterations having to be made, and a builders' extra created. Where the dimensions on plans and sections are not figured in sufficiently, or but very sparsely, it is well for the clerk of works to do this himself in his office ; indeed, he cannot well add too many figures, so long as the remedy is not worse than the evil through rendering them too confusing and intricate. The difficulty of attempting on a scaffold, with the wind blowing a tracing about in all directions, to scale some "opening" or "set off" with a two-foot rule, can in most cases be avoided by figuring in the dimensions and distances beforehand. For certain works—extensive alterations, for instance—where dimensions have to be taken to enable plans to be prepared, and existing buildings cover the site, it will often be found when old portions of the buildings are removed, that there are considerable variations in detail, although the plans in the main are correct, and in such cases a working plan with the various breaks, set-offs, and openings figured in, or laid down to a large scale, is almost a necessity if blunders are to be avoided ; in fact, it is a work of this kind which in dealing with needs a greater amount of common sense and practical experience than entire new buildings of much more elaborate and costly description require. And the dimensions figured in or scaled of detail drawings should be compared with the general drawings at an early stage of the work, not left till the work has to be put in hand, and if an error is found the architect has to be communicated with. So with the specification : if the latter specifies certain things to be done which are impracticable from local or other causes, ample notice of this should be sent to the architect, that the subject may have proper consideration. A habit of taking time by the forelock in matters of the kind, but after full consideration and deliberation, is a necessary qualification for every clerk of works to possess. Tact is, too, an essential qualification ; although it is assumed that the clerk of works has direct dealings with the builder or general foreman only, there are still many occasions where the matters of complaint are too trivial and too frequent to render it necessary he should interview those in authority. The bricklayers may be laying their bricks too dry, or not grouting their brickwork courses at certain intervals as specified ; their labourers are adding too much sand to the lime, or the cement is getting set through being mixed up too long before use ; carpenters are making ill-fitting joints or improperly fixing roof or floor timbers ; masons are undercutting ther stones far too much, so as to make neat-looking close joints when fixed ; plumbers are "tucking" their flashings in masonry or brickwork joints an eighth of an inch or so—for is not the mason going to follow on at once pointing, and who will be a jot the wiser? And so on. A little mild persuasion remedies these matters better than a larger amount of blustering, especially where the latter is the usual method adopted for counteracting *laches* of this description. Workmen are apt to connect a great deal of bluster with an inverse proportion of practical knowledge, an assumption which often proves correct. Another matter of tact consists in dealing in a circumspect manner with those in authority connected with the work. It should never be forgotten by the clerk of works that although the architect does not as a rule pay his salary, he is solely responsible to him for what he does, and should not act as a go-between with any third parties. He should make no suggestions for alterations, improvements, deviations, or omissions, except to the architect or by his directions, or with his full knowledge and consent, and which latter should be clearly intimated. The clerk of works who seeks to ingratiate himself in the good graces of his employer or employers by parading his own knowledge, and suggesting how this, that, and the other may be improved, risks doing so at cost of getting into disfavour with his architect. It is quite within his duties, however, to inform the latter of any way in which certain improvements, according to his views, may be effected, and he is often well able to do this, because the gradual erection of a building develops occasional matters of detail which a person who is constantly on the work, and whose whole attention is directed thereto, is in a much better position to deal with than the architect who is far away, who has only the plans to refer to, besides various other works to look after, and divers matters to think about. It is an unfortunate failing possessed by some clerks of works that they cannot refrain in an insinuating tone of speech from making their employer or employers aware that it was through their suggestion that this thing was done, or the other matter altered, or in some other way endeavouring to bring under his or their notice the fact that they possess a clever clerk of works. This kind of thing is obviously more noticeable amongst those whose experience in the position they occupy is limited, for as they acquire more practice they at the same time gain more prudence, and find that the endeavour to curry favour with certain individuals is often the means of losing it with those to whom they have to look for future employment or recommendation—their architects. It should be a settled point, as far as the clerk of works is concerned, to use the pronoun "I" always with discretion. A clerk of works should never find out errors where none exist ; if he believes that certain details are not being carried out according to the plans and specification, he will make doubly sure that such is the case before bringing them under the notice of the builder's foreman, and having done so, firmly insist on undoubted errors being at once remedied. Nothing makes a man look so little in the eyes of workmen—supposed to be beneath him in general knowledge of constructive matters, or is so much an incentive to the foreman to ride the high horse on future occasions, as for the clerk of works to discover mistakes where none exist, nor on examination admit of a doubt. Although the clerk of works should check all and every measurement, he should not undertake to set out work for the builder, not even as a friendly action, unless the latter is prepared to accept the responsibility. Even then it is best left alone, for should an error take place, unpleasantness might follow as the result thereof. So with regard to levels ; the usual method of employing a long straight edge or board and spirit level, more or less true, sometimes resulting in the bricklayers finding themselves when "tumbling" in the foundations, a course of bricks out when they have worked round to the starting-point, should be left entirely to the foreman, except where a surveying level is employed, and then the objections on this score do not exist. The advantageous qualification of being able to measure and value executed work is one which unfortunately too few clerks of works possess. How much time and contention might be saved if, instead of measuring extras and omissions after the works were completed, they were taken at the time the buildings were in progress, and agreed to by the builder or his representative, roughly drafted into form, and sent to the architect at stated periods. Nor would such a matter be a difficult undertaking, assuming the clerk of works to be but a moderate arithmetician, for the system and practice of taking and working out plain measurements are readily acquired by any man who has the names of every constructive detail by heart. The clerk of works well knows the meaning of reveals, arrises, weatherings, throatings, mitres, toothings, cuttings to hips and valleys, &c., and the hundreds of other technical phrases employed about a building are as "familiar in his mouth as household words" ; and whereas other individuals not so fortunate have to learn the signification of quite a dictionary of terms, before they can attempt to measure artificers' work, the clerk of works has acquired them long ago. Excellent instructions as to the best systems of quantity taking are contained in Fletcher's "Quantities," published at 5s. Beaton's "Quantities and Measurements" is a smaller work of a similar nature, one of Weale's series, costing 1s. 6d. Measuring executed work and taking out quantities from the drawings are so very similar, that if moderate proficiency is obtained in either, the other becomes an easy matter. As with drawing, so with quantity taking—perseverance, and practice are the main elements in obtaining success. Estimating may not come within the scope of a clerk of works duties ; nevertheless it seems to hinge on, so to speak, to measuring and quantity taking, and must not be lost sight of, and should the clerk of works happen at any future time to develop into a builder and contractor of large practice, he will find it extremely useful. "Estimating by a Practical Estimator," originally published in the BUILDING NEWS in 1883, to be purchased for 5s. 6d. of Batsford, 52, High Holborn, is a handy companion in this respect, and while upon the matter of technical books, it may not be out of place to remark, for the guidance of clerks of works, that should there be any unaware of the most suitable places for purchasing architectural or building works, or of ascertaining where they can gain information as to what works are published dealing with special building matters, this is one of them : Spon, 48, Charing-cross, and Crosby Lockwood and Co., 7, Stationers' Hall-court, are also publishers of many technical books extremely useful to clerks of works.

To furnish reports at fixed intervals, including a valuation of the work executed, considered by Mr. Hoskins as a qualification that the clerk of works should possess, is one, however, the latter portion of which, as a rule, can only be dealt with in a haphazard kind of way. He may be totally unacquainted with the locality, and therefore know nothing as to the price of local stone, sand, lime, and other building materials ; the builder may, perhaps, quarry his own stone, burn his own lime, or make his own bricks, or the clerk of works may have had no previous experience of the kind, and therefore never troubled himself about the value of brickwork, excavation, concrete, rough timber, joinery, leadwork, and innumerable other items. Many men who take an interest in the cost of work and value of materials, and are quick at figures, are necessarily able to do this with quite sufficient accuracy for the

purpose intended; but unless experienced in estimating prime costs, the clerk of works should be very careful in making statements which after all can only be approximate. It sometimes happens that the builder, before he completes his contract, is supposed to be on the verge of bankruptcy, and rather than have the works stopped and incur the difficulties and delays occasioned by dealing with bondsmen and assignees, the building is kept going, and the builder on his legs, in hopes that he may pull through till the works are completed, by advancing money beyond what he is actually entitled to, and the clerk of works in such cases should be more than usually careful and circumspect in his reports of what is being done and what remains to be finished.

(To be continued.)

SEWER VENTILATION AND OTHER APPLIANCES.

THE admitted difficulty of controlling the currents of air in sewers has given much trouble to sanitary engineers. Experiments made with a view of discovering the best mode of ventilation have shown that the ordinary road gratings in a line of sewer often act in the two-fold manner of inlets and outlets, as the varying temperatures of the outer sewer air and other conditions prevail. The Æolus Waterspray, Ventilating, and Electrical Engineering Co, 124, High Holborn, have, by the application of their well-known Æolus waterspray ventilator, shown that it is quite possible to control the current or compel it to travel in any desired direction. By the introduction of one of the down-cast or wind-catching heads fixed to a shaft, with a spray into the crown of a sewer at any point, fresh air can be driven down into the sewer. At another or upper point of the same system, an exhaust ventilator is fixed of a siphon-shaped form, in which is another bell-mouth spray, the action of which creates a vacuum, exhausting the gas and driving the air up an upcast shaft which may be placed against any building or lamp pillar. By the combined action of the inlet and exhaust ventilators, a powerful current is maintained against the flow of the sewer. These may be placed at any convenient distances apart. We have had the opportunity of inspecting some working models of this system in which the smoke-test was applied, and directly the sprays were set in motion, a strong current was instantly set up. The siphon outlet and spray can be inclosed in a chamber or casing having a small door by which the spray can be regulated. When sea-water is employed for the sprays, a special spray is used, and a cylindrical filter having diaphragms at intervals is employed for screening the seaweed and other particles before the water passes the spray. This special filtering apparatus has convenient means for cleaning the sieves or meshes, which are of different degrees of fineness. The same principle of ventilation is shown applied to a passenger ship. The "Æolus" is fixed to the fore bulkhead, and is worked by a pump in the engine-room. The spray is of the "Turbine" pattern, permitting the particles of sea water to pass; the spray occupies the whole space of the cylinder, and drives the air before it. A vacuum is thus created behind the spray, the air being thereby sucked in through it, and enters the hold or cabin through a main shaft with vertical inlet tube; a second or exhaust "Æolus" exhausts the vitiated air from the upper part of the cabin, and thus a constant change of air is effected. The waste water is carried off by a waste-pipe. The down-cast cowl patented by this company, and fixed to the down-cast Æolus, collects the wind from any point, and drives it down to the waterspray. In case of a heavy sea entering the inlet-shaft, there is a hinged basin-shaped bottom at the bend of shaft, which tips down and discharges the water on to the deck. The exhaust can also be surmounted by an automatic exhaust ventilator, so that without the waterspray self-acting ventilation is secured. The advantage of the "Æolus Waterspray" for creating currents cannot be denied, and we believe that for sewer ventilation the system can be economically applied in very many cases which have defied the ordinary treatment.

We saw a working model of the "Capell Double-power Exhaust Fan," for which the Æolus Water-Spray General Ventilating and Electrical Engineering Co. are agents. For ventilating purposes this fan appears to be exceptionally good, and a more powerful exhaust we have never seen. The fan consists of two sets of six blades, an inner and an outer set, shaped to a particular curve. The outer blades are fixed on a drum with openings. Its efficiency has been tested, and excellent results have been attained with a small velocity of blade tip. For drawing off foul air, vapour, dust, and smoke, the Capell fan is well suited.

Our attention was also directed to an incandescent electric light on an economical system, suitable for domestic use, and avoiding the expense and space required for engines and dynamos. The lights we saw are fed by primary batteries, which do not take up space, can be placed anywhere, and require no skilled attention. All that is necessary is to recharge the batteries once a week or fortnight, though the company undertake this duty if required. The cost of the incandescent light is very little more than gas, the user having all the advantages of a brilliant, steady light without vitiating the atmosphere of the room, as is the case with gas, oil, and candles. We are informed that one battery of eight cells will maintain ten lamps of 5 candle-power. The three Swan lamps we saw burning can be maintained for 60 hours by one charge of the battery, and the cost of one charge is about 4s., or, in other words, the cost is about one-third of a penny per lamp per hour. With the cost of production reduced by these means, the electric light must soon become a formidable rival of gas.

AN ALTAR IN GOLDS AND COLOURS.

DURING the past week an exceptionally interesting example of church furniture has been on view at Mr. J. Aldam Heaton's studios in Charlotte-street, Bedford-square. We refer to an altar which has been just finished for St. Margaret's, Ilkley, Yorkshire, built a few years since from the designs of Mr. R. Norman Shaw, R.A.* The treatment adopted is decidedly original in idea, and is intended to obviate the use of embroidered altar frontals by introducing a series of seven panels decorated with figures of censing and musician angels painted in colours on a burnished background of yellow gold. The frame work, which is designed without mouldings in plain divisional uprights and rails, is also covered with gold, and throughout is enriched with Italian ornaments in browns and yellow-browns painted over the gilding. The wings of the angels and the nimbus of each figure are drawn with an incising tool on the burnished gold, and this work is very cleverly picked out and heightened by lacquers, which tone the sheen of the groundwork and serve to bring out the features to which they are so ingeniously applied. The framing of the altar, as well as the panels, are made of mahogany, the altar top being a stout slab of solid oak fumigated and polished, with five satinwood crosses inlaid on the upper face. The altar is ten feet long, and it will stand against a setting of alabaster with red dossal hangings over. The figure panels were all painted by Mr. W. H. Margetson, and there is considerable merit in his work; but to our minds the detail of the draperies lack study and finish. This effect is no doubt heightened by the highly elaborated and burnished background in which the angels are placed. The artist would have done better had he followed such artists as Memling, dealing with more attention and care to detail rather than aiming at a superficial breadth of effect so fashionable among French decorative painters. Along the frieze of the altar are inscribed the seven gifts of the Holy Spirit in little jewel-like panels amongst the Italian ornaments. The bottom rail is shaped, allowing ample space for the toes of the priest when celebrating. The panels of the altar at the ends are decorated with foliage corresponding with that on the framework.

The parish church of Crathorne, near Picton Junction, in the North Riding, is about to be restored, from plans by Mr. E. Hodgson Fowler, F.S.A., of Durham.

* A double-page illustration of this charming church was published in the BUILDING NEWS for May 13th, 1877.

OUR COMPETITORS' COLUMN.

THE papers sent in for our seventh competition are, taken all round, very creditable. The best is undoubtedly that by "Studiosus," to whom we award the prize. Several other papers are almost of equal merit, and, with some hesitation, we place that by Mr. Charles T. Taylor second.

We now offer another prize of One Guinea for the best

SUGGESTIONS TO ARCHITECTURAL SOCIETIES

for sessional papers next year, with hints as to subjects most appreciated by members, illustrated, if desirable, by references to and comparisons with past papers.

To be sent in by Friday, July 15.

Another prize of One Guinea for the best short essay, naming the architect who, during the past thirty years, has

MOST DECIDEDLY INFLUENCED ECCLESIASTICAL ARCHITECTURE IN ENGLAND.

To be sent in by July 22.

And another prize of One Guinea for the best paper giving

THE EXPERIENCES OF AN ARTICLED PUPIL,

comprising such hints for self-improvement and the best utilisation of time and resources as may benefit others. Papers giving actual personal experience will be preferred.

HINTS ON ARCHITECTURAL DRAUGHTSMANSHIP.—(BY "STUDIOSUS.")

The subject falls naturally under two heads—that of mechanical or geometrical drawing, and that of freehand. There is not much to be said on the former. Anyone can become a good mechanical draughtsman by dint of practice, and a determination to succeed, whether he happens to have artistic ability or not. At the same time it may be useful to hint at certain principles of good taste which apply to mechanical drawing. First, it is well to bear in mind that a geometrical drawing *is* a geometrical drawing, and not a picture, and that the two cannot be combined without destroying the effect of both. If a drawing is to be a mechanical and mathematical representation of a building or any other object expressed by lines as a formula is by letters and figures, let it be that and nothing else. Don't aim at effect. Let it be as mechanical as it can be made, and never draw a line therein if you can rule it instead. The common practices of "breaking" brick lines on an elevation and darkening the corners of windows are everyday instances of what I mean by trying to gain effect. But, however mechanical the drawing may be, there is room for taste and discernment in the arrangement on the paper, choice of colours for materials in working drawings, and the type and excellence of writing employed for titles and description. I venture to think these little matters, though not in themselves of great importance, serve to show whether a man is careful and takes pride in his work or the reverse. One good result of the competition system has been the great increase of excellent draughtsmanship. The six sets of drawings for the Imperial Institute lately exhibited are model instances of technical draughtsmanship, whatever other merits they may or may not possess. Proficiency in technical draughtsmanship is the very A B C of the youthful architect, the first rung of the ladder worn by the mounting of so many illustrious feet and it can be attained, and must be attained by any and every member of our profession who intends to reach the top. Much might be and has been, written on this subject, but I think a few general hints are all that can really help the student who, if he be in earnest will conquer the little difficulties, and invent the little technicalities belonging to the subject for himself, better than anyone can tell him. This remark also applies to the second division of my subject, freehand drawing. I include all drawing under this head that is not performed with mechanical aid, in which the student must rely on truth of eye and skill of hand alone. I have no hesitation in saying that an architect should be able to "draw anything" just as much as a painter. It should be as easy to him as writing. To acquire the power he should begin very young, and acquire it while young, and once learnt it will be the very "open sesame" to him all his life. I would have every embryo architect, before entering the profession at all, spend at least two years in drawing from the antique and the life. If he cannot draw them at the end

vo years, let him go on trying till he can. Then he can he will be able to draw any building ever yet erected, and anything else besides. his is the ideal of this portion of architectural ducation, seldom, I fear, realised. The ques-on naturally arises, What are those students do who have been unable to enjoy these cilities? I suppose the question applies to e vast majority who do not choose their pro-ssion till after leaving school, and who con-quently have been unable to begin very ung. I venture to think that, although it is ndoubtedly a characteristic of many great en that they began their profession as soon as ey could walk, in many the talent for any ecial line in life does not develop till child-od is over. It is then obviously no use telling e latter that they ought to have begun years o. They have got to begin now and make up r lost time, and, given a foundation more or ss deep of artistic ability, industry, and a de-rmination to succeed, I firmly believe they ll succeed. The youthful architect must aw and draw till he *can* draw, and above all, possible, get a good drilling in the repre-ntation of the human form divine, antique d living. As I remarked above, the knowledge this will meet every emergency. If he nnot do this from want of time or oppor-nity, or any cause, let him not, therefore, spair of becoming a good and facile draughts-an. Let him take every opportunity of sketch-g, not necessarily buildings, but anything at strikes his fancy, and let him get his incipal or some artist friend to correct his rors. He will gradually find that he is gain-g the power and facility he aims at. I am are that there are some who would meet ese observations with the just remark that architect's duty is to build pictures, not draw them, and that beyond a certain ount of South Kennington "freehand and del drawing," draughtsmanship is useless to e architect, however ornamental it may be. regards these objections, I would observe at, however magnificent a man's conception y be, they are necessarily and absolutely ited by the skill he possesses in expressing em. Of course, if a man feels that he will ver stand in need of any particular skill in pression, there is no necessity for acquiring I contend for the necessity of artistic ll in draughtsmanship for the reason indi-ed above, and also as a means—the means all others—of education. As regards this, I er, first, to the necessity of sketching from and new examples, both in perspective and measured drawings. How many times has s necessity been insisted upon by the great n of our art in lecture after lecture, printed l spoken? A good and careful sketch is rth more to the author of it than a week's otography, and a fortnight spent in drawing l measuring more than a whole winter's dy of books. Let all sketches be as good as know how to make them, regardless of the e spent in their production. Speed will ne in due time of its own accord. Express nuch as possible in as few strokes as possible. you are sketching architecture for strictly ucational purposes, put in all the detail the wing will hold, regardless of effect. Never nd whether it looks pretty or not. I need rcely refer to such well-known examples the sketches of Mr. Gerald Horsley Mr. Sydney Mitchell as instances of at I mean. Secondly, there is another way which the practice and power of drawing colouring are valuable as education, and I think generally much undervalued. "I nt," said William Hunt, in answer to the vy, "I paint—to learn." The navvy replied, hat was all he would rather break stones. ry sketch from nature honestly and care-y made is a lesson in the perception and ression of beauty from the greatest of hers. Therefore, let the student who feels can gain from such work, by all means e every opportunity of doing it. If he does feel he can gain aught therefrom, he had er leave it alone. It should always be e in mind that nature is the storehouse of beauty, and the source of all inspiration, that from thence, and thence only, can the gner gain materials for the creation of truly utiful forms. How can he design a har-ious scheme of colour for a room, or pave-t, who has never educated his taste by ying the ever-present harmonies of colour all round him? But whatever else the student may or may not do, there is one absolute essential, without which all study is useless, and with which there is much study that is rendered superfluous. I mean the faculty of observation—"the daily and hourly habit of comparing what we see in nature, and the thinking of how it should be represented in art; the constant observation of great things and small, and the experience that springs from it." If the student forgets every other hint I have tried, imperfectly enough, to set before him in the foregoing pages, let him at least remember this concluding one, simple as it may sound, "Never let anything pass him."

SECOND PAPER.

HINTS ON ARCHITECTURAL DRAUGHTSMANSHIP.

The acquirement of freehand drawing is the foundation of all good draughtsmanship; therefore architectural students cannot do better than follow the subject thoroughly, as it will be found to amply repay hereafter for any time that may be bestowed on the same. Without its aid expert draughtsmanship cannot be attained; by its means the eye may be trained to see correctly and the hand to follow readily the dictates of the eye. The most approved course to take in sketching is to commence with figure sculpture and plant forms, &c. When some degree of proficiency has been attained thus far, the student might extend his range, and seek some interesting example of ancient architecture, confining himself in the first instance to details, and gradually extending to groups of buildings. Having now explained what might be designated as the introduction, I will proceed to deal with architectural drawing proper, and in doing so I will divide it into four distinct classes (dealing with each class separately)—viz., (1) Geometrical drawings, as plans, elevations, and sections (working drawings coming under this class); (2) perspectives, including coloured perspectives; (3) etchings; (4) line drawings, competition drawings coming under this class. Beginning with the first-class, the chief characteristic of a good set of working or contract drawings is that they must be clear and intelligible. There should be as near an approach as possible to mathematical accuracy, figured and measured scale dimensions in strict accord, the lines fine, to enable measurements to be taken off accurately, the various materials to be indicated by corresponding tints, somewhat lightly laid on; these being essentially practical business drawings, clearness and accuracy will be of the first importance. The plans will not be complete without a good deal of explanatory lettering and figuring, which should be clear and distinct, so that any ordinary workman can understand them. Elevations should never be elaborately coloured; pictorial effects must be left for perspectives. The practice of leaving a slight interval of white paper between the corner of a building or projection upon which the light comes and the tint, is a good one, as it brightens up a drawing. It is extremely necessary that the draughtsman should be provided with a really good set of instruments, and that the drawing paper should not only be of good quality, but should be properly stretched on the boards. For general purposes, Whatman's unpressed double elephant drawing paper may be considered best. The pencils should be H or HH, according to scale of drawings. Tee and set squares are best made of pear wood. Vulcanised indiarubber should never be used, except for cleaning up, as it rubs up and ruins the paper; the ordinary bottle indiarubber is best. Of course, good square boards are indispensable for good drawing. Good Indian ink should be used, that which will not run when colour is applied; the same should be mixed frequently in small quantities and used fresh. It would perhaps be as well now to say a few words as to method of procedure in the designing of a building. As soon as the principal floor has been outlined, and the general arrangement determined, the basement and upper plans may be taken in hand, and carried on sufficiently far to set all doubts at rest as to the practicability of the arrangement of the whole scheme. In like manner the sections and elevations should proceed as far as possible together. It is a very common mistake to endeavour to finish one drawing, say, the elevation or the ground plan, before beginning the others. This method is a very unsatisfactory one, and inevitably leads to much vexatious undoing and redoing of work. Nothing should be inked in until the whole of the drawings are complete in pencil, and it is seen that each drawing thoroughly fits each other in every respect, and that there will not be the slightest alteration necessary. When this stage is arrived at the drawings must be examined carefully, and if considered incapable of further improvement, the inking-in with a clear, fine line might be proceeded with. There is nothing that will give the students better practice in inking-in than making a few sets of drawings of existing buildings; of course, to be plotted down accurately, and executed with all possible care, also he might consult such works as the "Moniteur des Architectes," or the "Revue Générale de l'Architecture," by so doing he will be enabled to form some idea as to what really good architectural draughtsmanship consists of. (2) Perspectives.—The first essential is to obtain a complete knowledge of the principles, really very few and simple; unless this is done at first, mistakes will be of constant recurrence. We are sadly deficient in number of books on perspective useful to architectural draughtsmen. Supposing the student to have mastered the rudimentary principles, he must not rest satisfied with the power of applying the rules practically to the extent of being able to put an ordinary building in perspective under the supposition that he has acquired all that is necessary; after he has done with the books and obtained from them all he can, he has yet much to learn before he can consider himself thoroughly qualified in the art. The careful examination of the actual appearance of buildings, as seen from different points of view, will teach more of real perspectives than any number of books, however learned; moreover, by this means, if properly carried out, the students may acquire the really valuable art of seeing mentally, as it were, in perspective the effect of his design when only in the form of geometrical plans and elevations; it will further enable him to make eye perspectives—that is, freehand perspective sketches of his designs. Coloured Perspectives.—These must be an affair of colour and shadow, no lines appearing. It is not a question of technical drawing as in constructional architectural plans; it is, in short, a picture—a water-colour drawing. In perspectives the general effect is the chief consideration, the details being quite a matter of secondary importance; too many lines should not appear, as in the process of colouring these get partially obliterated. The paper for a coloured perspective should be of a slightly rougher texture than that used for ordinary drawings, and should be exceedingly well stretched, else buckling-up will be the consequence. The outline must be drawn with a pencil, not unduly hard, so as not to necessitate digging into the surface of the paper; in damping the paper previously to commencing the colouring, it is best to slant the board and pour water gently over it; this done, allow the boards to stand on end for it to drain off. Cake colours are preferable to moist, as the latter are liable to get dirty. Colour brushes should be of best sable. (3) Etchings.—Etching is done by getting all the effects of a drawing by shadows indicated by short, rapid touches of the pen, therefore differing very widely from line-drawing; the lines should not be drawn with a mathematical drawing pen, the hand and ordinary pen should be used. The fault of most etchings is that there is too much work in them, and at a short distance they appear as one confused mass, exaggerated shadows, distance, sky, and foreground all alike in intensity. Curves should be done by hand. (4) Line Drawings.—In drawings of this kind the architectural lines, that is, all corners, angles, &c., as distinguished from the indications of shadows, must be drawn in a clear, distinct, though occasionally broken line, which should be rather fine than otherwise; the less shading the better. In competition drawings special attention should be given to making the leading arrangements obvious and unmistakable, omitting minute detail. The walls on plans and sections are better inked in with Indian ink than coloured. The explanatory writing, lettering, and figuring should be large, bold, and legible.

CHAS. T. TAYLOR.

WAYSIDE NOTES.

THE holiday season may now be said to have commenced, and in fine, genial weather—a very important consideration with the sketcher, who should endeavour to make the most of the long, rainless days—the earnest student, if he be not daunted by a burning sun, will find that he can accomplish a vast amount of work about this time of year, when he can sketch and measure from cock-crow to nightfall. Those who study in the hottest and brightest days of summer, however, will find a good purpose-made umbrella a prominent necessity, and it is, therefore, an article that should not be forgotten by those who intend to occupy themselves chiefly with systematic sketching. A solid member of the family of campstools, also, adds greatly to comfort in working. It is perhaps best to frankly recognise its importance by arming oneself with a really serviceable article, and avoiding those combination instruments which alternately serve the purpose of a seat, a walking-stick, and a weapon with which to overawe the too-inquisitive foreign *gamins*. One often meets, however, with individuals who would seem to possess legs with muscles like unto those of the stork or pelican in powers of endurance, and who can, therefore, sketch almost as well standing as sitting. Personally, it must be confessed, I never could do much drawing without a good seat, especially whilst engaged with the highly-colouring department of the business. A handy moss-covered bank, canal wall-coping or other natural, if primitive, seat, greatly assists us in determining the "position of spectator" in our perspective sketches.

A very large relative portion of travellers (especially on the Continent) must be composed of architects and artists. A genuine love of old architecture naturally creates a keen desire for travel. Now that railway and boat-fares are relatively so small an item in one's expenses, there is little excuse for those, of even moderate means, not taking advantage of every opportunity to improve themselves by more or less extended travel. There are two distinct benefits to be derived from a habit of touring—an increased knowledge of the artistic side of one's business, and a certain polish of manner that comes to the person who moves freely about in the world, and the acquisition of which is no mean advantage to a man in the struggle for existence. Seeing this, it is absolutely necessary to decide exactly what our object in travelling is before setting out, and also to consider whether we go for the purpose of seeing as much as possible of a certain town or district, or whether we are only to carefully study a few of its buildings; whether we are to see "life" or study architecture; whether, again, we have to follow a prearranged route, or be guided solely by the inclination of the moment. It is infinitely better, as a rule, to decide definitely on the towns, &c., that we are to visit on the way, and to stick to this decision through thick and thin. At any rate, carefully avoid aimless and purposeless wandering. The former method of procedure is based on the soundest moral principles, whilst the latter will inevitably lead the tourist into a state of bewilderment and uncertainty, and every little wayside incident will cause him to alter his course with the rapidity and variableness of the most fickle weather-cock.

Judging by the frequency with which designs with a more or less pronounced flavour of Flemish architecture appear in competition and ordinary business work, it would appear that one of the most profitable districts to visit, for the purpose of sketching, is that stretch of flat or gently undulating land known as the Low Countries. In the Imperial Institute competition there was more than a flavour of this style in the successful design, and one competitor's exhibit was wholly founded on the style of Mediæval Flanders. Indeed, the influence of old Dutch and Belgian architecture on our modern English work has of late years been very pronounced. And there is certainly a vast storehouse of picturesque architecture in Belgium and Holland, which every architect could become acquainted with advantageously. The Dutch style, however, must be studied with extreme caution, as there are many features in its detail that are most undesirable as examples for imitation. Much of the typical ornament is in the worst rococo taste. The student should endeavour to mentally pass all work he may come across through a purifying fire of much thought and severe criticism, to reduce all to a standard of beautiful design and constructional truth, rejecting, as so much dross, all debased and worthless forms, such as the unarchitectural, snake-like scrolls in gables and towers, of which the Dutch builders were so fond. The old architecture of the Low Countries is eminently *suggestive*, especially as regards outline and composition of the picturesque order; but much of the detail is so objectionable that there are few buildings that could safely be copied in a literal manner.

Companionship in travelling is most desirable where of a harmonious nature. Unfortunately, it is rarely that two professionals are sympathetic enough to agree on every question, and mutually forbearing enough to sink differences of opinion for the common weal. Where a young architect cannot secure a companion with whom he is likely to agree, he had a thousand times better go alone. For many, however, the most satisfactory way of spending a sketching tour would be to join the Architectural Association Annual Excursion. Those who accompany the A.A. this year should have a very pleasant tour when the time comes. Bath and its neighbourhood are rich in old work, which will well repay study. By joining the A.A. tour members obtain many more chances of seeing new places of interest than when they are travelling by themselves, as facilities are given to the body to visit private domains that could with difficulty be obtained by the *voyageur tout seul*.

The result of the last BUILDING NEWS prize competition was but as most of us must have expected. In judging of the merits of architects who have risen to eminence, it would be as well to recognise the curious fact that everyone has a more or less marked mannerism. We find that there are men who go "mad" on proportion, whilst others rely solely on the beauty and originality of their detail for effect, and others, again, on the harmonious disposition of mass; but they often carry each quality to excess. Many an architect whose design is of merit in respect to one only of the many necessary qualities of architecture rises in our estimation; but the great man is he who attends to all the points, and especially to the noblest attributes of well-building. Such persons have generally grasped the *principles* of design in architecture, and while possessing great technical skill, they wisely subordinate this interesting accomplishment to the unalterable laws of beauty and fitness.

There is such a fascination about this technical excellence in design that at times we may be led to neglect the just claims of the *laws* of good composition. Thus there are many noteworthy architects who, but for the halo of "architecturalism" they throw over their work, would habitually produce the most hideous architectural deformities—judged by the rules of design. But this great skill in the treatment of debased styles must be looked upon rather as a *tour de force* in design, and is akin to practical joking in draughtsmanship. Still, we most of us prefer to see the real artist "running amuck," than the person without artistic power designing by pure and irreproachable rule. But it must be constantly borne in mind that excessive technical skill has ever caused the downfall of all true styles. As the individual ascends so the style of the multitude descends. In the old times the individual appears to have been secondary in importance to the community—all worked with a common aim—the well-being of their particular style. The old builders worked on *principles*, and unless we, also, inquire deeply into the laws of design, and work on fixed and true principles, we shall find that all our knowledge of *style* is only as a vast unwieldy hulk, that we have not the power of safely steering through the many shoals and sandbanks of artistic delusions. We are drifted about by the winds and waves of circumstance and fashion, till our hopes are finally wrecked on one of the many unseen rocks that lie just beneath the surface in the navigable course of the unprincipled.

GOTH.

ADMISSIONS TO ARCHITECTURAL SCHOOL.

ROYAL ACADEMY, JULY, 1877.

UPPER SCHOOL.—P. Anderson, S. H. Barnsley, W. H. Boney, H. P. B. Bowning, C. Gill, P. M. Ginham, G. Harvey, G. F. McCombie, F. W. Marks, F. Masey, G. W. Nicolay, A. Sykes, A. Tayler.

LOWER SCHOOL.—H. Baker, G. E. Collins, R. E. Draper, E. E. Fetch, A. L. Giles, W. Grace, W. F. Horton, A. J. Inman, G. R. Jaques, L. Martin, H. Mathewman, C. H. Norton, E. E. Poole, A. H. Powell, A. Pywell, R. W. Sampson, W. Taylor, A. Thompson, A. G. Veal, F. J. Verity.

PROBATIONERS.—A. E. Bartlett, W. B. Clarkson, A. F. Faulkner, L. Frazer, A. G. Haslilow, E. A. Hawkins, H. G. Ibberson, H. C. Rogers.

CHIPS.

The tower and spire of St. Lawrence Jewry, E.C., are now undergoing restoration. Mr. Young is the architect, and Messrs. Dove Brothers, of Islington and Tokenhouse-buildings, are the contractors.

Sir Lionel Pilkington has presented to the Local Board of Sandal, near Leeds, the ruins of the ancient Castle of Sandal, and the grounds adjacent thereto—containing the site of one of the battles fought in 1460, during the Wars of the Roses—as a site for a public park.

At the annual meeting of the Midland Union of Natural History Societies, held last week at Malvern, the Darwin Medal, which is this year set apart for archæology, was awarded to Mr. Edward W. Badger, M.A., of King Edward's High School, Birmingham, for his paper on "The Monumental Brasses of Warwickshire."

Mr. Thomas Alexander, C.E., Glasgow, has been appointed Professor of Engineering, Dublin University. Mr. Alexander was for seven years Professor of Engineering at the Imperial College of Engineering, Tokio, Japan, and returned home at the end of last year. While in Japan he published conjointly with his colleague, Mr. Arthur W. Thomson, B.Sc., Glasgow, a work on "Applied Mechanics."

The foundation-stone of the new Church of Our Lady of the Assumption and the English Martyrs at Cambridge, was laid on the 30th ult. by the Bishop of Northampton. Among those present at the ceremony was Mrs. Lyne Stephens, at whose cost the church (in Early English style) and presbytery (in Tudor style) are being erected. The latter is entirely and the former half built, both from designs by Messrs. Dunn and Hansom, of Newcastle-on-Tyne.

A new church, dedicated to St. Peter, at Salesbury, near Blackburn, was consecrated last week. The new structure is of stone, and contains accommodation for 400 persons. It consists of nave and chancel, organ chamber, with clergy and choir vestries. It adjoins the old churchyard, and is built in the Late Fourteenth Century type of Gothic. The cost was about £3,950. The old building which it replaces was erected in 1808, and a few years ago was found so unsafe that services had to be conducted in the schools.

The Liverpool corporation have appointed Mr. W. A. Legg to superintend the construction of the Cotebrook reservoir and other works on the Vyrnwy water supply undertaking, at a salary of £250 per annum.

The town council of Grimsby have appointed Mr. Joseph Maughan, who has served the town as borough surveyor for the long period of 31 years, and now retires on account of advancing age, as consulting engineer and surveyor.

Lord Lyons recently laid the foundation-stone of a new church to be erected in the Rue des Bassins to replace the Marbeuf Church which was pulled down some years ago. The new church is, in honour of the Jubilee, to be called the Victoria Chapel.

At the annual meeting of the Dundee Institute of Architecture, Science, and Art, held on Thursday, the 7th inst., it was stated that the membership had increased from 159 to 192, and that the accounts showed a favourable balance of £19. It was mentioned that prizes would be given for the best drawings, etchings, photographs, modelling, carving, design for a wrought-iron bridge, and paper on building mortar.

The organ has been reopened in St. Stephen's Church, Willington, near Darlington, after extensive enlargement. Mr. Postill, of York, was the builder.

The parish church of West Heslington, near Scarborough, is about to be restored from plans by Mr. C. Hodgson Fowler, F.S.A., of Durham, at an estimated cost of about £1,300.

Mr. George Paton, C.E., of Glasgow, has been appointed Professor of Engineering at the Royal Agricultural College, Cirencester, in room of Mr. Arthur W. Thomson, resigned.

TO CORRESPONDENTS.

We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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RECEIVED.—C. and J. M.—P. R. W.—M. Bros.—B. L. Co.—A. W. K. and Co.—T. B. I. Co.—W. O. and Son.—T. T.—T. L. B.—H. J. B.—M. and Co.—Sir W. E.—B. of L.—S. L. B.—M. A.—J. B.

Correspondence.

ARCHITECTS AND THE REGISTRATION ACT.

To the Editor of the BUILDING NEWS.

SIR,—Mr. Farman's letter, with an extract from the *Morning Post*, may serve very well to give a little colour to the proposed Registration Act; but are there no counter indictments? I think so.

Names and dates are not always public property as in the case Mr. Farman cites. If they were I could give an instance in this town where an architect's blunder—I was going to say *ignorance*, but have adopted a more charitable word—caused the whole front of a warehouse to topple over into the street.

Amongst the thousands of buildings constantly in course of erection or alteration throughout the country we must always have a percentage of such accidents. The only wonder is that they are so few.

Mr. Farman's haste to avail himself of this instance is indicative of a weak cause. The fact that a plumber is the culprit in this case reminds me of the architectural quack's "signboard" quoted by one of your correspondents a month or two back. "Plumber, glazier and decorator, architect and surveyor," I think it ran. Well, Sir, if this versatile genius has been "in practice" since 1882, and the registrationists have their way, he will shortly be a certified architect. Which is better—a presumptuous plumber, *known as a plumber*, or a presumptuous plumber whom the law has dubbed "Sir Architect"?—I am, &c.,

INVICTA.

AN EXPLANATION WANTED.

SIR,—I guess "M.P.'s" is a day-work job!—I am, &c.,

BRITISH WORKMAN.

THE IMPERIAL INSTITUTE.

SIR,—From a letter by Mr. Jas. Pulham in your last issue, I gather that "a dome is recommended" instead of a tower to the Imperial Institute. Let me say that, if such is the case, I think it downright unfair to us. Why not adopt the balance of our design as well?—I am, &c.,

THOS. M. DEANE (T. N. Deane and Son).

3, Upper Merrion-street, Dublin, July 11.

ARCHITECTS IGNORED.

SIR,—At the Lincolnshire County Magistrates' meeting, held last Thursday, referring to an annuity proposed to be given to Dr. Palmer, medical superintendent at Bracebridge County Lunatic Asylum, which, by the way, was refused, Viscount Oxenbridge is reported to have said that "Dr. Palmer planned the asylum, which has been from time to time added to according to his plans and advice." No one would imagine for one moment that his lordship stated what he knew to be false, but the statement is certainly most extraordinary, and, if true, is (after 40 years' secrecy) a real "letting the cat out of the bag." The fact of the case is that the county magistrates advertised for plans, and the designs sent in by Messrs. Hamilton and Medland were approved and carried out. Now, if Dr. Palmer planned the asylum, he must have helped Messrs. Hamilton and Medland, and as the magistrates received assistance from Dr. Palmer in selecting the approved design, therefore Dr. Palmer advised the selection of his own plan. This was very unjust, and heavy handicapping of the unfortunate unsuccessful competitors, and it is to be feared that architects even nowadays often suffer under similar injustice. They are induced to expend their time, their money, and their knowledge by a promise or hope of remunerative success, when it is well known to those behind the scenes that a certain favoured individual will receive the fruition.—I am, &c.,

PALMAM QUI MERUIT FERAT.

NUMIDIAN MARBLE.

SIR,—Having executed the whole of the marble work of the National Gallery extension and grand staircase of the New Liberal Club, we beg to state that none of the materials used are from the quarries of the so-called "Numidian Marble Company, Limited," whose revised prospectus is now before the public, and in which they infer that these marbles are the produce of their quarries, when in reality they are shipped at ports 200 and 600 miles off respectively in North Africa, as concerns the National Gallery; the Liberal Club marbles being the products of Italy.—We are, &c.,

FARMER AND BRINDLEY.

67, Westminster Bridge-road, London, S.E., July 13.

THE PROPER THICKNESSES FOR WALLS OF DWELLING HOUSES.

SIR,—As regards health, security against fire, and stability, it is important that local authorities should prescribe and enforce reasonably stringent by-laws as to the above matter. The question is one upon which there is much diversity of opinion, and thereupon much variation in practice. If you will permit me, Mr. Editor, I will ask the questions:—

1. What are the proper thicknesses for external and party-walls of dwelling-houses varying from 20ft. to 50ft. in height?

2. Ought the same rule to apply to cottage houses which would let for £15 per annum, as to houses at rents varying from £30 to £300 per annum?

To illustrate what I have said as to the variance, from any definite rule which exists in practice, it is only needful to point to the cases of those districts which have adopted the model by-laws of the Local Government Board and that of the City of Manchester.

In the former case, a small house with a basement, ground floor, and chamber floor, having walls 28ft. to 30ft. high; because the walls exceed 25ft. in height, and comprise more than two stories, the external and party walls of the basement and ground stories must be 13½in. thick, and the rest 9in. thick. For twenty years hundreds of similar houses have been erected annually at Manchester, with external walls 9in. instead of 13½in. thick, and party-walls 4½in. instead of 13½in. thick! Still they stand, and owing to the comparatively slight risks of fire in dwelling houses, I am not aware that many fires have extended from house to house *through* the very slight party-walls erected. According to metropolitan ideas, I have no doubt the above comparison may cause some little amazement and perhaps ridicule. There is, however, no fiction stranger than fact. No architect building a substantial villa at a cost of £600 or £800 for a client who could afford the outlay would hesitate much about voluntarily adopting the thickness prescribed by the Local Government Board, as based upon the Metropolitan Building Act; but any ordinary capitalist thinking of investing his money in dwelling for the working classes in most of our Northern towns would hesitate. Is there no middle course? Sanitary, like other reforms, must of necessity be accomplished gradually. Public opinion is incapable of suddenly rushing from one extreme to another. Is not progress being prevented instead of being encouraged?—I am, &c.,

A CONSTANT READER.

Manchester, July 9.

ARCHITECTS AND QUANTITY SURVEYORS.

SIR,—It is rather amusing to read the letters of your correspondent "C. F. M." He states that the architect should do such "surveyor's work" as cannot be properly done by a quantity surveyor "pure and simple." I, for one, should very much like to hear "C. F. M.'s" explanation of this. The quantity surveyor, "pure and simple," is required by the Surveyors' Institution to undergo a very crucial examination, not only in quantities, measuring, and valuing artificer's work, but also in land surveying, constructive working drawings, composition of stones, limes, and cements, law relating to easements (light and air), fixtures and dilapidations, and, further, as a preliminary requirement, to measure up a building of a given extent, and prepare a decent set of drawings to a small scale. What, then, is the "surveyor's work" that should be done by the "architect" on account of the quantity surveyor's inability?—I am, &c.,

QUANTITIES.

ORDNANCE SURVEY.

SIR,—From practical experience, I am sorry to say, I can fully endorse the statements made by your correspondent the other week. The Ordnance Survey carried out on its present scale means simply ruination to a large body of professional men, without the slightest compensation whatever, and with no commensurate advantages to the country at large. There are cases, to my knowledge, of respectable country surveyors, with whom large premiums have been paid, and who have been perhaps years in perfecting themselves in their profession—in which it takes as much time as in any other profession to become an adept—being brought to the verge of starvation after enjoying incomes of £250 to £500 a year, and for whose benefit? For the country's? No! But for the rich landowners', railway directors', colliery proprietors', who make the laws for themselves, and who doubtless caused the Ordnance Survey to be published on the 1-2,500 scale to save their own pockets. The publication on this scale is unjust and unwarrantable, destroying, as it does, a respectable profession. And there is in many cases no return for it. Any Ordnance map agent will say that there are not half a dozen sheets of certain country districts sold, say at 2s. 6d. each, whereas the expenditure on such sheets must cost the country £1,000. Besides this they are too large and unwieldy for military and strategical purposes, and, what is not generally known, are altogether inaccurate and unreliable as indications of boundaries of private property, the areas being given to centres of hedges and not to ditches, causing, in many cases, great discrepancies, and paving the way for disputes and expensive law-suits. The Survey of Yorkshire on 6in. to a mile, with contours, some years ago, was a really excellent production, quite large enough for military and public purposes, and useful alike to the private surveyors and the public, and did not interfere with private practice; and it would be as well had the authorities confined themselves to that scale for other counties, without attempting to compete with



local land surveyors in the larger scale plans, which are a signal failure as records of private property, although recognised, I am sorry to say, by county court judges and lawyers, who cannot understand the merits of the case.

With regard to the town surveys on 10ft. to the mile scale, I believe it is a fact that certain corporations and boards have subsidised the Ordnance Department to complete the surveys of their districts, in some cases at a cost of several thousand pounds to the ratepayers, whereas local surveyors could have been found to undertake the work at less cost, the ordinary borough engineer and surveyor and his staff not having in the majority of cases the experience necessary to undertake surveys on any large scale.—I am, &c., A Sufferer.

WAVE BASINS.

Sir,—The important subject of rough water inside harbours, and the use of wave basins has been recently referred to in your journal. Without denying that, under certain circumstances, recourse to them may be justifiable, there seems to me so much to be said against them, that I trust you will permit a few words of protest.

Are wave basins things for an engineer to plume himself upon? Are they not usually a confession of failure; an admission that the original design for the harbour has not produced the expected result?

There are three large harbours on the east coast which have tried wave basins, and illustrate this question in the best of all ways—viz., experimentally. A study of these and almost every other port that occasionally has the wind setting right into it, is most instructive. The wrecks and damage to solid works that result from the range of the sea within harbours, and which are repeated from year to year, show conclusively that the present description of harbour works at whatever cost, are insufficient. Look at the three ports, Aberdeen, Tynemouth, and Sunderland. In each case the established plan of two training walls has been adopted; but in each case, after very heavy expenditure, it is found that these and the other improvements of dredging and deepening the river simply result in waves occasionally travelling into the harbour with greater depth and force, and to a greater distance up the river than before any works were constructed. The "range of the sea" within harbours has become quite a hackneyed expression, a state of things that we have become accustomed to and devise new works to meet. The original estimate purports to create a port by running out two long solid piers into the sea; but supplemental estimates have afterwards to be sanctioned to remedy a new condition of affairs that these works have brought about. Wave traps and wave basins endeavour to reduce the evil that results from training walls, which, while they usefully confine the outgoing flow of a river, also confine and direct with concentrated force the incoming destructive power of waves.

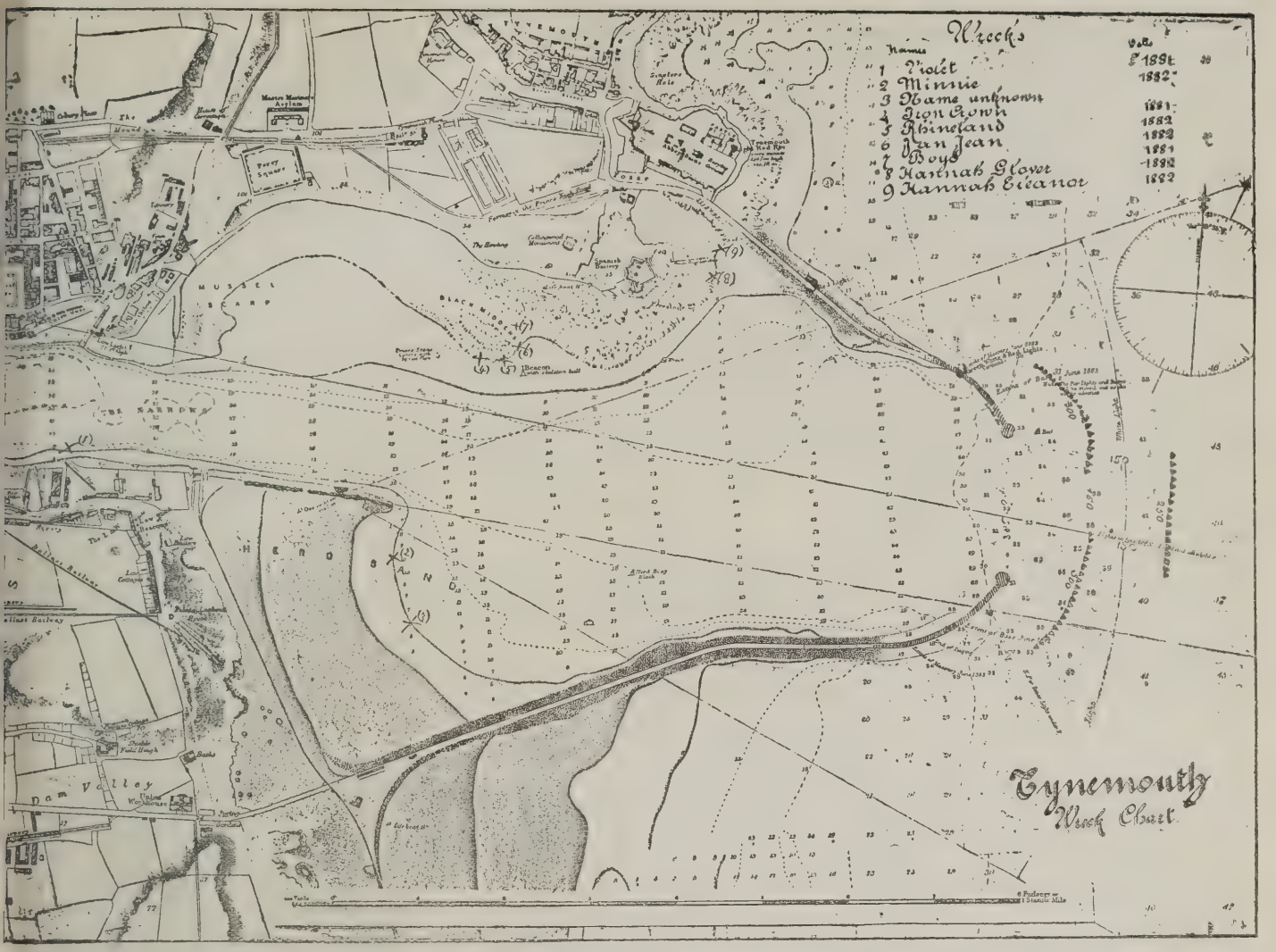
At Aberdeen, despite four wave traps on the north side, and three on the south, the water well inside the harbour is dangerously agitated with certain directions of the wind. At Tynemouth, though £7,000,000 have been spent on the river and its entrance, and there is a wave basin on both north and south sides, the first mile within the piers is still confessedly unsheltered, unreclaimed from the state of the neighbouring ocean in an easterly gale. All vessels that succeed in entering through the stormy water at the pier-heads have to run miles up the river before they really find shelter. Numerous wrecks within a mile of the pier heads show how imperfect is the shelter afforded, and docks at North and South Shields formerly "on the Tyne," are now said, from the wave disturbance felt there, to be "on the German Ocean." At Sunderland similarly, at one entrance ships have to run up the river, at the other into docks. In the north harbour there are four wave traps on the north side, and two on the south; and in the south harbour there are four wave traps on the north, and five on the south side—in all, fifteen wave traps. In fact, what should be a sheltered harbour and anchorage within those long and costly piers is found to be still so much at the mercy of the waves that this inclosed space, instead of containing shipping, is thus filled up with inner piers called wave traps, four deep, in the hopes of, in some degree, checking the force of the waves as they advance up the harbour, and are obstructed and turned by one pier after another. Almost the whole area, that is, properly speaking, the harbour, is given up to piers and waves that it is hoped will there expand and expend themselves—as primitive and clumsy a device as it is costly. As well might an engineer who has constructed a noble span for a town-hall or a railway station proceed forthwith to occupy three-fourths of the space with walls and pillars. So inefficient is this system found, that over and above all this fruitless and vast expenditure on four outer piers and fifteen inner ones, Sunderland may now be said to be commencing de novo, for, at an expense that will be little short of one quarter of a million, she is providing herself with a new harbour, entirely outside the present works at the entrance to the river, and on so generous a scale as to allow waves also their space wherein to have their own sweet way, and, mayhap, leave the rest of the inclosed area quiet for the use of vessels. What is wanted is that a vessel passing through the heads should find itself in shelter and in comparatively clear water. Stormy water should not be allowed to enter the harbour. But this is not all; violent waves outside and at the entrance to a port are a great inconvenience, and the cause of many wrecks. Wave power needs to be checked both inside and outside a port. Inside wave basins do it in a partial and costly way—costly both in money and in the area of the harbour that is sacrificed to them, leaving but a narrow passage in the middle for ships, say one quarter of the whole inclosed area. But at the entrance nothing is attempted. If waves can be robbed of their powers outside the entrance, then both objects are attained at once. If wave basins and every other expedient that has been attempted are found both costly and imperfect, is it not time the patient ratepayers and shipowners insisted on engineers turning their attention in some other direction, and devising something more effectual, more certain, and less costly?

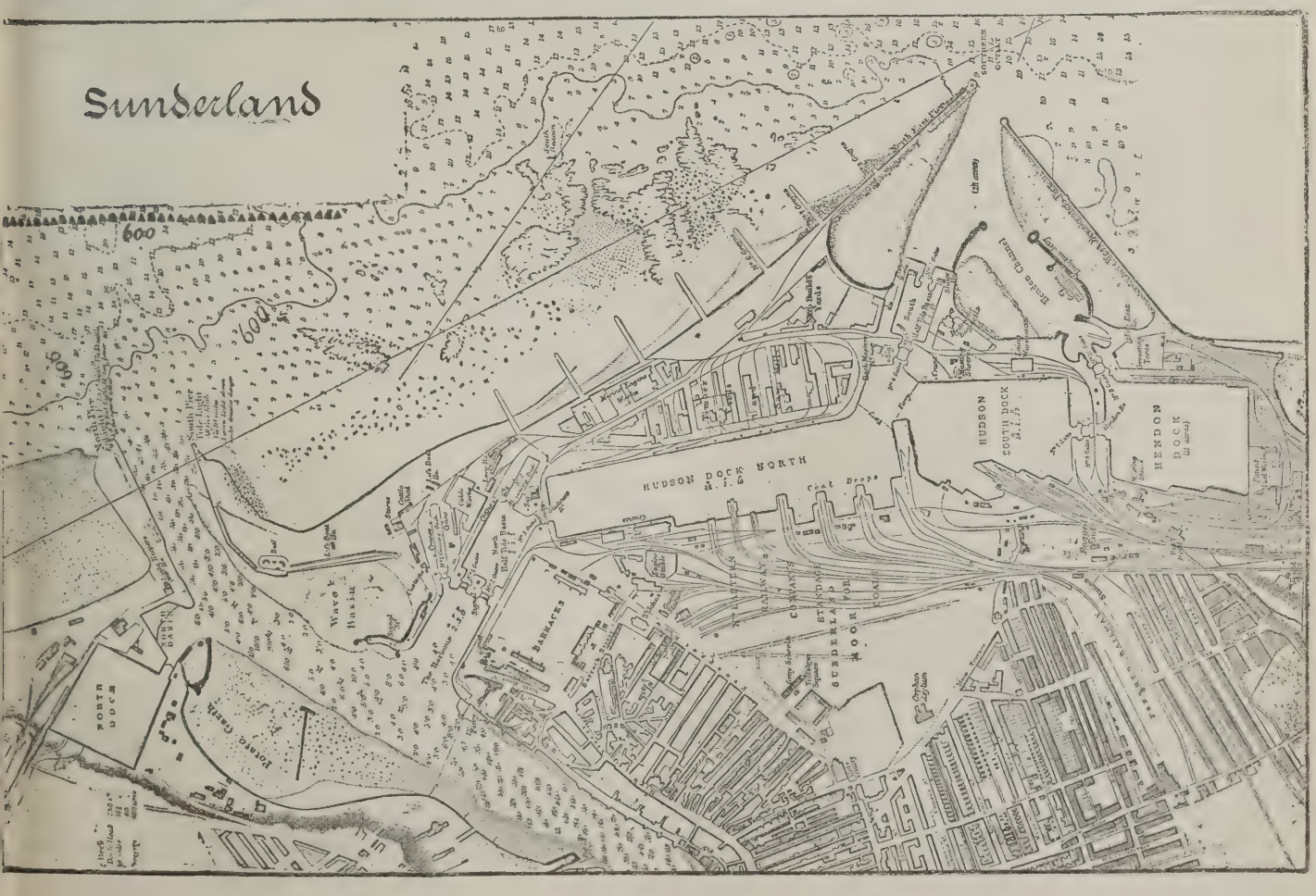
The remedy seems to be ready to hand, and has been known for centuries to every sailor who has found shelter behind floating ice or seaweed. A floating structure appears to be the only thing that can successfully be employed for checking the force of the sea at the entrance of and within a harbour. It will interfere with no currents, check no scour, and cause no deposit, and it can be so placed as not to narrow the entrance and incommode vessels desiring ingress or egress in any direction. It can also be shifted in position, and thus a mistake corrected—an impossibility in solid works.—I am, &c., E. C. Greenway Thomas.

65, Cornhill, July 9.

DRAINAGE AND SANITARY FITTINGS.

Sir,—When I wrote the letter that appeared in your issue of June 24th I had no intention of encroaching further on your space; but I beg leave to correct a deliberate misstatement


Wrecks
Name
1 Violet
2 Minnie
3 Name unknown
4 Lion Lamb
5 Rhineland
6 Jan Jean
7 Boys
8 Hannah Glover
9 Hannah Eleanor
Tynemouth
Wreck Chart


Sunderland
HUDSON DOCK NORTH
HUDSON SOUTH DOCK
HENDON DOCK
NORTH DOCK
BARRACKS

as published in Mr. Buchan's letter on p. 52. Under the section of a common branch pipe are the following words:—"Buchan's 1877 and Bruce's 1885 round opening or eye B." This statement is intended to convey a claim by me, but it is only a deliberately-manufactured statement made by Mr. Buchan to suit his own style of writing. In one of my specifications there is shown and described a metal gas and water tight cover for inspection eyes, made square, oblong, or round. This may show some of your readers the value of Mr. Buchan's "asserted" facts and drawings; and it is amusing to see the drawings which Mr. Buchan has made of Shoebridge's 1853 access pipes to suit his own statements.

I can afford to pass by the remarks about my 1885 trap, as no statement from Mr. Buchan will remove the fact of this trap being self-clearing, with 1in. of deeper seal than any trap that Mr. Buchan has been able to produce in fireclay or metal—when Buchan's and Bruce's traps are flushed with the same quantity of water. It is a matter of no importance what depth of seal Mr. Buchan may describe on paper when he has not been able to construct a clean working trap with a good deep seal.

Mr. Buchan informs the public what his lawyers may do, and as they have made an attack on Messrs. Robert Brown and Son, Sanitary Fireclay Works, Paisley, the present manufacturers of my 1885 trap, I beg to inform Mr. Buchan that this trap will be made and supplied to the public on my responsibility until Mr. Buchan can make good a case of infringement against me. This threat is more clear evidence showing how very inconsistent Mr. Buchan is when he describes in detail the construction of my 1885 trap as "nonsensical" and "ridiculous."

On p. 53, Mr. Buchan treats your readers to a plan showing the drawings of Armadale Castle, for Lord Macdonald of the Isles. I have carefully examined this plan, and I safely state, without fear of contradiction from anyone (except Mr. Buchan) who fully understands good drainage, that the plan shows a great want of knowledge, and ignorance of the most essential principles of improved sanitary arrangements. The position of the manholes shows that Mr. Buchan does not realise the proper use of a manhole; and there are no manholes shown on the principal branch drains at their junction with the main drains at front and back of house, and, according to the plan and description, many of the branch drains are not ventilated, in some parts to the extent of 20ft., without any ventilation behind the traps.

It is a great curiosity to see the number of "Buchan" traps indicated and described on the plan, and the idea of curved and crooked drains with branch connections below the floors, without any means of access at the branches, is perfectly absurd, showing the want of ordinary ability. It would be interesting to know how Mr. Buchan formed the joints of the curved drains, which he has shown drawn to about a radius of 12ft.?

It does not require an expert in sanitary matters to see that this plan, or what is termed "Buchan's sectional system of house drainage," will not pass muster in this Jubilee year as improved drainage. It is much more like some old plan of fifty years ago.

Although this system of drainage is badly arranged, badly ventilated, and overstocked with Buchan traps, &c., according to the plan and description, it is pleasing to learn that Mr. Buchan used *fireclay drain pipes*, and not iron pipes, at Armadale Castle.—I am, &c.,

William Bruce.

1, Sciennes Hill-place, Edinburgh.

THE NUISANCE FROM SEWER VENTILATORS.

Sir,—So far as can be judged from his letter on p. 52, it appears to me that Mr. R. H. Reeves draws important conclusions from rather curious premises. He refers to an "offensive" street sewer grating which had "a brick ventilating-pipe" under it running below the road some 30ft., and then up a house wall to half-way up the chimney.

Now, if this street grating had no water-trap below it, how could it be expected that the offensive smell in the sewer should stop coming out at it, even although there was a so-called ventilating-pipe put in, as stated, below the grating? If it were trapped, there must have been something faulty, or else how could the bad smell get out?

Then, was the "brick" ventilating-pipe carried up the wall, or was the vertical portion iron, and not brick? If iron, what size? And is it not nearly choked at foot by falling rust, owing to not being red-leaded or coated inside?

Further, if it was desired that this sewer ventilating-pipe should act efficiently as a ventilator for the sewer, why was its outlet not carried up to above the chimney cans several feet, and surmounted by a good fixed exhaust ventilator, instead of the outlet stopping at "half-way up the chimney"?

So far as I can judge at present from Mr. Reeves' letter, he has no sufficient reason, under the circumstances, for writing about the "utter uselessness of stack-pipes as a means of ventilation to sewers." In my opinion, stack-pipes—but rightly connected and properly put up—will be much more used in the future than they are as yet.—I am, &c.,

W. P. Buchan.

CHIPS.

A bridge of 1,600 tons weight, spanning the Pennypack, at the Homesburg Junction of the Pennsylvania Railway, was, on June 26, moved a distance of 50ft., by engineering skill, within 11½ minutes. Only 32 men were engaged in the operation.

On Wednesday week, the ceremony of formally opening the new Hull and Sculcoates Dispensary, situated in Baker-street, Hull, took place. The building is of Flemish Renaissance character, from designs by Messrs. Botterill, Son, and Bilson, architects, Hull, and includes a dispensary and residence for house surgeon.

Mr. John Rowe, of Mayflower-road, Clapham, shot himself on Friday through the head with a revolver. The deceased was a builder on an extensive scale, and had recently called together a private meeting of his creditors, the liabilities being estimated at over £30,000.

The Queen's Bench decided on Friday that the Institute of Civil Engineers was liable to pay a duty of five per cent. upon its annual income or profits, as it was established for the promotion of a particular branch of knowledge, and was not devoted to the promotion of education, literature, science, or the fine arts, which would have entitled it to exemption.

The Glasgow District Lunacy Board have disallowed the claims of £1,448 by Mr. Dansken, measurer, and £3,400 by Messrs. Bruce and Hay, architects, on account of professional work done in connection with the Hartwood Asylum up to the present time, and decided on Friday to call in professional advice as to the matter.

A new church in connection with the Church of Scotland has just been opened for worship at Corrie, in the Island of Arran. The new church is in the Early Gothic style, built of red sandstone, having a simple stone belfry and wooden porch, the roof being covered with green slates. Internally, the church has a nave with single aisle and chancel, the nave and aisle being separated by three moulded wooden pillars supporting timber arches. Rush-bottomed chairs, accommodating 250 persons, take the place of pews. Messrs. Burnet, Son, and Campbell, Glasgow, are the architects.

The Bristol School Board have adopted plans by Messrs. Trew, of that city, for new industrial schools.

The Mayor of Croydon has laid the foundation-stone of a new reservoir, which is now being constructed by order of the Croydon Corporation on the Addington-hills. Mr. C. C. Moorland, Chairman of the Water Committee of the Corporation, stated that the estimated cost of the undertaking would amount to between £40,000 and £50,000. The Mayor then duly laid the stone, which bears an inscription to the effect that the "Addington Reservoir" has an overflow of 465ft. above the level of the sea; that its length is 420ft., its breadth 124ft., a depth of 16ft. 8in.; and a capacity of 5,000,000 gallons.

The Bishop of Chester preached at St. Anne's Church, Sale, on Wednesday week in connection with the dedication of the north aisle, organ chamber, and choir vestry, which recently have been added to the edifice. By these additions the number of sittings in the church has been increased from 789 to 845 at a cost of £1,500. Mr. John Lowe, St. Anne's-square, Manchester, was the architect, and Mr. J. B. Kendal, of the same city, the builder.

COMPETITIONS.

Gateshead-on-Tyne. — The Gateshead School Board recently invited plans from local architects for a group of schools to be built at Teams to accommodate one thousand children in three departments, with schoolkeeper's house, the limit of cost being fixed at £5,000, exclusive of school desks. Thirteen sets of designs were received, and a committee recommended that the first premium (to merge in the ordinary architect's commission) be awarded to "Derwentwater"; the second of 20 guineas to "Evolution," and the third of 10 guineas to "l'Ecole." The premiated plans all showed the boys' and girls' departments placed one above the other, with infants' in separate building. Plain brickwork was proposed for elevations on account of low limit of cost. No one plan fully met the conditions, "Derwentwater" failing to place caretaker's house so as to command all the entrances, nor could all his classrooms be seen from head teacher's desk; while "Evolution" gave direct light on one side only of two of classrooms, the other side receiving borrowed light through a glass partition. The report was adopted and the envelopes opened, when it was found that "Derwentwater" was by Mr. W. H. Dunn, of Newcastle-on-Tyne, who was appointed architect for the schools; the second, "Evolution," by Mr. Stephen Piper, M.S.A., 2, Millfield-terrace, Gateshead-on-Tyne; and the third, "l'Ecole," by Mr. Gibson Kyle, of Newcastle.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

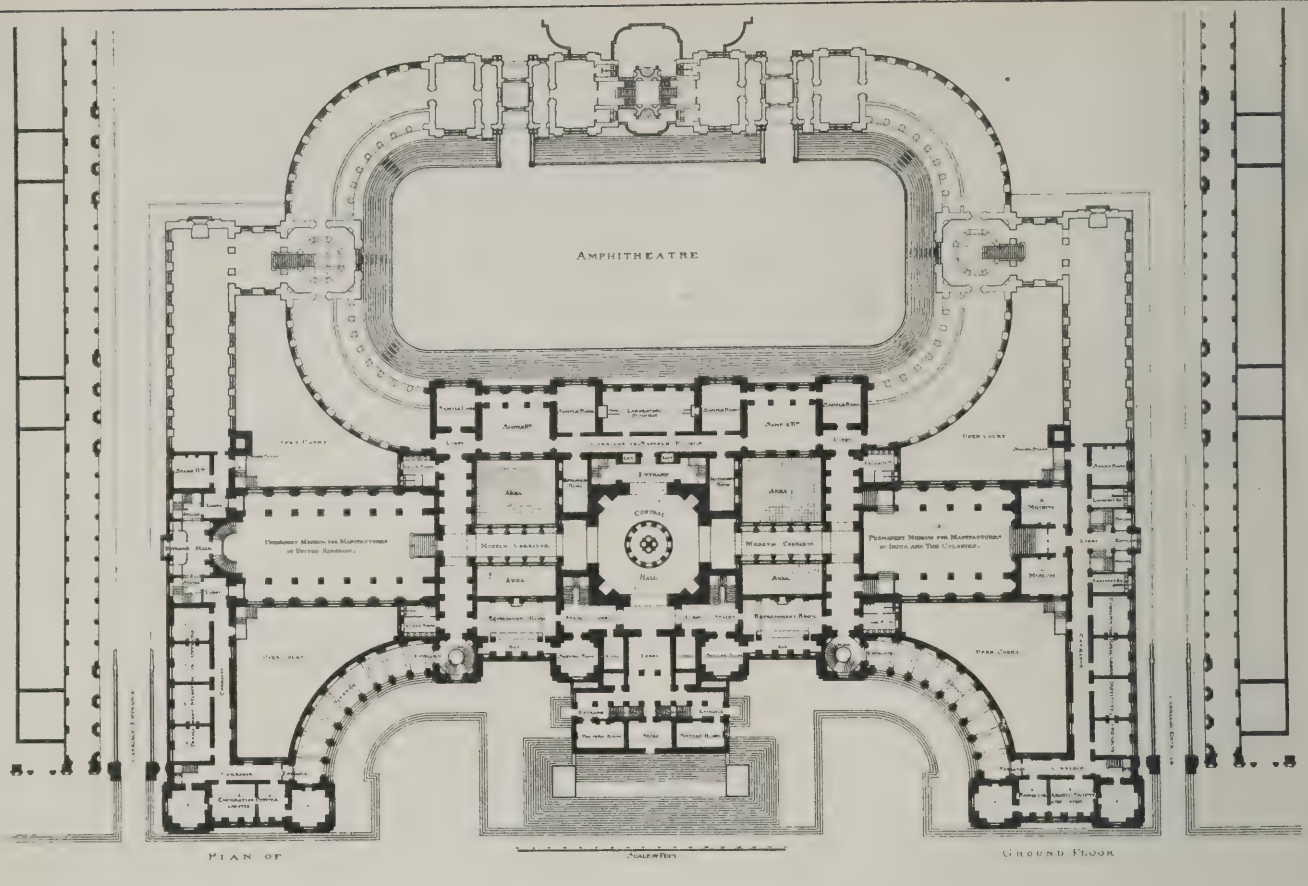
Antiquarian Society of Newcastle-on-Tyne.—The sixth country meeting of this society were held on Saturday afternoon, when Bywell and its vicinity were visited. The party alighting at Stocksfield Station, first examined a round hill on the south of the railway, which has evidently been a stronghold of the Ancient Britons. Some of the earthworks by which it has been fortified still remain. At Bywell the antiquaries went to the church of St. Peter's, where an address was given by the Rev. Anthony Johnson, vicar of Healey, upon the history and characteristics of the two churches of Bywell. It appears that some portions of the north wall and the north pillars of the nave of St. Peter's are Saxon. The rest of the chancel was built about 1160, while the tower was built in the thirteenth century. The tower was intended as a refuge for the inhabitants in times of danger as much as for ecclesiastical purposes. On entering the church Mr. G. C. Hodges lucidly described its peculiarities. The church of St. Andrew was next visited. Its tower is a noble specimen of Saxon work. The rest of the church belongs to the Early English period. The church of late has been restored, and all its ancient features, so far as the interior is concerned, destroyed. Into its exterior walls have been inserted a very considerable number of ancient grave covers. Bywell Castle was afterwards reached, a building now in ruins. It was built by Ralph de Neville between the years 1472 and 1485, but was not completed. Hence probably its present ruined condition.

A visit of the Society of Architects has been arranged to take place to-morrow (Saturday) to St. Cuthbert's Church, Philbeach Gardens, at 2.30 p.m. (nearest station Earl's Court), and to St. Paul's Church, Hammersmith, at 3.30 p.m. The party will be conducted by the architect, Mr. H. R. Gough, F.R.I.B.A., past President of the Society.

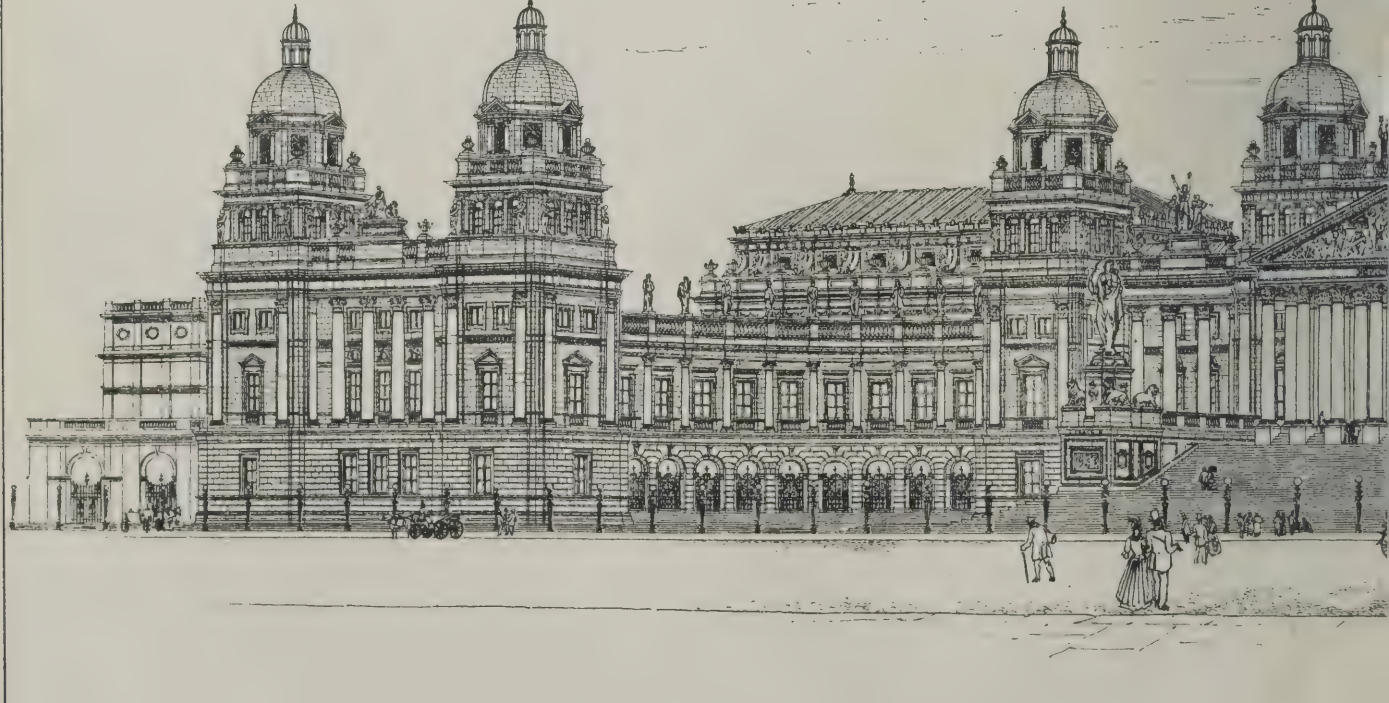
The parish church of St. John the Baptist, East Markham, was reopened last week by the Bishop of Southwell, after restoration from plans by Mr. Scott. £3,000 has been expended on the work, which has been carried out by Mr. Rudd, of Grantham.

Some paintings and decorations have just been executed at St. Luke's Church, Camberwell, from designs by Mr. F. Shields, artist, by Messrs. Cox, Sons, Buckley and Co., of Southampton-street, W.C. These paintings are illustrative of Christian parables and symbols.

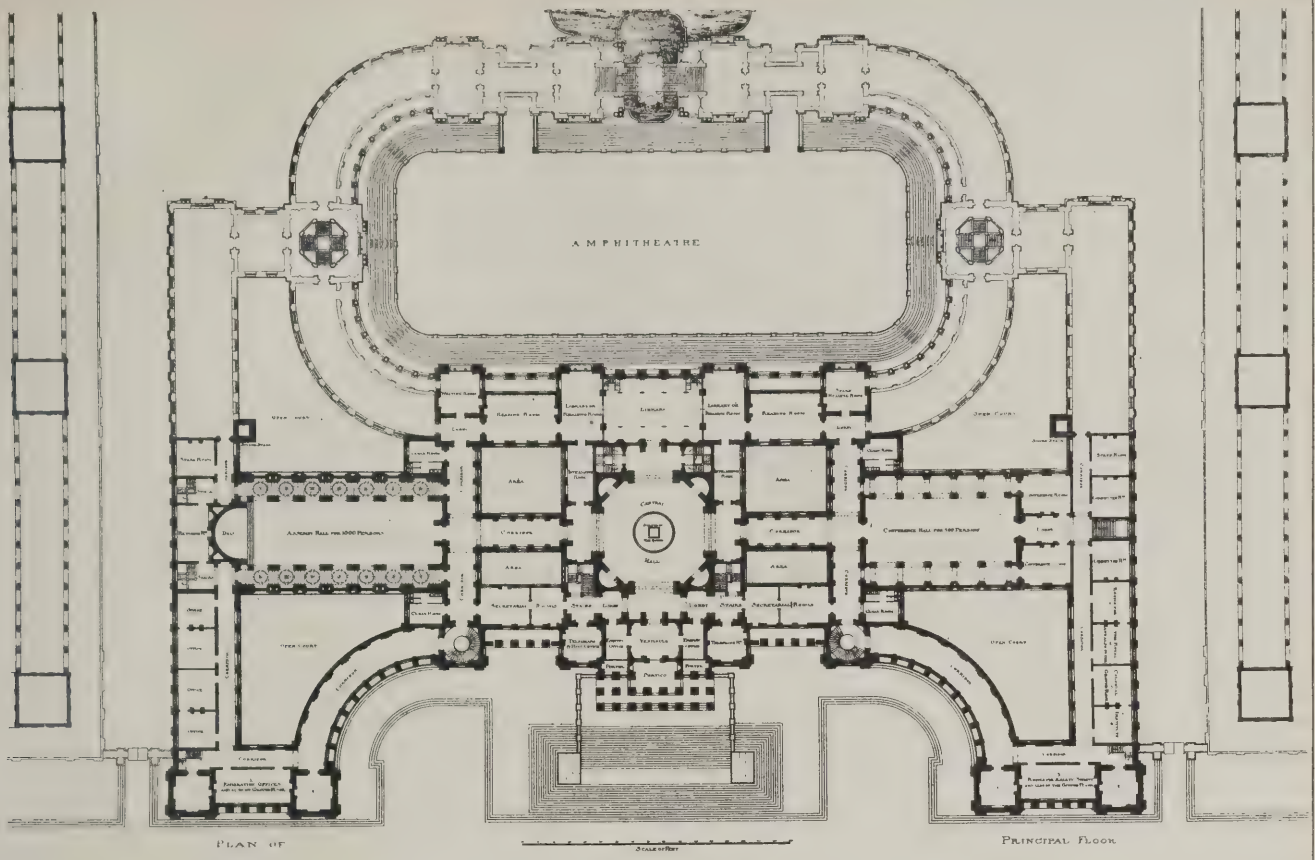
At a meeting on Monday of the Governors of the George Heriot Trust, Edinburgh, Mr. Thomas Hudson Beare, University College, London, was unanimously appointed Professor of Mechanics and Engineering in the Heriot Watt College.



PLAN OF GROUND FLOOR



IMPERIAL INSTITUTE BUILDINGS, SOUTH KEN



PLAN OF PRINCIPAL FLOOR

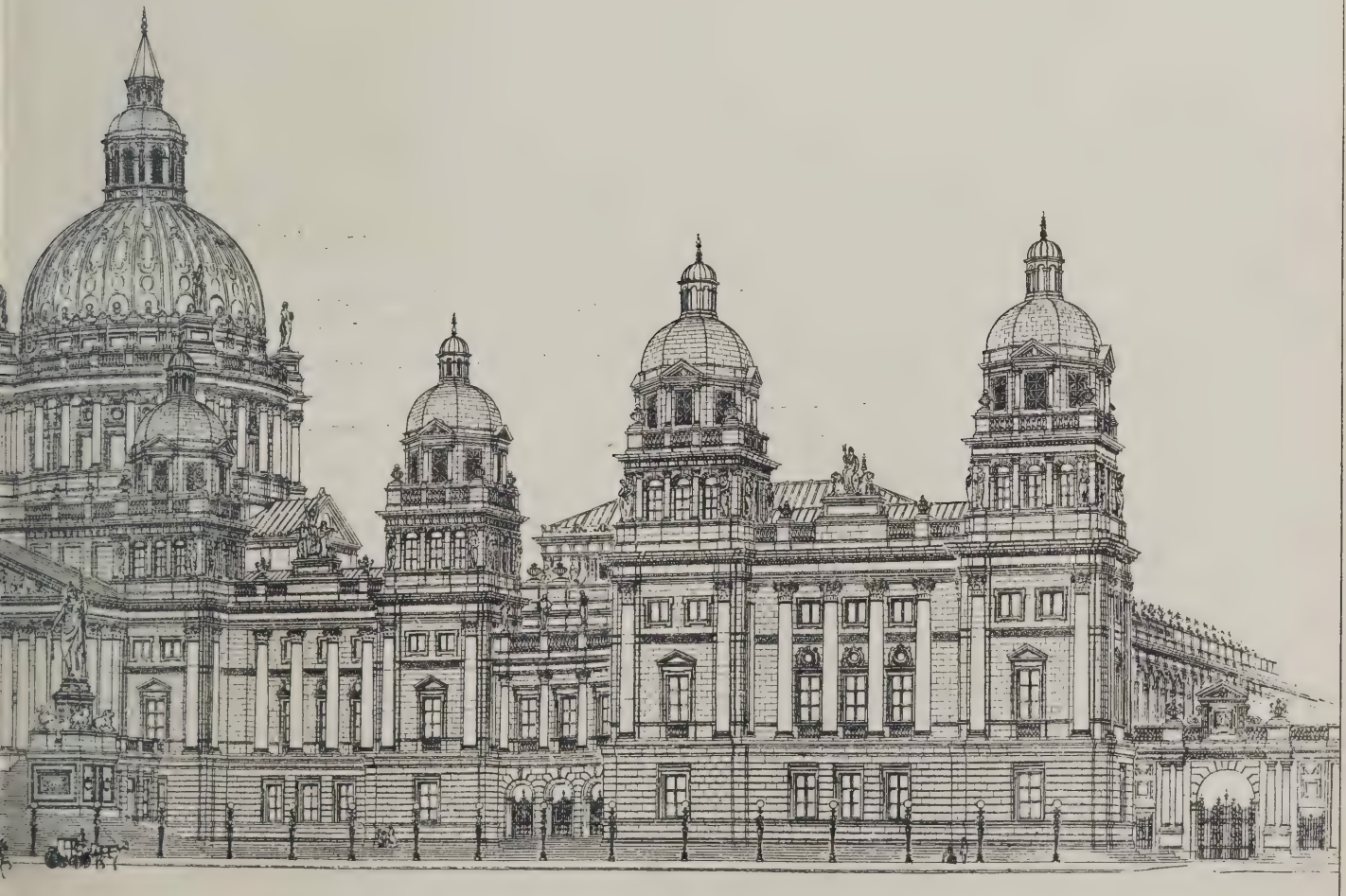
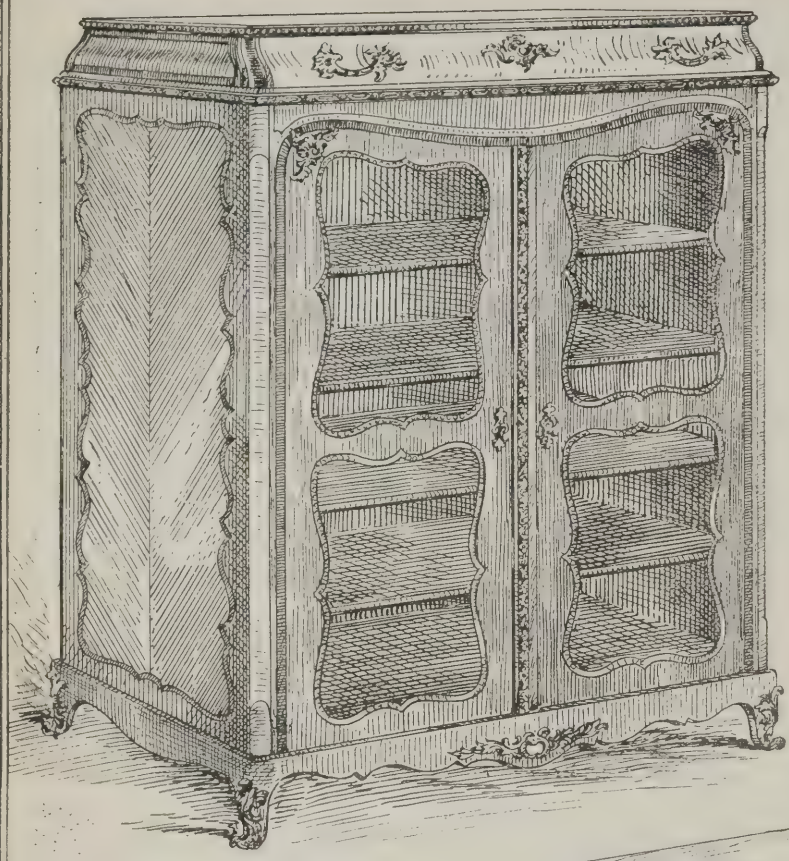


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

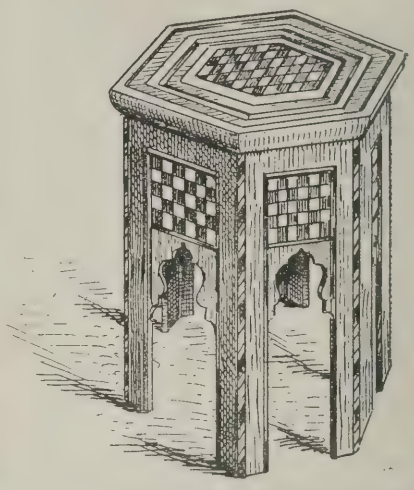
GTON, DESIGN BY MESSRS T. N. DEANE AND SON, ARCHTS

At the Sale Rooms

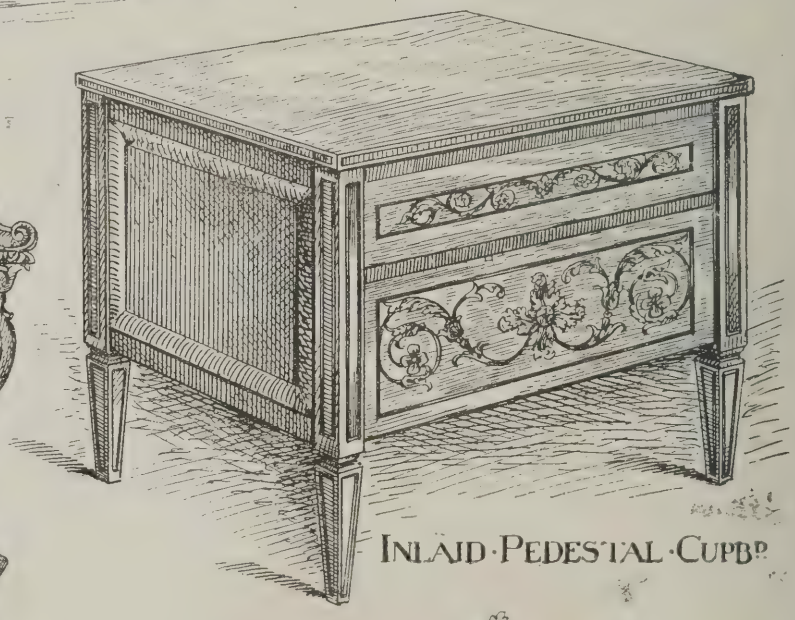
Sketches of Furniture Recently Sold at Messrs Phillipson & Neale



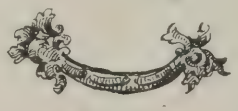
Louis XVI China Cabinet



Moorish Inlaid Stool



Inlaid Pedestal Cupb.d





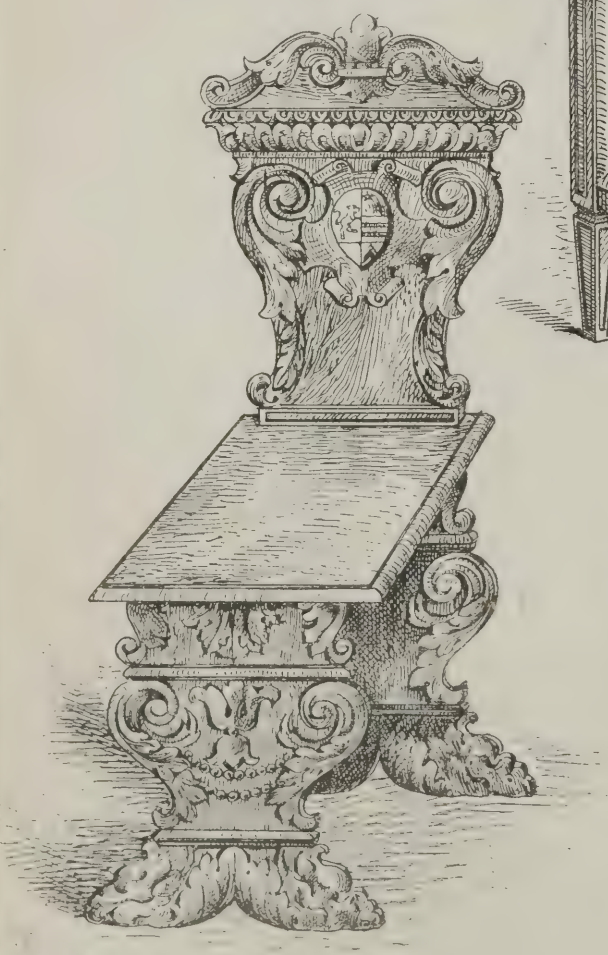


Details of Ormolu Mounts to China Cabinet



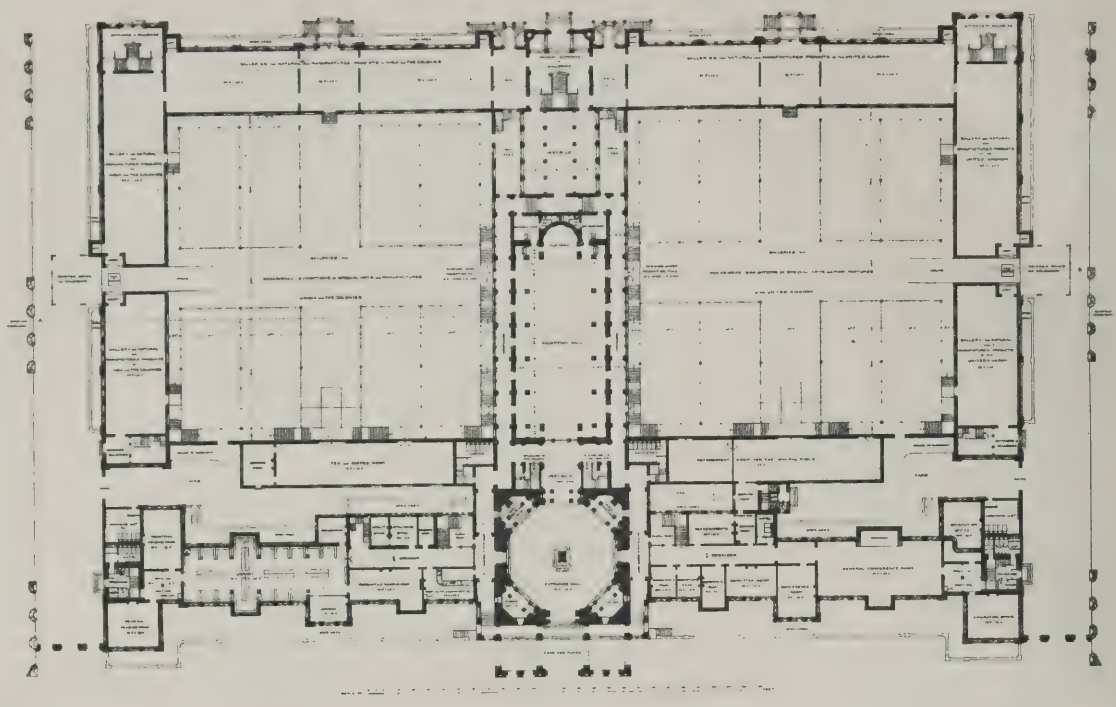






Italian Carved Chair

W. L. Young, del.

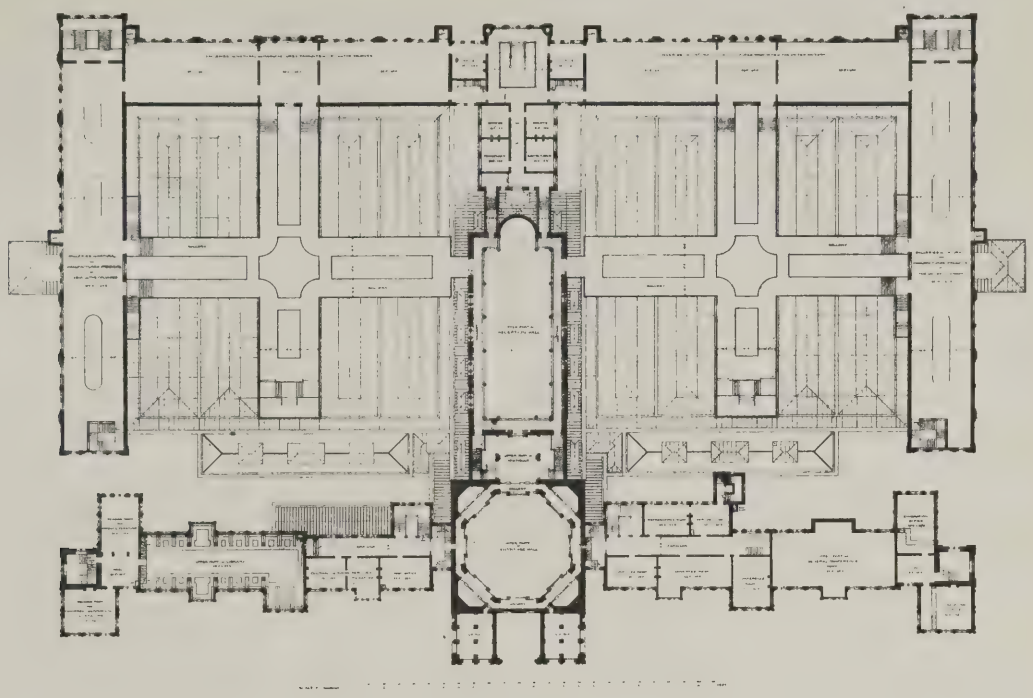


GROUND FLOOR PLAN



SCALE OF

IMPERIAL INSTITUTE BUILDINGS, SOUTH K



FIRST FLOOR PLAN

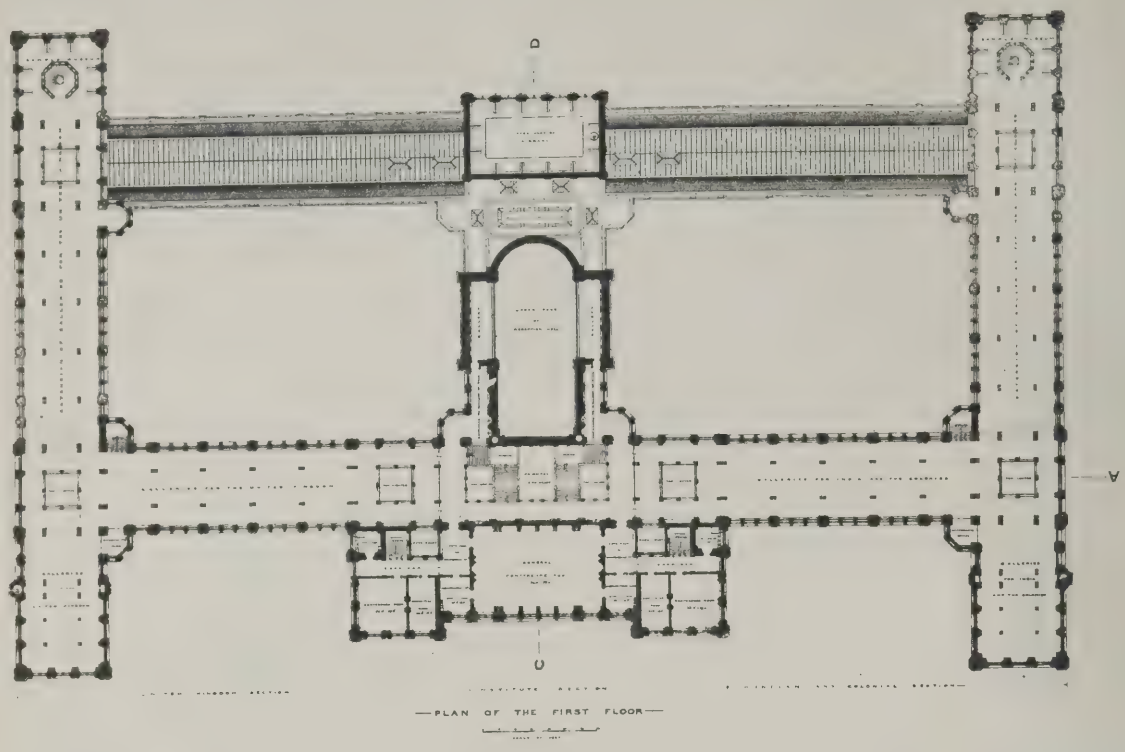


FEET

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SINGTON, DESIGN BY A. W. BLOMFIELD, M.A. ARCHITECT.

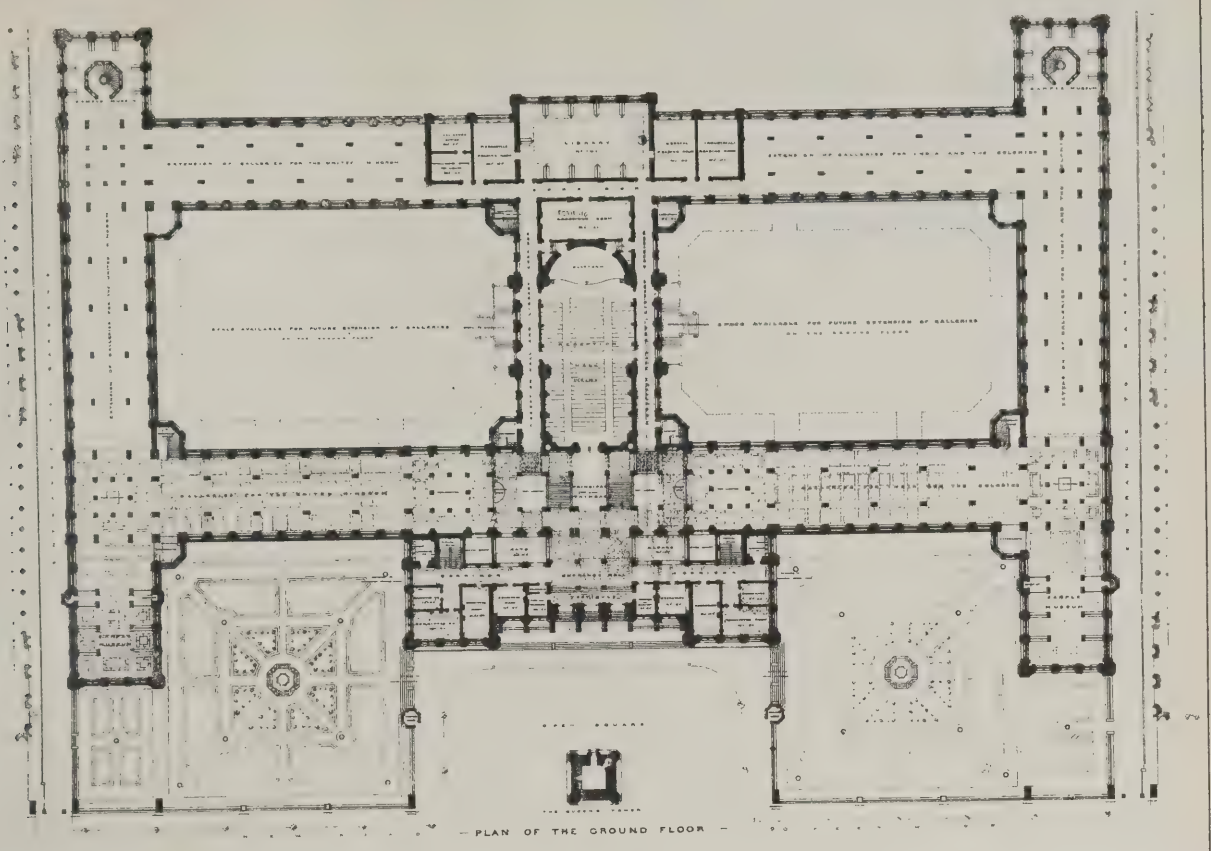

PORTABLE · SHINGLE · HOUSE
AT · THE
AMERICAN · EXHIBITION
WEST · KENSINGTON
DESIGNED · AND · EXECUTED · BY
MESSRS STENT & CO



—PLAN OF THE FIRST FLOOR—



IMPERIAL INSTITUTE BUILDINGS, SOUTH KENSING



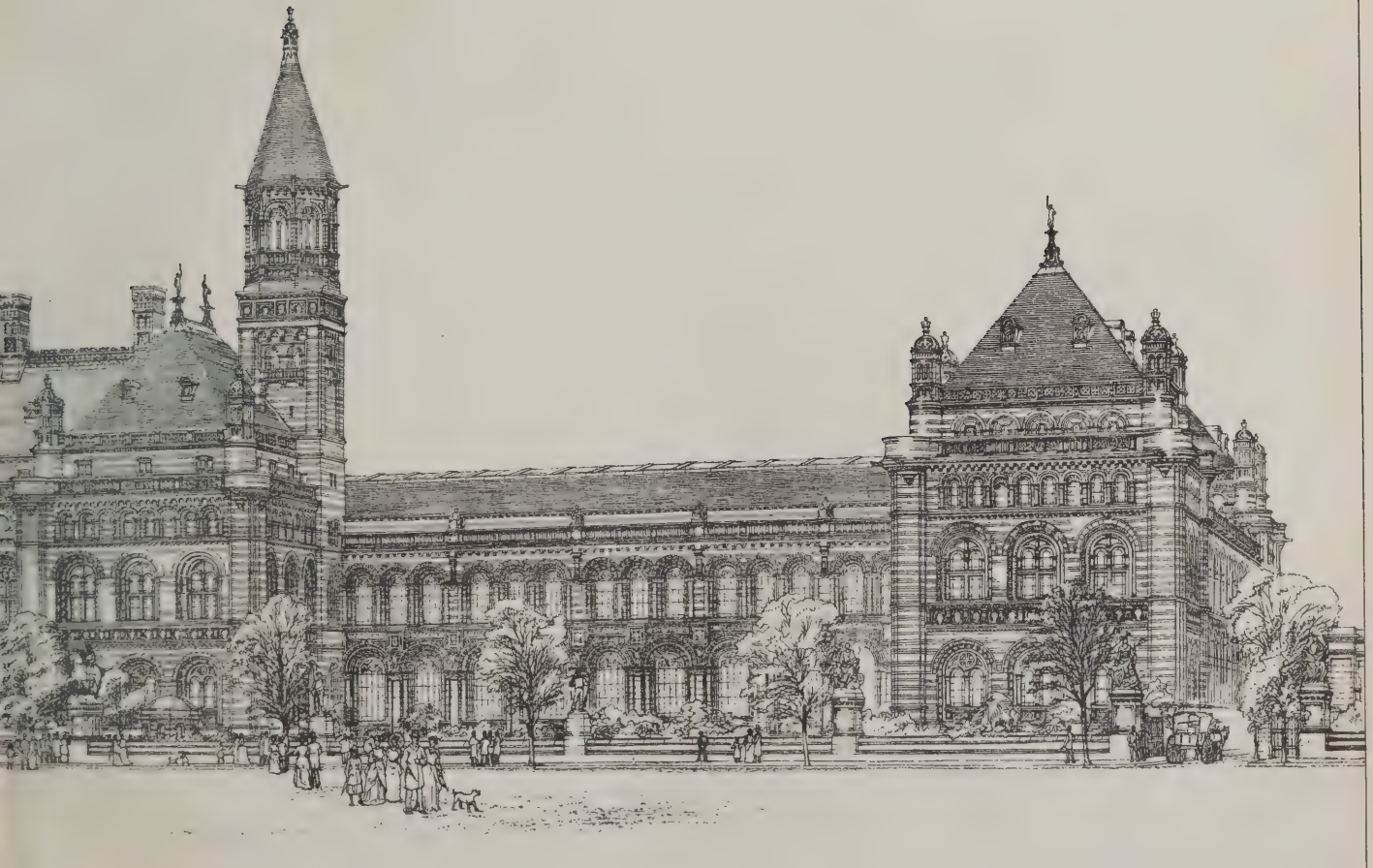
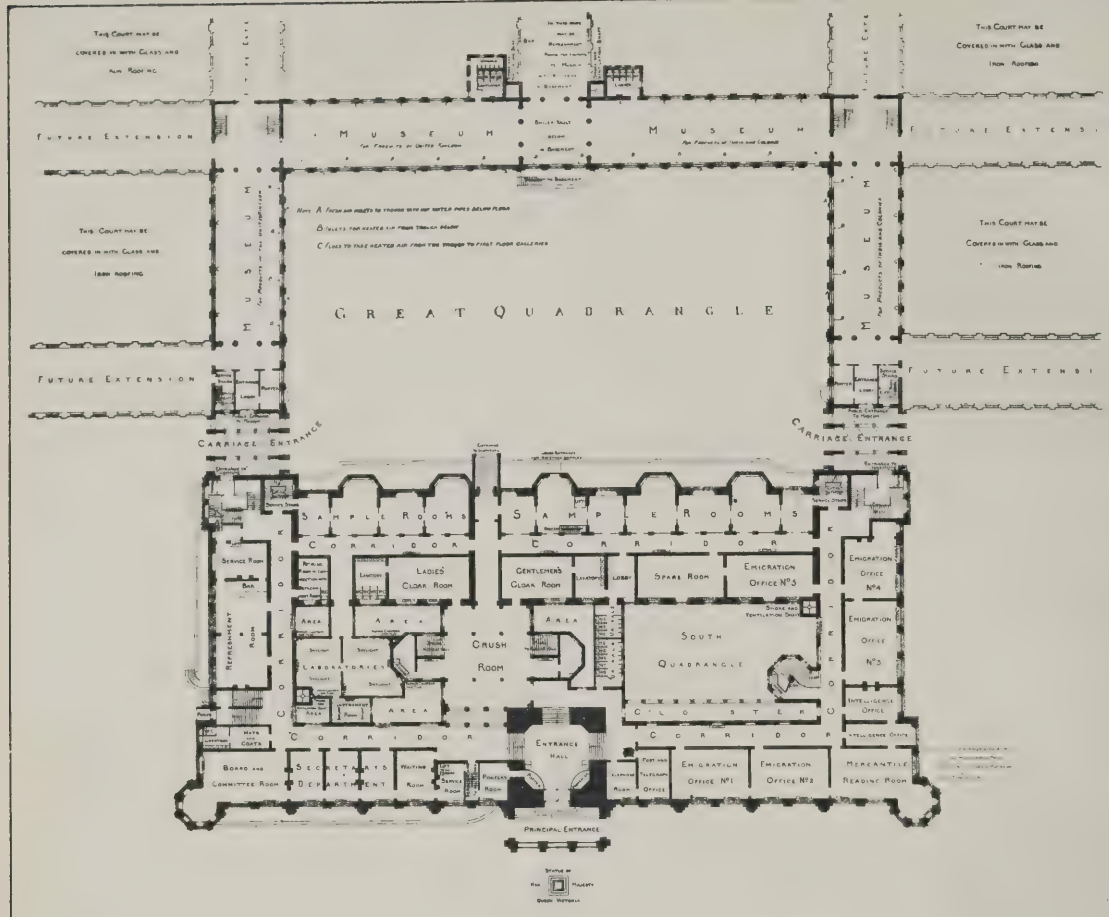


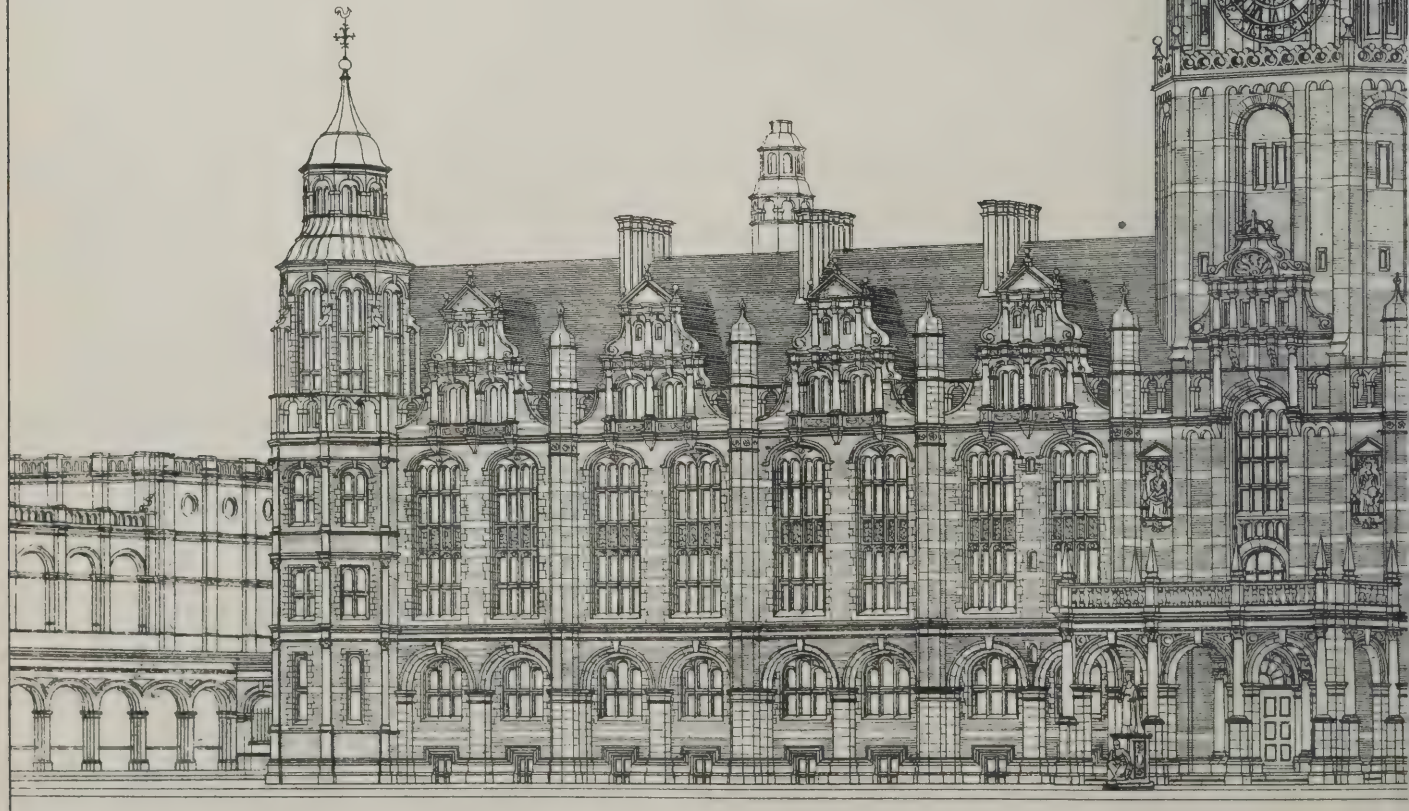
Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C

, DESIGN BY MESSRS. ASTON WEBB & INGRESS BELL ARCHTS.,

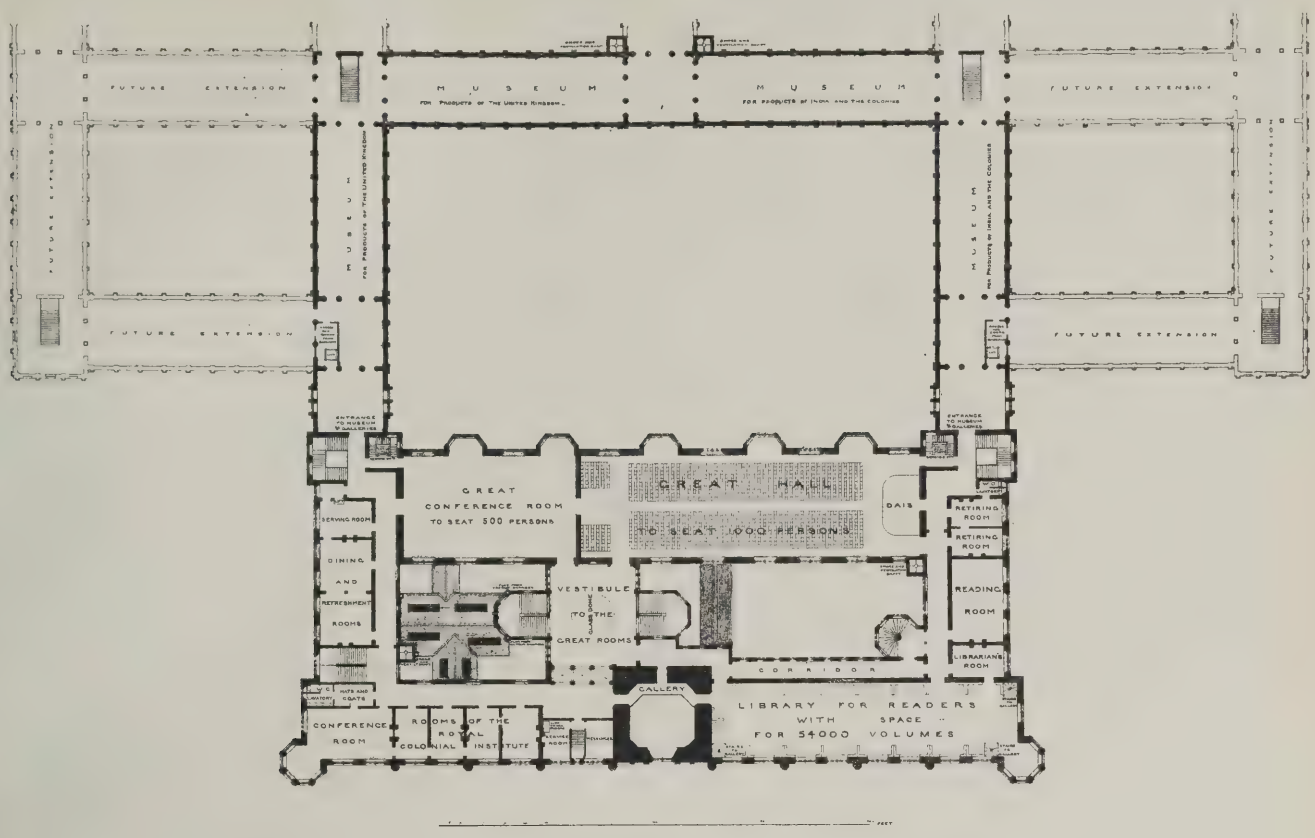


St. Bartholomew
: Lostwithiel :
Cornwall : 14th Cent.





IMPERIAL INSTITUTE BUILDINGS, SOUTH KE



FIRST FLOOR PLAN



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C

INGTON, DESIGN BY T. G. JACKSON, M.A. ARCHITECT.



: S^t: Clements : Ch: Sandwich : Kent :

DUTIES OF A CLERK OF WORKS.*

R. LEANING, whose useful set of "Contract Documents" we lately noticed, has brought out a little book on the "Duties Clerk of Works." The subject is a good , as we are not aware of any book extant n the duties of this important functionary. could only have wished the author had tten a complete guide to those duties, as we sure many would have welcomed it. Mr. ning has here devoted a few pages to remove e of the difficulties in the path of the clerk vorks, and to insure more uniform practice. h this object he has given a form of report progress, which Mr. Alfred Waterhouse, , has furnished, and has supplied under the ds of the trades a few suggestions of value, des indicating the duties of the office. The l clerk of works is not often to be met with. h class of building requires certain qualitions, and the most important material to lealt with is a point to be considered in the ice of one. Thus, for high-class masonry joinery it would be very little use to employ erk of works who had been chiefly engaged rdinary brick buildings; for an iron and s structure one conversant with iron conction is absolutely necessary. Of course, primary duties of the clerk of works are to e himself master of the design of the itect, to read the drawings and specifications aright, to keep account of materials and ur expended, to keep down extras, and to rt progress to the architect weekly or thly. He may be, and often is, required to e working details, and to keep account he time of the men, and of the mals used, so as to furnish to the architect approximate estimates of the work done. Later on he is required to make out a list of items of extras and deductions for the surveyor, a business requiring methodical bookkeeping.

Many hints are given by the author, which will be a guide to the young clerk of works in interpreting specification clauses. Thus, the clause often inserted, "Each trade to attend on all others, and do all jobbing work required," implies that all "trades are to attend generally upon all others, cutting and making good, except to gas-fitter, bell-hanger, and hot-water engineer, as for conservatories. But the clause covers domestic hot-water supply." Referring to "setting out," the author says "the clerk of works should not set out, but should check the setting out after it is done." Under "Carpenter" the advice is given not to depend slavishly upon brands on timber or deals—they are not conclusive, as parcels of timber with a good brand have often the best pieces withdrawn and sold at enhanced prices. Points under each trade likely to be neglected are noted. The author further alludes to the Government clerk of works in the Public Works Office, and the subjects of examination are pointed out. The "special regulations" respecting open competitive examinations for clerk of works in the Office of Her Majesty's Works give the following subjects:—1, Handwriting; 2, orthography; 3, English composition; 4, arithmetic to vulgar and decimal fractions; 5, geometrical drawing; 6, knowledge of materials; 7, designing simple buildings, with specification and estimate, and working drawings of details of carpenters' and masons' work; 8, taking out quantities from plans, measuring and valuing; 9, modern sanitation. Mr. Leaning's book will be found a useful guide, and is small enough to be carried in the pocket.

*he Duties of a Clerk of Works. By J. LEANING. on: B. T. Batsford, High Holborn.

VENTNOR NEW PIER.

IN the year 1870 a private pier company erected a pier at Ventnor, to which, in 1880, they added a landing stage. Soon after, in a gale, this stage was demolished, and the pier head and nearly half of the structure were carried away. The wrecked pier remained till 1884, when the Ventnor Local Board obtained an Act of Parliament which enabled them to purchase the old pier at a cost of £3,500. They bought the old pier, and have since carried out a new promenade and landing-place. Mr. Henry E. Wallace was the engineer selected by the Board in competition, and he appointed Mr. Theodore Saunders, Ventnor, as resident engineer. The contract was obtained by Messrs. Trehearne and Co., of Battersea, and Mr. Grace, of Southampton, has acted as foreman of the works. The head of the pier is shoe-shaped, measuring 100ft. by 80ft. A glass wind-screen is fitted at the head, and a band-stand of cast-iron is erected within this screen. There is a landing-stage entirely disconnected from the pier. The stage consists of two levels, one for high-water the other for low, and is constructed upon green-heart piles 14in. square, and braced in wrought iron. The head is raised 18in. above the trunk of the pier, and is reached by three steps. The width of the body of the pier, measuring between the backs of the seats, is 25ft. It is built throughout on cast-iron piles, braced with wrought iron. There are wrought-iron gates at the entrance. Inside are the turnstiles, tollhouse, cloak-rooms, and lavatories. Tesselated pavement is laid just within the gates, and extends to the commencement of the flooring of the pier. The whole structure measures, from end to end, about 650ft. The cost of the pier has been nearly £12,000.

CONTENTS.

Building Legislation ... 77
Our Water Supplies ... 77
The Profession of a Clerk of Works ... 78
Sewer Ventilation and other Appliances ... 80
An Altar in Golds and Colours ... 80
Our Competitors' Column ... 80
Wayside Notes ... 82
Admissions to Architectural School ... 82
Correspondence ... 83
Competitions ... 86
Architectural and Archæological Societies ... 86
Duties of a Clerk of Works ... 113
Ventnor New Pier ... 113
Our Lithographic Illustrations ... 115
Church of St. Bartholomew, Lostwithiel, Cornwall ... 115
Church of St. Clement, Sandwich, Kent ... 115
At the Sale Rooms ... 115
Shingle House at the American Exhibition ... 115
Building Intelligence ... 116
Engineering Notes ... 117
Intercommunication ... 117
Parliamentary Notes ... 118
Statues, Memorials, &c. ... 118
Stained Glass ... 118
Legal Intelligence ... 118
Water Supply and Sanitary Matters ... 118
Our Office Table ... 119
Meetings for the Ensuing Week ... 119
Trade News ... 119
Tenders ... 120

ILLUSTRATIONS.

PROPOSED DESIGNS FOR THE IMPERIAL INSTITUTE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE IMPERIAL INSTITUTE.

THE authors themselves probably need no explanation of the week's delay we ventured to make in the reproduction of their designs. To the rest of our readers we may say it was thought better to reproduce them properly, and as the photographs had to be taken at South Kensington, a little more time was desirable. In another number we shall complete the series by some additional illustrations of one or more of the designs.

THE CHURCH OF ST. BARTHOLOMEW, LOSTWITHIEL, CORNWALL.

OF the Mediæval architecture of Cornwall comparatively little is known; the chief interest of this county being centred in its numerous cromlechs, inscribed stones, and other primeval remains.

The greater number of Cornish churches belong to the Perpendicular period, and it is very remarkable the resemblance one church bears to another in the designs of this time. There are very few remains of Norman work, but of the 13th and 14th centuries several good examples exist, and the one especially worthy of study in the earlier period is that of St. Bartholomew, Lostwithiel, presenting a specimen of design worthy of the highest and most successful periods of English architecture, and, with the exception of some little additions in the 16th century, the fabric may now be said to be intact as originally erected in the early part of the Decorated period.

The church consists of a chancel, nave and aisles, south porch, and tower at west end, with its beautiful spire,* unique of its kind, I believe, in England. Each side of the octagonal belfry is pierced by two pointed leaded lights with a quatrefoil in the head, divided by a sort of shaft mullion, circular in plan, and divided in the middle by a transverse consisting of a double row of quatrefoils of bar tracery; each side being surmounted by a gablet of plain but telling character. The same design appears on each face, except that on the north-east side, where the transome is formed by a circle divided into six trefoiled divisions, with a quatrefoil in centre. A bold effect is gained by the introduction of a three-quarter round moulding at the angles of belfry and terminated at the top with a head of grotesque character. Immediately below the sills of the windows the diagonal sides of the octagon converge and form the square of the tower, which is divided into two stages, marked on the outside by a set-off in the walls; the tower story is supported by buttresses of massive proportions.

Lostwithiel is situate about six miles south of Bodmin, and is of very early date—indeed, it is said to have been a Roman station, though no traces of that period have, I believe, been found. According to tradition, Lostwithiel was so called as having been the residence of Withiel, anciently Earl of Cornwall, who had a palace at Penknight, a part of this borough. In the reign of Richard I. the town was held under the Earl of Cornwall by Robert de Cardinham, who procured for it the privilege of a market, and Richard, Earl of Cornwall, brother of Henry III., made Lostwithiel a free borough. Dugdale asserts that the parish church was profaned by the Parliamentarian soldiers, and injured by an explosion of gunpowder in 1644.

H. P. BURKE DOWNING.

* This spire was illustrated from a drawing by Mr. W. H. Lethoby in the BUILDING NEWS for Oct. 24, 1876.

CHURCH OF ST. CLEMENT, SANDWICH, KENT.

THE church of St. Clement, Sandwich (from Latin Sabulovium, or Sandy Town), is one of the most interesting of the Kentish churches. It is both large and handsome, consisting of a nave and chancel, each with side aisles, and a very fine Early Norman tower, rising from between the nave and chancel.

This is an uncommonly beautiful specimen of enriched work of the period. The piers supporting it are composed of clustered columns, with carved Norman capitals, connected by four lofty semi-circular arches with good mouldings, opening into the interior, and above which is a band or small arcade of semi-circular arches with single and double columns alternately treated in much the same way as in the exterior.

The church contains good examples of work of each style from the 11th to the 15th centuries, though the greater portion is of the latter, or Perpendicular, period.

The building was a few years ago in a very dilapidated condition, but has since been most carefully and successfully restored by Mr. Joseph Clarke, F.S.A., and as an example of good Norman work it should certainly not be missed by architectural visitors to this part of the county.

H. P. B. D.

These two sketches were submitted by Mr. H. P. Burke Downing for the Architectural Association Travelling Studentship of this year, and awarded the second prize.

AT THE SALE-ROOMS.

OUR illustration this week is of some furniture that was recently sold at Messrs. Phillip, Son, and Neale. The China Cabinet was of tulip-wood, mounted with ormolu. The front was made up of four panels, having a drawer over, and was inlaid with ebony, satinwood, and various other woods. The little Moorish Stool was a characteristic piece of that work which is celebrated for beautiful inlays of mother-of-pearl, ebony, &c. It was hexagonal, each leg being inlaid at the angle, and having little Moresque arches in each side of the hexagon. The inlaid pedestal Cupboard calls for no special remark. The Italian carved Chair was a good example. We also give a few details of the Ormolu mounting to the China Cabinet.

SHINGLE HOUSE AT THE AMERICAN EXHIBITION.

WE illustrate this week a full-size Shingle House, of two stories, with a verandah all round, and a piazza leading from the upper floor. The house is very picturesque, and of pleasing design. In America great numbers of these houses are in vogue, where at the principal watering-places and summer resorts whole colonies of them are constantly being erected. No two designs being alike, the monotony usually observed in places of a similar description in this and other countries is entirely avoided. Individual tastes may be readily satisfied, both as to internal and external details, with the greatest ease. They are adapted for any climate, and the mode of construction renders them warmer in winter and cooler in summer than ordinary brick houses. (We may remark, in passing, that this has been well exemplified in the house in question during the hot summer we are now experiencing.) The buildings are prepared and fitted together in Canada and America, and as only the best Canadian white pine is used, this may be regarded as a guarantee of their longevity. Climatic influences have little or no effect whatever; indeed, they are improved externally in appearance by weathering. The house illustrated has been designed and erected by Messrs. Stent and Co., of New York, and 18, Parliament-street, at the American Exhibition, Earl's-court, and we believe that Company have already secured important orders for these houses, and are in a position to execute contracts on the shortest notice. We shall welcome the erection of many such houses at the seaside for instance, and in country districts where the dull, unending, staring white plaster and stucco do much to ruin the natural beauty of the scene.

CHIPS.

Mr. Comenius Davies, who for many years was deputy city engineer for Liverpool, died on Saturday at his residence, Kinglake-street, Edgehill, near that city. Mr. Davies retired from active service some time ago, but continued to give the Health Committee of the Corporation the benefit of his ability and extensive experience. He was especially noted for his intimate acquaintance with the great drainage system of Liverpool. Mr. Davies had reached the 77th year of his age.

The Sheffield corporation have adopted a recommendation by the Sewerage and Rivers Committee that the Corporate Common Seal be affixed to the appointment of Mr. C. J. Innocent, architect and surveyor, as single arbitrator to settle the amount of compensation to be paid to David Ward "for the loss and damage alleged to have been sustained by him in respect of his property at Walkley Bank by reason of the construction of works of sewerage."

The east window of Upper Arley parish church has been filled with stained glass as a memorial. The window is of five lights, representing in the upper portion various scenes connected with our Lord's Passion and Crucifixion; and in the lower part the five prophets who foretold the same are depicted—Hosea, Isaiah, David, Ezekiel, and Zechariah. The window is from the studio of Mr. Kemp, and completes the restoration of the church, carried out last year, under Mr. Lewis Shepherd, of Sansome-walk, Worcester.

A memorial tomb has been erected in Eling burial ground, Hants, over the grave of Sir Henry C. Paulet, Bart., by whom the ground was presented to the parish. Messrs. Garret and Haysom of Southampton, executed the work.

The Braid United Presbyterian church at South Morningside, Edinburgh, was opened on Sunday. Mr. G. Washington Browne, of Edinburgh, was the architect of the church, which has cost £5,000.

The city council of Canterbury have received 124 applications for the office of city surveyor. The Roads and Survey Committee have gone through the testimonials, and selected about 40 from the number. These were further considered on Friday afternoon, and the following selected to appear before the town council:—Messrs. Alfred Dryland, Deal; J. C. Webster, Malton; Henry Richards, Kingston; J. Haigh, Abergavenny; Charles Lawgreen, Nuneaton; W. H. R. Crabtree, Rotherham; Charles Brownridge, Leeds; H. C. Crummack, York; George W. Lund, Blackburn; J. A. Angell, Stratford; E. L. Elgar, Broadstairs; and Philip Murch, Portsmouth.

At a special meeting of the proprietors of the Sheffield Waterworks, held on Monday, the terms of agreement recommended by the directors for the sale of the undertaking to the corporation were unanimously confirmed. The terms are equivalent to a purchase price of rather over £2,000,000. The Corporation Bill seeking the power of purchase is now before Parliament, and is expected to pass as an unopposed measure.

New head offices have just been erected for the Rock Freehold Land Society (Limited) at 112, Westminster Bridge-road, facing Kennington-road. The building is Renaissance in character, four stories in height, finished above with open balustrade, and is faced with Portland stone. The offices have been erected from plans by and under the personal superintendence of Mr. Charles Blinco, the society's surveyor.

A series of lectures on "Style and Styles in Building" is to be delivered on the 19th, 22nd, 26th, and 29th of July, at 8.15 p.m., at the Guilds Central Institute, Exhibition-road, S.W., by Mr. Lawrence Harvey. The fee for the course is 5s.

The York Race Committee are expending £1,200 in adding another story to the Subscription Stand at Knavesmire. This, when completed, will double the accommodation hitherto provided, the lower portion remaining the same. Mr. Fisher, of York, is the architect, and the work is being done by local firms.

Building Intelligence.

BEDFORD.—The parish church of St. John the Baptist has been reopened by the Bishop of Ely, on completion of the restoration, consequent upon its injury by fire on the 28th July, 1886. The conflagration having totally destroyed the chancel and organ-chamber roofs, also the roof of the choir, together with the fittings, windows, and seats, new roofs have been put on. Upon examining the old roof over the nave, it was found that what were supposed to be oak tie-beams were simply lath and plaster bracketed out and painted to imitate oak. The new chancel roof is open timbered of the hammer beam type, framed and trussed with circular ribs and braces, springing from carved corbels of Bath stone. The roof over the choir is of the trussed rafter type. The roof over the nave has trussed principals, and is of pitch-pine. One of the most interesting features of the restoration is the re-instatement of a continuous stringcourse in nave and chancel found beneath the plaster. The choir and nave have been refitted with pitch-pine open benches on wood flooring. All the windows have been reglazed with cathedral tinted glass in quarry shapes with margins of ruby and maze. The reredos has been painted by Mr. Leach, of Cambridge. The whole of the work has been executed by Mr. S. Foster, of Kempston. The works have been carried out from the designs and plans of Mr. John Day, M.S.A., of 12, Victoria-terrace, Bedford, diocesan surveyer. The cost of restoration was about £1,700.

BOOTHEN, STAFFS.—The corner-stone of the mission church of All Saints', Boothen, near Stoke-on-Trent, was laid last week. The building, when completed, will consist of a nave, with north and south aisles, chancel, with north chapel, organ chamber, and vestry, and two porches, north and south, at the western end of the aisles. There will also be a small baptistery at the west end, and a bell-cot over the western bay nave. The walls will be built of grit stone from Wall Grange, the external weatherings being of the same stone, and the dressings of Beggerswell stone. The style of architecture is Late Perpendicular, and the seating accommodation will be for 600. Messrs. Lynan and Rickman, Stoke-on-Trent, are the architects, and the contractors for the whole work are Messrs. Yoxall and Heath, of Stoke-on-Trent, whose contract amounts to £3,300.

HULL.—The buildings of the Hull and Sculcoates Dispensary in Baker-street were opened on Wednesday week. The premises include the dispensary and a residence for the house surgeon, which are entirely distinct. The dispensary contains a waiting-hall, 25ft. by 23ft., paved with wood-block flooring, and with a dado of glazed bricks around the walls, which accommodates 90 patients. A bust of the late Mr. W. T. Dibb, executed in Carrara marble by Mr. W. Day Keyworth, jun., stands in a niche in the wall of this hall, and was unveiled at the opening ceremony. At the back of the waiting-hall is the house-surgeon's consulting-room, having separate doors for the entrance and exit of patients. Adjoining is the dispenser's room and drug store. The board-room is placed to the right. The surgeon's residence includes dining-room, kitchen, and offices on the ground floor; drawing-room, two bedrooms, and bath-room on the first floor, and two bedrooms on the second floor. The design is of Flemish Renaissance character, executed in red brick, with Ancaster stone dressings, and with the roofs covered with red Broseley tiles. Messrs. Botterill, Son, and Bilson, of Hull, are the architects of the building, their design having been selected in a limited competition. The works have been carried out by Mr. Frederick Blackburn.

MANCHESTER CATHEDRAL. — The chapel erected at the cost of Mrs. Fraser, as a memorial to Bishop Fraser, was consecrated, and the Diocesan memorial cenotaph and effigy of the late prelate, was unveiled on Friday. The chapel and tombs were designed by Mr. J. S. Crowther, the Cathedral architect, and the recumbent figure is by Mr. James Forsyth, of Finchley New-road, London, whose model of the work is now on view at the Royal Academy. The chapel is situated at the extreme east end of the south chancel aisle, and is 13ft. square. The roof is of English oak, laid out in small panels, with mouldings. The spandrels of the beams and wall posts are sunk and filled in with tracery. Outside the chapel are two corbels at the spring of the window, on which are carved likenesses of Queen Victoria and Bishop Fraser. These have been carved by Mr. Ralph Wales, a local sculptor in the employ of Messrs. Earp, Son, and Hobbs. Mr. Crowther has followed the original Perpendicular style of the church. The contract has been carried out by Messrs. Stores and Sons, of Stalybridge, under the superintendence of the clerk of the works of the present Cathedral restoration, Mr. John Jenkinson. The floor pavement is formed of ceramic mosaic tiles. In the centre of the chapel stands the cenotaph or altar tomb; it has been designed by Mr. Crowther in accordance with the Perpendicular character of the chapel, and executed by Messrs. Earp, Son, and Hobbs. The plinth is composed of polished Scotch granite, and the niches, pedestals, canopies, buttresses, and pinnacles are all of highly-polished alabaster. On the north and south sides, in the niches, are introduced statuettes, in white statuary marble, of the Twelve Apostles, with shields in the centre on which are carved the bishop's coat-of-arms empaled with the arms of the diocese of Manchester. At the east end is a representation of Our Lord as the "Light of the World," and at the west as the "Good Shepherd," with adoring angels on both sides. In the frieze of the cornice is an inscription. On the tomb is Mr. Forsyth's recumbent effigy of the bishop, executed in white marble. The figure is life-size, and is draped in the modern robes of an Anglican bishop. The left arm is disposed at length by the side, resting upon a pastoral staff, while the right hand rests upon the breast, clasping a prayer-book. Angels in a kneeling attitude are placed at the four corners, all differing in action and expression. During the past week Mrs. Fraser has caused to be placed on the west wall of the chapel a brass with an elaborate border, on which is an inscription from the pen of the Very Rev. Dean Vaughan.

SOUTHAMPTON.—The trustees of Thorner's Almhouses for aged women have ordered the erection of an additional block to the houses in Polygon-road, Southampton, the brickwork of which is now nearly completed. Built on the west side of the older block, it resembles it in character and in the white bricks with red stringcourses of which it is composed; but there are several architectural improvements, and one of a structural character which will doubtless prove of substantial advantage—viz., the substitution of wings in the rear for the kitchen accommodation in the basement of the older buildings. The new block will afford on its two floors sets of three rooms each—sitting-room, bedroom, and kitchen—to eight additional inmates. It is 66ft. in length by 28ft. depth, the wings at the back each measuring 20ft. by 16ft. There are corbelled pent-roofed porches to the two front entrances, and red brick gauged arches over the windows, with a brick moulded eaves cornice and close-boarded and slated roof. The architects are Messrs. E. I'Anson and Son, 7a, Laurence Pountney Hill, London, and the builder Mr. Udall, of Carlton-place, Southampton. It is intended to build another block somewhat to the rear of and between these two, and connect the three so as to form three sides of a square.

SPARKWELL.—A memorial pulpit has been erected in Sparkwell Church, Plympton, S. Devon, of which the Rev. Pender H. Cudlip is the vicar. It was designed by the Rev. E. Geldart, of Little Braxted, Witham, Essex. The base is of freestone and the superstructure in English oak, with traceried and carved panels and cornices. The central panel contains a sculptured figure of St. John the Baptist in high relief, standing on a carved corbel, and a riband over the figure bearing the words, "bring forth fruits of penance" carved thereon. A "brass" inserted in one of the panels bears the inscription in Old English text. The whole of the work has been executed by Messrs. Luscombe and Son, sculptors and art workers, of Exeter.

VENTNOR.—At the Royal National Hospital for Consumption at Ventnor a new block of buildings for the reception of patients, erected under the provisions of the will of the late Mr. John Jones, of Piccadilly, has been built, and will shortly be opened. Everywhere the lofty, airy corridors and bedrooms are receiving additions of comfort, combined with cheerfulness, and the provision of every detail necessary to the recovery or improvement of the patients. The hospital is constructed on the cottage principle, and occupies an extensive piece of land in the Undercliff, and overlooking large garden ground. To the new dining hall accommodation will now be provided for 140 patients. The new block is larger than any of its predecessors. The whole of the patients can be accommodated. The tables used for dining purposes are so constructed that they may be placed together and used as a platform for entertainments. At each end are sitting-rooms, and on the left of the entrance hall are apartments for the head nurse and the dispensing, and on the right are consulting and waiting rooms. Upstairs are bedrooms for 20 patients, each to have a separate apartment, and all facing the south. A verandah runs outside the bedrooms. Lifts communicate with the kitchen, which was illustrated in the BUILDING NEWS for March 18th of present year; there are bath-rooms and lavatories, and a room heated by steam, where blankets and sheets are kept free from damp. A heavy lift also passes through each of the four stories of which the building is composed. There is a separate staircase for the servants. On the top story is a kitchen; it has white glazed bricks. The floor is tiled, and the cooking is to be done by a kitchener, with tiers of ovens built in at the side, all heated by one small fire chamber. The scullery and larder, adjoining the kitchen on the same floor, are also built with white glazed bricks. The sitting-rooms and bedroom each have a box of steam pipes. In the coldest weather the air passes through these pipes into the room at a temperature of 62 deg. By means of a fan, worked by an engine in the basement, the vitiated air in each of the rooms is drawn through a grating near the ceiling, and by this means an atmosphere as pure as possible is maintained. The architect of the new block is Mr. Hellyer, of Ryde, and the builders are Messrs. Ingram and Son, Ventnor. The cooking arrangements are by Messrs. F. Edwards and Son, 54, Great Marlborough-street, London, and were recently illustrated in this journal. The sewerage arrangements for the set of buildings are distinct from other systems in the neighbourhood. The drainage discharges into one channel carried under the rocks 200 yards right out to sea.

WARRINGTON.—The foundation-stone of a new chapel to be erected in close proximity to and for the joint use of the Training College and Clergy Daughters' School, off Manchester-road, was laid by the Dean of Chester on Friday. The contract has been let to Messrs. Gibson and Sons, of Church-street, Warrington, and the work is being carried out from designs and under the superintendence of Mr. James Adams, Sankey-street, in the same town. The building will comprise nave, chancel, with apse, and entrance porch, the communication with the colleges being by a covered cloister. Architecturally, the building will be Early English in style, and the materials used will be red brick and Rainhill stone dressings. Internally the walls will be faced with buff bricks with red arches and panels, open-timbered roof and seats and stalls of pitch-pine. The stonework will be executed by Mr. Gittens, of Warrington, and the stained glass will be supplied by Messrs. Williams and Son, of Chester. The chapel will be heated by hot air by Messrs. Newton, Chambers, and Co., of Sheffield. The pews, pulpit, and clergy stalls will be made by the contractors from designs especially prepared by the architect. The cost will be £1,400, and 200 seats will be provided.

The Queen formally laid last (Thursday) evening the foundation-stone of the equestrian statue of the Prince Consort, which is to be erected in Windsor Great Park as the women's Jubilee offering to Her Majesty. A red-brick pedestal has been built to carry the foundation-stone. The mason's mallet used by the Queen belongs to Mr. Hollis, the contractor. With it George IV. laid the first stone of the gateway between the York and Lancaster Towers at Windsor Castle on August 12, 1824, and it has since been used for other ceremonials by the Crown Princess of Germany and by Prince Christian. The statue will be a replica in bronze of the one by Marochetti at Glasgow.

Engineering Notes.

THE FORTH BRIDGE.—The granite piers on the south side of the Firth, which support the approach girders, were raised on Friday to the full height of 150ft. The work on other portions of the bridge is progressing rapidly. On the island of Inchgarvie the vertical tubes have now reached a height of over 200ft., while the cantilever tubes both on the north and south sides of the Firth have been carried out a distance of about 100ft., and are in the mean time supported by temporary struts attached to the vertical tubes at a height of about 150ft. The approach girders on the north side, which were completed some time ago, are being finished off on the land side by the construction of three stone arches, which are also nearly completed.

MODERN HARBOUR CONSTRUCTION. — A paper on this subject was read at Edinburgh on Monday night before the Royal Scottish Society of Arts, by Mr. Alan Brebner, C.E. Referring to breakwaters of masonry, the lecturer said that their construction in exposed situations presented difficulties that were practically insurmountable, instancing as examples the harbour works at Plymouth, Alderney, and Portpatrick. In regard to the works at Pulteneytown, Wick, he said the lesson to be derived from them was that a breakwater erected with a perpendicular face to the sea, composed of open work below low water, and covered up with a solid air-tight superstructure, was of itself incapable of resisting for many years the impacts of heavy seas such as those of Wick Bay. The reason was that the interstices between the lower blocks got filled with air or water, and when the waves struck the face of the wall the air was compressed with tremendous force. The internal recoil thus made loosend the blocks, which were broken or forced outward by the reacting force. The introduction of Portland cement had entirely revolutionised the system of erecting harbours. Mr. Brebner then gave examples of the proper proportion of cement, sand, and stones which had been used with success, and described the different modes of constructing concrete work in exposed situations. The paper concluded by urging the necessity of liberal grants being made by Government for the construction of fishery harbours.

CHIPS.

The City Corporation discussed last week the question of the desirability of appointing a City Architect in succession to Sir Horace Jones, and decided by the bare majority of one vote not to fill the appointment, but to appoint instead a "City Surveyor," whose duty it will be to manage the City landed property.

The Duchess of Albany opened on the 7th inst. three new wards at the National Hospital for the Paralysed and Epileptic, Queen's-square, Bloomsbury, the foundation stone of which was laid by the late Duke the year before his death, the building having been opened by the Prince of Wales two years ago. The new wards comprise the "Duchess of Albany" Ward for children, a ward, unnamed, for female paying patients, and a free ward for male patients, making 55 beds and cots in all, and raising the total accommodation of the hospital to 180 beds and cots. The hospital has been erected from the designs and under the superintendence of Mr. M. P. Manning, and was illustrated in the BUILDING NEWS for June 27, 1884.

The highway board for Hollingbourne, Kent, have raised the salary of the surveyor, Mr. Roper, jun., by £40 per annum.

The extension of the electric tramway from Bushmills to the Giant's Causeway was opened last week for passenger and goods traffic, after inspection by General Stevenson, on behalf of the Board of Trade. The line is constructed on the narrow-gauge principle, with an electric rail raised about a foot and a half from the ground. The extension line is six miles in length, and runs through a rabbit warren, over the River Bush, from Bushmills to within a few perches of the Causeway. Mr. Trail is the engineer.

New business premises are about to be erected next the Canterbury Bank now in course of erection in St. Margaret's-street, Canterbury. The shops and residences above are Renaissance in character, and are faced with red brick, with Bath and Portland stone dressings. Messrs. Cowell and Bromley, of that city, are the architects, and Mr. W. Martin, of Ramsgate, is the builder.

Intercommunication.

QUESTIONS.

[9342.]—**Articles.**—What is usually done at the end of an architectural pupilage? Are the original indentures given up to the pupil, or what form of release has he to show? A pupil whose articles are about to expire would be grateful to correspondents for any information on the subject.—PUPIL

[9343.]—**Cheap Furniture.**—Will any reader kindly recommend any book giving working designs for simple articles of furniture, such as bookcases, to be made by an amateur carpenter?—E. L. H.

[Surely our own back vols. abound in such designs?—ED.]

[9344.]—**S.K.M. Exam.**—Will any reader inform me what books I require to read up for the South Kensington examination on "Architecture"?—DEVON.

[9345.]—**Sewage.**—Will some reader kindly give me particulars for the treatment of sewage in a gentleman's country house, where there is no district sewage system, or recommend me a good book on the subject?—W. H. B.

REPLIES.

[9310.]—**Half-Timbered Walls.**—One of the first principles in building is to be what it seems to be. No architect is bound to show his construction; but what he does show should be what it purports to be, even if it is contemptible. Hence, plaster or cement on lath is quite legitimate, and it has the merit of precedent—i.e., "wattle and dab" (of which by the way, I know probably quite as much as "F. B. P."), and to which I referred on p. 40; but plaster or cement on brickwork is a sham, and worse than the brickwork alone for keeping out the wet, the expansion and contraction of the timbers causing it to bulge from the brickwork, very often in flakes the size of the panel. The "wattle and dab" and its modern substitute, lath and cement, fit into a groove like the panels of a door, and accommodate themselves to circumstances. The thickness of Mr. Rumble's wall is not shown or stated, and 9in. would be sufficient for his purpose; whereas it is doubtful if twice that thickness in brickwork alone would be watertight in some positions where I have carried out buildings of this kind. "F. B. P." admits that half-timbered construction conduces to a warm building. Granted; but it is not so by his method. Veneering the outside of a brick building with stone is quite as barbarous a method of scene-making as the contemptible work "F. B. P." despises. It is well known that brick filling-in alone, or plastered over, is not waterproof, and I know more than one modern timbered building open to this objection. In May last I saw a residence on the borders of Worcestershire and Herefordshire, a good example of wattle and dab construction which, judging by the timbers, must be several centuries old, and bids fair to last a long time if no vandal introduces the brick filling-in. Some two years ago I saw a fine old mansion near Market Drayton, where the filling-in process had been carried out to the inevitable result—*i.e.*, the collapse of the building. "F. B. P." may pose as "Sir Oracle—when he opes his mouth no dog must bark"; but I decline to accept the dictum of one who, by his own showing, does not know the difference between a water and wind-tight building and a shower-bath. My opinions are based on the practical experience (from every point of view) of upwards of 40 years, and I can venture to set my ounce of practice against "F. B. P.'s" ton of theory.—JAMES THORNELOE.

[9331.]—**Mounting Photographs.**—As an amateur photographer of 25 years' experience, and the winner of as many medals and diplomas, my experience is that there is nothing like Glenfield's white starch. Make in the usual way, and pour out into a basin to cool. When cold, it should set nearly to the consistency of an ordinary blanc mange—a trifling bit thinner, but stiff for all that, is the correct thing. Place the photographs in clean water if they are dry, and bring the batch together, all the backs upwards. Lift out all together still, and after draining well, lay on clean white blotting-paper, backs uppermost. Commence to mount by taking a piece of soft sponge wetted, but the water squeezed out of same. Press sponge into the starch, and dab it, so as to mix and break up same, then apply by rubbing over the back of damp photographs. This slight friction will dissolve or rub out any little irregularities of thickness in the mountant. Carefully lift up photo. by two corners and place on card mount. A piece of clean foolscap paper placed upon the face of the photograph is pressed on same by quickly rubbing the fingers over until the photograph is properly laid down, pressing out to the edge by the same means any air-bubbles under photo. The operation is now complete. Possibly lines may be seen here and there slightly raised, showing the direction the sponge charged with the starch has passed over the photo.; but these disappear as the photo. dries. Do not weight the photos. While drying, the next photo. in the batch is ready, back upwards, to receive the starching, and so on until the last is arrived at. The damp photographs are separated from each other only as each is lifted up after starching to place on card. By this means all the photos remain damp and flat for receiving starch to the end.—A TAUPENOT BOY.

[9333.]—**Ventilation and Prevention of Downdraught in Churches.**—I am greatly obliged to Mr. W. P. Buchan and to "Fresh Air" for their replies on the above subject. The former refers to my "wholesale" condemnation of the heating and ventilation. I regret that my words should have had that definite meaning attached to them, as I only intended them as an "opinion open to correction." The subject of down-draughts is, unfortunately, too often practically illustrated in many large public buildings, and my object in placing the subject before the readers of the BUILDING NEWS was not so much with a view to find a remedy for the special case in question, as in the hope that much valuable information might result from the comparing of notes and opinions. In Mr. Buchan's words, I condemn the ventilation of the Congregational church referred to, and given as a test case. I do so because the only means of obtaining such are small swing casements to the windows, and because the openings in ceiling only open into false roof instead of to exhaust air-shafts, and which, I am glad to find, Mr. Buchan agrees with me are necessary. I am sorry that in stating my case I made a most important omission, as it will doubtless lead Mr. Buchan to alter his views as to cause. The openings into false roof have been closed for a couple of years past, and still the down-draughts continue; and it was this fact among others mentioned that led me to think the heating apparatus was a defaulter as well as the ventilation arrangement, and also because we have been able to stop the down-draughts by lighting the upper level chandeliers; but it takes hours to do so by this means. I thank "Fresh Air" for his suggestion to communicate with a certain firm who have had great experience in such matters. I have been acquainted with numerous firms for years past who advise in such matters on their own business systems, but my object would not be gained in so doing. I must testify to the great value I place upon the BUILDING NEWS Intercommunication Column for getting to know "the reason why" in matters of a practical character, which I am glad to say is seldom placed there in vain. In the spirit of seeking knowledge, I would ask "Fresh Air" to say why hot-water heating should be conducive to down-draughts? We may find a link connected with the subject of inquiry in the answer. Would Mr. Grundy favour us with his opinions in the matter also as to the cause of the down-draughts? I will not ask him to name a cure unless he feels at liberty to do so.—REX.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—It would scarcely do to allow the assertion by "Fresh Air," on page 74, to pass unchallenged, that down-draughts through the ceiling-openings of a church could not be cured unless a particular new heating apparatus is put in. The assertion is pure nonsense. For some time back, and for some months to come, we will not need heating apparatus. At present we are hot enough. We want fresh air in the church, and to be kept cool without being chilled by draughts, and this is a desideratum which a new heating apparatus will not supply.—W. P. BUCHAN.

[9339.]—**Alterations and Additions.**—"A 12 Years' Constant Reader and Subscriber," and his relation, and the owner, have produced a pretty kettle of fish between them. The best way to get out of the mess would be to hand all documents to a competent and reliable surveyor to make out a proper account of the value of the works done in conformity with the several agreements. If the amount should exceed the sum claimed, the owner to pay the surveyor's fees; but if it should be less than the sum offered, the "12 Years' Reader" or his relative to pay the fees, and if the amount of the account prepared by the surveyor was between the sums claimed and offered, the fees to be divided and half to be paid by each party.—M. M.

CHIPS.

A new façade is about to be built to St. Alphege's Church in London Wall. Messrs. Dove Brothers, Islington and Tokenhouse-yard, are the builders.

The parish church of Rockbeare is about to be restored from plans by Messrs. Hayward and Son, of Exeter, at a cost of about £1,500.

The annual meeting of the Kent Archæological Society will be held on Tuesday and Wednesday next, with Tunbridge as headquarters.

A correspondent writes to complain that the ruins of Melrose Abbey are being "desecrated by the erection of a wooden gravedigger's tool shed against the abbey walls, and entirely filling up the space between two of the buttresses."

A new Wesleyan Sunday-school is in course of erection at Aston, Salop. Mr. J. H. Pickard, of Whitchurch, Salop, is the architect, and Mr. S. Manley, of Aston, the builder.

Messrs. Watt and Wilson, Glasgow, have secured the contract for the erection of a new station in Greenock in place of that in Cathcart-street.

The result of the poll in Clapham, under the Public Libraries Act, was a declaration in favour of the free library by a majority of 1,135.

The Huntley chapel attached the parish church of Preston-on-Wye has just been restored from plans by Mr. Nicholson, of Hereford, who was the architect for the restoration of the church in 1883. Mr. James Davies, of St. Nicholas-street, Hereford, has been the builder; and the re-opening service will take place on Thursday next.

The annual summer meeting of the Architectural and Archæological Society will be held at Nottingham on Tuesday and Wednesday in next week, the 19th and 20th inst. Excursions will be made to Woollaton Hall, Bakewell, and Haddon Hall.

A special loan exhibition of works of art is to be held at the South London Free Art Gallery in Battersea New-road during the autumn months. The movement is under the patronage of Sir Frederic Leighton, Sir J. D. Linton, Mr. G. F. Watts, R.A., Mr. E. Burne Jones, A.R.A., the Hon. John Collier, and Mr. Walter Crane. The treasurer, Mr. W. Rossiter, Birchanger Hall, Bishop's Stortford, appeals for aid in money or by the loan of pictures.

A new Congregational church and schools are about to be built at Cirencester from plans by Mr. W. Gilbee Scott, of Bedford-row, London.

Plans by Messrs. Hine and Odgers, of Plymouth, have been adopted for a town hall and mechanics institute about to be built at Buckfastleigh.

PARLIAMENTARY NOTES.

H.M. OFFICE OF WORKS' EXAMINATIONS FOR CLERKS OF WORKS.—On Monday Mr. Lewis H. Isaacs asked the Secretary to the Treasury whether the candidates at the examination held last April for clerks of works to Her Majesty's Office of Works and Buildings had complained of the too theoretical character of the examination, and whether it would be reformed and rendered more practical in the future; whether the clause which stipulates that a candidate "shall have been employed five years superintending buildings" should be read as fixing the time to be wholly devoted to such duties; and whether a healthy, noiseless, and comfortable room suited to the purposes of an examination would be provided for conducting the examinations in future.—Mr. W. L. Jackson: There were some complaints from candidates examined last April for clerk of works in the Office of Works and Buildings as to the too theoretical character of the examination; but on inquiry into the matter those complaints proved to be groundless under the existing regulations. The Civil Service Commissioners are not aware whether the Office of Works consider that the regulations require to be reformed, but it is understood that the matter is under consideration. The Civil Service Commissioners do not consider that the clause which stipulates that "a candidate shall have been employed at least five years in the superintendence of buildings" should be read as fixing the time to be wholly devoted to such duties. The candidates on the occasion in question were examined in a healthy, noiseless, and comfortable room in the office of the Civil Service Commission in Cannon-row.

STATUES, MEMORIALS, &c.

CANTERBURY.—Mr. A. B. Wall, of Cheltenham, has executed and fixed up at Canterbury Cathedral eleven statues in memory of Archbishop Tait. They are placed upon the choir screens on each side of the altar. The Dean has expressed great satisfaction with the artistic treatment of the statues.

STAINED GLASS.

NEWINGTON.—A memorial window, the subject being the parable of the "Prodigal Son," has been erected in St. Mary's Church, Newington. A very beautiful window of three lights, representing SS. George, Michael, and Edward, has also been executed for the memorial church at Lucknow, in India. These works are from the studios of Messrs. Cox, Sons, Buckley, and Co., of London and New York.

CHIPS.

A memorial brass to the late Mr. John Monckton has just been placed in the south aisle of All Saints' Church, Maidstone, by his ten surviving children. It was designed by the late Sir Horace Jones, City Architect, and executed by Messrs. Hart, Son, Peard, and Co. It is mounted in a frame of double marble, the inner being serpentine and the outer dove marble, by Mr. Witcombe, of Maidstone.

A warden's stave, of unique design, for Roundhay Church, near Leeds, has been carried out by Messrs. Jones and Willis, art-metal workers, of Birmingham and London.

The foundation-stone of the church of St. Agnes, Burmantofts, Leeds, was laid on Saturday. The church is to accommodate about 600 or 700 persons. It will be of stone, and the style will be Decorated Gothic. The plans show a wide nave, with narrow aisles and chancel, and in the north aisle there will be an organ chamber, and in the south a choir and clergy vestry. There will be placed at the west end a window in commemoration of the Jubilee year. The structure is expected to cost £4,000.

A boys' modern school is about to be erected on the grounds at the rear of the Mechanics' Institute at Leeds. The building will have a frontage to Rossington-street of about 100ft., and to Percival-street of 70ft., the architecture harmonising with that of the institute. On the ground level will be a covered playground, and above this there will be three stories. The first floor will be divided into classrooms, five in all, and the head-master's room. The second floor will comprise a lecture theatre, 39ft. by 39ft., an apparatus room, a room for physics and mechanics, and a classroom. On the third floor will be a laboratory, 64ft. by 41ft., balance-room, metallurgy room, and storeroom. The new building will cost £4,000. The plans have been prepared by Mr. C. S. Nelson, of Leeds.

The parish church of Lanhydrock, Cornwall, is about to be restored and reseated at a cost of about £2,500, borne by Lord Robartes, whose seat it adjoins. Mr. G. Vialls, of Ealing, is the architect, and the tender of Messrs. Carah and Edwards, of Crowan, near Cambourne, has been accepted for the execution of the work at £2,388 10s.

LEGAL INTELLIGENCE.

AN ARCHITECT'S CLAIM. — At the Ryde County Court on Wednesday week, the case of "Webber v. The Royal Hotel Company, Ventnor," was heard by Judge Leonard. Mr. T. White for the plaintiff, and Mr. Poole, of London, for the defendants. The plaintiff, who is an architect at Ventnor, claimed £23 4s. for services rendered in preparing plans for a greenhouse, &c. The defence was that the charge was excessive, that plaintiff had carried out the work in a very loose way, and that the structure did not answer the purpose for which it was intended. Mr. Stratton supported the plaintiff's charges, and said the work had been carried out in a proper manner; but Mr. Livesay, of Ventnor, stated that the charges were excessive, and the work not carried out as it should have been. His Honour gave judgment for defendants on a set off for £15, which leaves plaintiff £8 7s. of the amount sued for.

CHUBB'S PUSH AND PULL LOCKS.—On the 8th inst. an interlocutory application was made on behalf of the plaintiff in the case of Kaye v. Chubb to the Master of the Rolls (Lord Esher) and Lords Justices Lindley and Lopes for a stay of proceedings in the action pending an appeal to the House of Lords. When the action was tried, Mr. Justice Mathew decided in favour of the plaintiff, but in the Court of Appeal their Lordships gave judgment with costs in favour of the defendants, Messrs. Chubb, lock and safe manufacturers. The plaintiff having entered a further appeal to the House of Lords, now applied for a stay of execution pending the result of such appeal. After hearing the arguments, however, their Lordships refused the application with costs.

RATEABILITY OF ADVERTISING HOARDINGS.—In the appeal of "Taylor, Garrett, Evans, and Co. v. the Overseers of Pendleton, Lancashire," heard before Mr. Justice Wills and Mr. Justice Grantham on Monday, the question was raised, not for the first time, whether hoardings erected for advertising purposes are rateable. In 1883 the proprietors of a timber yard entered into an agreement with Messrs. Taylor and Co. to allow them for three years the privilege for erecting on their premises a hoarding for the purpose of advertising, at a rent of £30. For this Taylor, Garrett, and Co. were rated, and they appealed against the rating, and the sessions relieved them, but stated a case, which was now argued. The case of "Willing v. the Assessment Committee of Pancras" (2 Law Reports, Q.B., 258) was cited. The Court came to the conclusion that the agreement gave the appellants the exclusive occupation by their hoarding of the land on which it was erected, and so it was rateable as in their occupation, and thus their appeal ought to have been dismissed. Judgment accordingly.

THE CHARGE OF ARSON AGAINST AN ARCHITECT.—At the Carnarvonshire Assizes on Wednesday, before Mr. Justice Denman, Abraham Henthorn Stott, a mill architect, having an extensive practice at Manchester, was indicted for firing his dwelling-house at Pensychnant, Conway, upon which there were insurances amounting to about £10,000. The defence was that the prisoner was not responsible for his actions. The jury, after being locked up for four hours, acquitted the prisoner, on the ground that there was no proof that he attempted to set fire to the place.

At the last meeting of the French Académie des Sciences, M. Bertrand read a report upon the Gallic cemetery recently discovered at St. Maurles-Fossés, near Paris, by Mr. Ernest Macé, who has presented most of the objects discovered there to the Museum of National Antiquities. These objects are identical with those found hitherto in the departments formed of that part of Gaul which Cæsar allotted to the Belgians. Most of the tombs had been walled round to a height of from 12in. to 14in. to keep back the sand at the sides, and the body is placed immediately upon the sand and covered with a row of large flat stones. In every case the bodies are laid with the face upwards, the sword in the right hand, fastened by a jointed iron belt. On the right-hand side is the point of a lance, the handle of which is placed between the legs.

Mr. James Anderson, formerly of the firm of M'Coll, Anderson, and Co., engineers, of Melbourne, has completed the construction of an enormous floating dock at Sydney, capable of taking in the largest sailing ship afloat. It is 320ft. long, 57ft. wide, and 26½ft. deep, and has a displacement of 14,500 tons. It has been christened the "Victoria Jubilee Floating Dock." The structure is entirely of colonial workmanship.

Almost simultaneously with Mr. John Aird's taking his seat as member for North Paddington the *London Gazette* notifies that the Queen has granted the dignity of a Baronet of the United Kingdom to Mr. Aird's partner, Thomas Lucas, of Ashted Park, Surrey, and of Lowestoft.

WATER SUPPLY AND SANITARY MATTERS.

BOURNEMOUTH. — The Local Government Board have granted their sanction to the loans for the following works—viz., £9,000 for scheme for watering the roads and flushing the sewers with sea-water; £5,500 for the construction of a storm outfall; £1,750 for private street improvements; £320 for additions to stabling; and £2,500 for public conveniences for ladies and gentlemen.

MANCHESTER.—The Manchester City Council received and adopted on Wednesday a report from the Rivers Committee respecting a scheme they had drawn up for dealing with the sewage of that city. Under the scheme brought forward by the committee a system of filtration will be followed, the effluent to be passed on to lands to be acquired by the Corporation, and so absorbed. The cost of the scheme is set down at £412,000. A Local Government Board inquiry respecting the application to borrow the proposed sum is to be asked for.

PURIFICATION OF THE WATER OF LEITH. —A report has just been issued by Professor Crum Brown and Mr. Robert C. Reid, C.E., on the purification of the Water of Leith, under a second remit from the local authorities of Edinburgh and Leith, the interested parishes, and the manufacturers on the water. The principal suggestion of the report is that an intercepting pipe should be constructed from Balerno downwards, to collect all the discharges from the mills and sewers now sent to the river. It is pointed out that the discharges might be treated at purification works outside Edinburgh, and again sent to the river; but though this system would meet the requirements of the Rivers Pollution Act, the river would not be restored to the purity which characterises it above Balerno, and to obtain this purity the pipe might be continued to the sea, or joined to the existing Water of Leith pipe, below Coatbridge. In order to provide for the water which would be withdrawn from the river by such a scheme, it is also explained that an additional storage system might be adopted, either by raising the embankments of the existing compensation reservoirs of the Water Trust to retain the water that overflows during winter, or by constructing an additional reservoir on the Water of Leith below Harperrigg.

ST. GEORGE'S EAST WORKHOUSE.—The report of the Local Government Board inspector (Dr. Bridges) upon the recent additions to this establishment has been laid before the guardians. It states that the new workhouse block (Messrs. Wilson, Son, and Aldwinckle, architects) is all that can be desired as regards drainage, warmth, and ventilation, which is on the Boyle system. On the occasion of Dr. Brydges' visit the workhouse was full of people, but the air was remarkably pure. The report was referred to the house committee for consideration.

CHIPS.

The most sensible thing in connection with the Jubilee was done by Messrs. Dennett and Ingle, of Whitehall, who (as will be seen from a notice elsewhere), being worried to death by something short of a thousand applications from "friends" for some sixty or seventy seats, let their rooms, and devoted the proceeds (over 100 guineas) to several deserving hospital charities. A capital idea; we shouldn't mind a Jubilee, say, once in 25 years, if the example set could be followed with similar success.

It has been decided to complete forthwith the tower and add new classrooms to the Congregational church in Oxton-road, Birkenhead, from designs by the architect of the church, Mr. T. W. Cubbin, of Hamilton-square, Birkenhead.

The tender of Messrs. Parnell and Son, of Rugby, has been accepted at £26,536, for the erection of the new Nonconformist Mansfield College at Oxford. Mr. Basil Champneys, B.A., is the architect.

A chancel and transept are about to be added to St. Luke's Church, Woodside, near Croydon, at a cost of £3,000. Messrs. Mullins are the architects, and Mr. Marriage, of Croydon, is the builder.

Damage to the extent of many thousands of pounds was occasioned on Sunday night by a fire which broke out at the extensive timber yard of Messrs. Calder, Dixon, and Co., Commercial-street, Middlesbrough.

The Numidian Marble Company seems to have a valuable investment to offer. The marbles of Kleber, in Oran, which the company is going to work, are very durable and beautiful, and the supply is practically inexhaustible. Mr. Norman Shaw, Mr. H. R. Gough, and Mr. Ruskin speak highly of the marbles, and Mr. C. J. Phipps is on the directorate. The capital asked for is only £200,000 in 32,000 ordinary shares of £5 each, and £40,000 in 5 per cent. preference shares of £100 each.

Our Office Table.

MR. JOHN WRIGHT OAKES, A.R.A., the landscape painter, died on Friday last at his residence, Leam House, Addison-road, Kensington, after an illness which had incapacitated him from the exercise of his profession during the past six years. Mr. Oakes, who was the son of a house painter, plumber, and glazier in Parker-street, Liverpool, first exhibited at the Academy in 1848, when he was 26 years of age, and continued to send pictures to the Academy, the British Institute, and the Suffolk-street Gallery, which were accepted year by year till 1880; but recognition of his talents came to him rather late in life, as he was not elected an Associate of the Academy till 1876, when he was 54 years old. Soon afterwards his health began to fail, and his later works show evidence that his labours were pursued with increased effort and diminished success. Examples of Mr. Oakes's landscapes are hung in the modern collections at South Kensington, "Early Spring Twilight"; Liverpool, "Autumn"; and Glasgow, "Early Spring," the two latter being of his best period. Two of his works "The Last Gleam" and "Glen Muich, Aberdeenshire," appear on the walls of the Royal Jubilee Exhibition at Manchester.

THE plan prepared by the officials of the Metropolitan Board of Works for widening the neck of Charing Cross-road by setting back the steps of the portico of St. Martin's-in-the-Fields Church, so as to isolate each column, the new steps being made between them, is meeting with some adverse criticism. Mr. William Butterfield condemns the proposal as ruinously disfiguring the church, and suggests that the only plan by which the increased width could be given would be by setting the portico inwards by half its width, when the steps and platforms would follow it. This proposal agrees with one of the three alternative designs prepared for the church by Gibbs, and would add 12ft. to the width of the road. Mr. Beresford Hope protests against the Metropolitan Board's proposal, which he successfully opposed in the House some years since, and the Rev. E. C. Hawkins declares that the project is needless as the road is wide enough for all ordinary traffic.

MR. JOHN AIRD, of 14, Hyde Park-terrace, and of Sutton, near Staplehurst, Kent, who has been elected M.P. in the Conservative interest for North Paddington, is, the *Times* remarks in a biographical notice of new members, the son of Mr. Aird who founded the well-known firm of contractors that bears his name; he is also a partner in that of Messrs. Lucas and Aird, of Great George-street, Westminster. He is about 50 years of age, and now enters Parliament for the first time. His firm constructed the Millwall Docks in partnership with the late Sir John Kelk, and they have been largely engaged in constructing gas and water works in many foreign capitals and cities; and they are understood to be the contractors elect for the Manchester Ship Canal. Mr. Aird is married, and has a numerous family.

THE remains of Peter Courtenay, successively Bishop of Exeter and Winchester, were on Thursday placed in the tomb in Winchester Cathedral, prepared for their reception under the supervision of the Dean. Bishop Courtenay died in 1492, and until his coffin was found by Dr. Kitchin in the crypt of the cathedral no trace of his remains or place of interment were known to exist. The site of the new tomb is on the south side of the nave, close by the altar rails, and immediately facing the tomb of Bishop John de Pontisara, with which it is in harmony. The design is Perpendicular in style, the work of Mr. G. H. Kitchin, son of the Dean, who has also supervised the details of the erection throughout. The tomb is of Caen stone, the carving on which is by Mr. Whitley, sculptor, of London. The leaden covering of the original lid of the coffin, 6ft. 7in. in length, on which runs a cross nearly the whole length with the arms of the Courtenay family at the bottom, has found a fitting place on the top of the tomb, around which is placed an inscription in the stone. As the tomb stands against Bishop FOX'S screen, only three sides are seen, and these are ornamented with panels containing armorial bearings and other devices and symbols taken from the mantelpiece placed by the Bishop in his palace at Exeter, where it is still to be seen.

A REPORT is to be presented to the Metropolitan Board of Works to-day (Friday), submitting, in pursuance of a resolution of the Board passed so long since as the 3rd December, 1886, a statement of the facts connected with the letting of the land at Piccadilly-circus. The committee report the result of an investigation which the committee has made into matters arising out of the above reference, and states that, "in the opinion of the committee, Mr. Robertson, of the Architect's Department, has been injudicious in allowing relatives to become tenants of the Board without informing the Board; but that the committee does not find that there has been anything worthy of more severe censure." Two amendments will be moved to this recommendation. The first, set down in the agenda by Mr. Mossop, is—"That, in view of the circumstances disclosed in the statement submitted by the committee, the Board regrets to be unable to come to any other conclusion than that it is inexpedient that Mr. T. J. Robertson should remain in the Board's service; and that he be dismissed accordingly." The second, by Mr. Price, is less severe, but equivalent in effect—viz., "That in the opinion of the Board the conduct of Mr. Robertson, as detailed in the report of the Works and General Purposes Committee, has been such as to render it undesirable that he should remain in the service of the Board."

A MEETING of the Glasgow Master Plumbers' Association was held in the Waterloo Rooms on Thursday evening, 7th inst., to consider the question of the registration of plumbers, Mr. Alex. Brown, president, in the chair. Mr. Brown read communications on the subject from the secretary of the Worshipful Company of Plumbers, London, explanatory of the matter. Mr. Brown then called upon Mr. W. P. Buchan, who had been connected with the movement since its commencement in London in 1884, to give some information as to its working and present position. Thereafter Messrs. Wright, Barrie, and Rattray expressed their approval of the proposed system of registration of duly-qualified plumbers. The Chairman then moved that this meeting of the Glasgow Master Plumbers' Association approve of the proposal for the registration of plumbers, and the motion was carried unanimously. Mr. McFeat proposed that a committee be appointed to get further information upon the subject, and report to a future meeting. This was agreed to, and a committee duly appointed.

SIR HERBERT SANDFORD telegraphs from Adelaide, S.A., as to the Jubilee Exhibition in that capital, that the Fine Art Galleries are well lighted and that all the buildings are in a good forward state, and much addition has been made in consequence of the numerous further applications for space. There are now a northern annexe, a machinery hall, an agricultural hall, and an armoury, all in addition to the original permanent building with its two annexes. The arrangements for lighting all the buildings by the electric light are very good, and promise to be very successful. The British exhibitors are well in advance of all others. Special vans were sent down to Port Adelaide to convey the fine art works to the exhibition.

AN international exhibition of science and industry is to be held at Brussels from May to October in next year, under the patronage of the King of the Belgians. Premiums will be awarded in cash, medals, and diplomas, amounting in value to 500,000 francs. Subdivision 40 of the exhibition consists of (*a*) civil engineering and public works, (*b*) architecture, and (*c*) materials of construction. The president of the committee of this subdivision is M. Theodore Lamal, of Brussels, engineer-in-chief of bridges and highways; M. Wynand-Janssens, of Brussels, and M. Louis Berger, of Schaerbeck, architects, are the vice-presidents; and the secretaries are Messrs. Desaunois and Joniaux, of Brussels, and Jean Laurent Hasse, of Antwerp. It is announced that a million francs' worth of the articles exhibited will be bought for premiums in the lottery authorised by the Belgian Government. All information will be given to inquirers by Count d'Oultremont, the General Commissioner of the Government, 11, Place de Louvain, Brussels.

A USEFUL group of circulars has just been issued for the recently-established Emigrants' Information Office, 31, Broadway, Westminster, for the guidance of those desirous of emigration, and anxious to ascertain what colony they should select. The circulars, ten in number, deal with the colonies of Canada, Australia, and South Africa, and give fares, length of voyage, conditions of assisted passages, facilities offered for acquiring land, and the kind of persons likely to succeed. These circulars, each of which deals with a separate colony, are sent for distribution to every post-office in the United Kingdom, where they may be obtained gratis, and each is expanded into a penny handbook. The Canadian circular states that in the Dominion there is no demand just now for mechanics, and that emigrants must be prepared to take to other work than that of their particular trades; the building trades are slack during winter. The wages of carpenters range from 1·25dols. to 2dols. per day in the Eastern provinces, and those of bricklayers from 2·25 to 3dols., the rates being much higher in British Colombia and the North-West Territories. In New South Wales the rates of wages per day of eight hours, without board and lodging, are for bricklayers, 11s. to 12s.; carpenters, 9s. to 12s.; gasfitters, 10s. to 11s.; plumbers, 10s. to 11s.; and stonemasons, 11s. to 12s.; while brickmakers earn from 22s. 6d. to 30s. per 1,000 bricks. In Victoria and Queensland the wages, as given in the circular, range about 10 per cent. lower, and in South Australia, Western Australia, and Tasmania, 25 per cent. lower; while in New Zealand the rates closely approximate to those of New South Wales. In Cape Colony, plumbers are paid from 10s. to 12s. per day; carpenters, 6s. 6d. to 10s.; bricklayers, 6s. to 10s.; painters, 5s. to 9s.; and builders' labourers, 3s. to 5s.; and in Natal the rates are somewhat higher, the wages quoted being: blacksmiths, 11s. per day; cabinet makers and joiners, 10s.; bricklayers and carpenters, 9s.; and grainers and writers, 8s. The pamphlets seem to be carefully drawn up, and will well repay attentive study by any who may be dissatisfied with their lot in England.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Society of Architects. Visit St. Cuthbert's Church, Philbeach-gardens, at 2.30 p.m. (nearest station, Earl's Court), and to St. Paul's Church, Hammersmith, at 3.30 p.m., conducted by Mr. H. R. Gough, Past-President.
St. Paul's Ecclesiological Society. Day visit to Salisbury. Train from Waterloo (7s. 6d. return), 9 a.m.

THURSDAY.—Builders' Benevolent Institution. Annual meeting, Willis's Rooms, 3 p.m.

Trade News.

WAGES MOVEMENTS.

EDINBURGH.—At a well-attended meeting of joiners held in the Good Templars' Hall, Edinburgh, on Monday night, it was resolved to request from the employers an advance of ½d. per hour on the present rate of wages, which is 6½d. an hour.

CHIPS.

A memorial church is about to be built at Clifton, near Rotherham, from plans by Mr. E. J. Hubbard, M.S.A., Moorgate-street, Rotherham.

A committee of the town council of Wolverhampton has recommended to that body the adoption of a scheme for improving the sewerage of the borough prepared by Mr. Berrington, and estimated to cost £8,000.

A labourer named Harding, employed on the building of a new Baptist chapel, Northcote-road, New Wandsworth, on Monday was seized with a fit, and fell from a scaffold. The height from the ground was only 3ft., but his neck was broken, and death was instantaneous.

At a meeting of the Birmingham Tame and Rea District Drainage Board, held on Tuesday, it was resolved to apply to the Local Government Board for sanction to borrow £20,000 for drainage, levelling roads, and other purposes.

CHIPS.

The restoration at Wincanton parish church has been commenced, and a considerable number of men are at work upon the interior, whilst others are levelling, preparatory to laying the foundation of the new edifice. The whole edifice, with the exception of the tower, is to be pulled down and reconstructed at a cost of nearly £6,000. Mr. Millward, of Cardiff, has been appointed clerk of the works. The architect is Mr. J. D. Sedding, of London, and the contractor is Mr. Vallis, of Frome, Somerset.

A collection of pictures formed by the late Mr. Roupell, Q.C., was sold by Messrs. Christie last week. It consisted chiefly of works by the old masters, none of which, however, could be deemed of great importance. Mr. Doyle bought for the National Gallery of Ireland a Camp Scene, with soldiers halting at a sutler's booth, for 255 guineas. Mr. Doyle also acquired for the same collection a landscape with state carriage drawn by four horses, with attendants and pages, by Jacob Ruysdael and De Keyser, the price paid being £399.

In our notice of the additions to the National Gallery last week, although we mentioned the portrait-heads of the painters—Rubens, Rembrant, Titian, Raphael, Leo da Vinci, and Correggio—we omitted to give the name of Mr. C. H. Mabey as the sculptor. He also executed the ornamental modelling to the vestibule under the direction of Mr. John Taylor, architect, of H.M. Office of Works.

Holloway's Ointment. — Go where you may, persons will be found who have a ready word of praise for this Ointment. For chaps, chafes, scalds, bruises, and sprains it is an invaluable remedy; for bad legs, bad breasts, and piles, it may be confidently relied upon for effecting a sound and permanent cure.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BOURTON, SOMERSET.—For new laundry, for the guardians of Bedminster Union. Mr. A. J. Sharp, engineer and surveyor:—

Builders' work:—

Child, J., Bourton	£360 0 0
James, J.	349 0 0
Hayes, C. A.	286 0 0
Beaven, A. J.*	280 0 0
Bastow, J.	275 0 0

For fittings:—

Llewellyn and James	278 15 0
Childs, J., Burton	270 0 0
May, J. B., London	240 0 0
Leary, J. S.	235 0 0
Beaven, A. J.*	230 0 0
Pope, W. J.	215 0 0

* Accepted. Rest of Bristol.

BRIXTON, S.W.—For the erection of a pupil teachers school in Hackford-road, Brixton, for the London School Board. Mr. T. J. Bailey, architect to the board:—

Higgs, F. and H. F.	£7,360 0 0
Leslie and Knight	6,698 0 0
Downs, W.	6,671 0 0
Stimpson and Co.	6,570 0 0
Holloway, J.	6,450 0 0
Wall, C.	6,450 0 0
Holloway, H. L.	6,390 0 0
Johnson, W.	6,350 0 0
Hart, H., Great Dover street, Southwark (accepted)	6,230 0 0

BRIGHTON.—Alterations to Nos. 98 and 99, George-street, for Messrs. Crouch, Stevens, and Gardner. Messrs. Fuller and Oakden, Eastbourne and Lewes, architects:—
Kemp, C., Brighton (accepted).

BROADCLYST.—For dwelling-house and outbuildings at Younghayes Farm, for Mr. T. E. Bidgood. Messrs. J. W. Rowell and Son, Newton Abbot, architects:—

Phillips, H., Exeter	£810 17 10
Luscombe and Son, Exeter	800 0 0
Scadding and Son, Exeter	710 0 0
Granger and Son, Whimple*	623 9 0

* Accepted.

CANTERBURY.—For new premises in St. Margaret's-street, for Messrs. Pool and Son. Messrs. Cowell and Bromley, Cathedral Precincts, Canterbury, architects:—

Gaskin, J. C.	£1,925 0 0
Adcock, W. J., Dover	1,890 0 0
Gentry, W.	1,799 0 0
Cozens, W.,	1,789 0 0
Wiltshier, J. E.	1,717 0 0
Wilson, H. B.	1,689 0 0
Judges, W., Boughton	1,573 0 0
Martin, W., Ramsgate (accepted).	1,583 0 0

Rest of Canterbury.

CLERKENWELL.—For the laying down of footways and executing other works in a proposed new street between Clerkenwell-road and Laystall-street, for the Metropolitan Board of Works:—
Mowlem and Co. (accepted) ... £2,489 0 0

CROYDON.—For alterations and additions to stabling at the Homestead, Bedford Park, Croydon, for Mr. A. Walton. Mr. C. Henman, 64, Cannon-street, E.C., architect:—

Maides and Harper, Croydon	£682 0 0
Goulder and Glasscock, Croydon	671 0 0
Smith, J., and Sons, Norwood	647 0 0
Garlick, J., London	616 0 0

EASTBOURNE.—For alterations to No. 8, Cornfield-road, for Mr. Elston. Messrs. Fuller and Oakden, Lewes and Eastbourne, architects:—

Gravett, G., Eastbourne	£132 0 0
Noakes, J., Eastbourne	105 0 0
Dore and Son, Eastbourne	97 10 0
Martin, M., Eastbourne (accepted)	87 12 0

EASTBOURNE.—For alterations to No. 13, Ashford-road, for Mr. T. A. Provost. Messrs. Fuller and Oakden, Lewes and Eastbourne, architects:—

Martin, J.	£142 0 0
Martin	141 0 0
Dore and Son (accepted)	88 0 0

EDINBURGH. — For carrying out improvements in Saunders-street, for the city council:—
Henderson, Matthews, and Co. ... £184 18 7
(Accepted.)

EDINBURGH.—For the demolition of old premises, Nos. 1, 3, 5, and 7, Canongate, for the city council:—
Waddell, A. (accepted) £50 10 0

GATESHEAD.—For two houses in Derwentwater-road, Gateshead, for Mr. M. Turner. Mr. G. W. Caris, 16, West-street, Gateshead, architect:—

Haswell and Waugh	£480 0 0
Greason Bros.	460 0 0
Briggs, F.	455 0 0
Henderson, F., Low Fell	440 0 0
Wakefield, F.	430 0 0
Greetham Bros.	430 0 0
Watson, T. (accepted)	380 10 0

Rest of Gateshead.

GIPSY HILL.—For new wing and additions to the Bungalow, for Mr. H. H. Macleod. Mr. M. N. Inman, 7, Bedford-row, W.C., architect:—

Poole, W.	£477 10 0
Fox, W.	476 0 0
Hitchcock, J. (accepted)	469 15 0

GLENFARG, N.B.—For the construction of the Glenfarg railway, for the North British Railway Co.:—
Brand, C, and Son, of Glasgow (accepted).

GRIMSBY.—For the erection of a factory for the Grimsby Fish Biscuit Company, Limited. Mr. E. W. Farebrother, F.R.I.B.A., architect:—

Smith, W. H.	£2,090 0 0
Roebuck and Cooseman	1,808 0 0
Guy, J. and R. G.	1,750 0 0
Riggall and Hewins	1,657 10 0
Siminson, T. (accepted)	1,590 0 0

GREENOCK.—For the erection of the new station:—
Watt and Wilson, Glasgow (accepted).

For boiler setting, &c., and extra timber for foundations:

Siminson, T., and Marrows, H.*	217 0 0

For fencing in site:—

Riggall and Hewins	£99 10 0
Marrows, H.*	97 0 0
Chapman, J.	70 0 0

* Accepted.

GRIMSBY.—For additions to Holme Hill schools, for the Grimsby School Board. Mr. E. W. Farebrother, F.R.I.B.A., architect:—

Roebuck and Cooseman	£293 5 8
Guy, J. and R. J.	290 0 0
Reggall and Hewins	274 0 0
Siminson, T. (accepted)	231 0 0
Walker and Cook	222 10 0

GRIMSBY.—For alterations and additions to Spring Church schools, for the trustees. Mr. E. W. Farebrother, F.R.I.B.A., architect:—

Emerson, W. H.	£389 0 0
Roebuck and Cooseman	376 0 0
Kirk, N.	372 0 0
Swain, T.	366 0 0
Bells, G.	353 0 0
Siminson, T.	333 0 0
Grant, F. (accepted)	280 5 11

GRIMSBY. — For alterations and additions to the *Grimsby News* offices and printing works, for the directors. Mr. E. W. Farebrother, F.R.I.B.A., architect:—

Walker and Cook	£280 5 0

GRIMSBY.—For additions to the Co-operative Ice works, Grimsby. Mr. E. W. Farebrother, F.R.I.B.A., architect:

Nightingale and Danby	£580 0 0
Roebuck and Cooseman	488 0 0
Guy, J. and R. G.	480 0 0
Reggall and Hewins (accepted)	423 0 0

GRIMSBY.—For new shop, Victoria-street, for Mr. Drakes. Mr. E. W. Farebrother, F.R.I.B.A., architect:—

Roebuck and Cooseman	£101 2 6
Frank and Jagger	97 0 0
Nightingale and Danby	92 10 0
Marrows, H. (accepted)	72 0 0

GRIMSBY.—For additions to South Parade board schools for the Grimsby School Board. Mr. E. W. Farebrother, F.R.I.B.A, architect:—

Walker and Cook	£465 10 0
Roebuck and Cooseman	465 0 0
Reggall and Hewins	463 10 0
Guy, J. and R. G.	463 0 0
Thompson, G. E.	443 10 0
Siminson, T. (accepted)	435 16 0

HALIFAX.—For the construction of a new road from Siddal to Salterhebble, for the town council:—
Tyson, G. and H. (accepted) ... £2,378 0 0

HALIFAX.—For the extension of South-street from Prescot-street to Oxford-road, for the town council:—
Tyson, G. and H. (accepted) ... £624 0 0

HALIFAX.—For the supply of cast-iron gas-pipes during twelve months, for the gas committee of the corporation;—
Clapham Bros., Keighley (accepted).

HANDSWORTH, SHEFFIELD.—For the construction of an approach road to the Woodhouse Cemetery, for the Handsworth burial board:—
Sykes, H. (accepted) £170 0 0
(Lowest tender received.)

HORNSEY.—For street fire-station, for the Hornsey Local Board. Mr. T. de Courcy Meade, Assoc.M.I.C.E., engineer and surveyor:—

	Fire Station A.	Fire Station B.
Russell and Rosser, Charing Cross—	£222 0 0	£177 0 0
Kerry and Son, Highgate—	177 0 0	136 0 0
Holmes and Son, Highgate—	172 0 0	134 0 0
Dixon, Highgate—	165 0 0	140 0 0
Marks, Crouch End—	156 15 0	141 17 6
Keay, Birmingham—	105 0 0	130 0 0
Cutting and Co., Strand (accepted)—	95 0 0	80 10 0
Linzell, Bedford-row, W.C. (withdrawn)—	68 0 0	48 0 0

HORNSEY.—For caretaker's cottage at Irish Corner, for the Hornsey Local Board. Mr. T. de Courcy Meade, Assoc.M.I.C.E., engineer and surveyor:—

Smith and Sons, Muswell Hill	£487 0 0
Holmes and Sons, Highgate	469 0 0
Marks Crouch End	465 9 3
Wheeler and Co., North Finchley	458 0 0
Price, Brixton	403 0 0
Dixon, Highgate	397 0 0
King Bros., South Norwood	359 0 0
Kerry and Son, Highgate	350 0 0
Kessells, Highgate	349 0 0
Mattock Bros, Finsbury-park	345 0 0
Paine Bros., Stamford-hill*	323 19 11
Linzell, Bedford-row, W.C.†	315 0 0

* Accepted. † Withdrawn.

HOLLESLEY. — For additions to The Red House Hollesley, for the Colonial College and Training Farms. Quantities by Mr. C. H. Goode. Messrs. J. Giles, Gough, and Trollope, architects:—
Girling, Ipswich (accepted) 2,350 0 0

HULL.—For the erection of new schools in West Dock-avenue, for the school board:—
Marsden and Hodson (accepted)... £6,589 0 0

KNOTTINGLEY.—For the restoration and reseating of St. Botolph's Church. Messrs. Demaine and Brierley, of York, architects:—
Woolston, T., Stamford (accepted).

KNOTTINGLEY.—For the enlargement of Christ Church. Messrs. Demaine and Brierley, of York, architects:—
Woolston, T., Stamford (accepted).

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THE VESTIBULE AND HALL ARCHITECTURALLY CONSIDERED.

THE treatment of the vestibule has always been a *tour de force* with the architect. If he can impart to it size, he can give to an otherwise commonplace design a feature important enough to compensate for many shortcomings in plan; if he can dignify it by architectural pronunciation, he can often atone for other weaknesses of proportion and ornamentation. Except in buildings of important dimensions, or of civic and national character, the vestibule is rarely made a feature. Only in the larger class of residences can it be developed fully or made important enough to play a part in the external architecture. How very far inferior in the appointments are our modern ideas compared with those of the Romans. As they are revealed to us in the remains at Pompeii, the *vestibulum* led into the *cavædium* or atrium, which was surrounded by columns open to the sky, in whose centre was the compluvium or basin, which received the water from the roof. This apartment led by the *tablinum* into the peristyle, which was a portion devoted to the family. It was also surrounded by columns, but larger than the atrium. The domestic apartments inclosed these open courts. In the Roman villa, it must further be noticed, there were two parts, the public and the private. The porticus and the vestibulum, atrium and tablinum, belonged to the public portion, the peristyle and the surrounding apartments to the private portion. But the vestibule, the atrium, and the peristyle were arranged on one axis, and presented an elegant and inviting appearance to visitors. We have nothing to compare with this arrangement in our modern houses. With few exceptions our public buildings are destitute of the atrium and peristyle. The visitor to the Crystal Palace who has ever sauntered into the Pompeian Court will have realised, to his mind, a very fair and by no means exaggerated effect of the Roman villa, where the several parts we have referred to are shown to a full size scale with the addition of the mosaic and coloured decoration which contributed so much to the charm of the arrangement. Light and colour, parterres of flowers, translucent marble columns, drapery, fountains, and polychromy invited the visitor into the atrium or outer court. It was the reception room for all visitors; beyond it, screened off by drapery, was seen the inner court or garden, fresh with flowers and playing water. We are told by Pliny that the atrium was adorned with pictures, statues, and plate, and it was a waiting-room for clients. The atrium in Early Christian architecture was equally important. Most of the early basilicæ had the inclosed court, as that of St. Peter and the church of St. Sophia. Eusebius describes the latter as magnificent. These courts were surrounded by internal porticoes, and became, as Fergusson remarks, "a singularly pleasing adjunct to the façade, removing the church from the noisy world outside, and by its quiet seclusion tending to produce that devotional feeling so suitable to the entrance of a church." The narthex and the galilee, the last as we see at Ely and Durham, were derived no doubt from the Roman atrium, but we rather wish to dwell on the secular use of the feature.

The modern vestibule and hall are offshoots, though degenerate ones, from Classic times: often they are mere apologies, sometimes a square room with four columns and a blank wall behind, sometimes an opening with two columns to screen off the staircase from the outer vestibule. So long as there are columns, no matter how placed, the architect thinks he has created an impression upon the visitor. But to see what, after he passes them? Perhaps nothing but a very ordinary staircase, blank walls with commonplace doorways. The anticipation is rudely shocked at such an anticlimax of so promising a beginning. Disappointment is suffered, and is all the harder to bear because the imagination has been aroused to a high pitch. We imagine something beyond that is grander in decoration or scale—an inner hall, a court at once a fitting climax to the entrance hall, lofty, full of radiant light, or open above, and surrounded by colonnades or arcaded logias. St. George's Hall, Liverpool, the Royal Courts of Justice, London; and the Royal Exchange are examples of dignified arrangements, in which we pass from the lesser to the greater—from an outer vestibule to a noble apartment or a handsome cortile. Barry, in his Reform Clubhouse, Pall Mall, has given an admirable example of the Italian cortile arrangement. This grand hall in the centre of the interior is 56ft. by 50ft., and is surrounded by colonnades, Ionic below and Corinthian above; the roof is of diapered flint glass, and the floor tesselated. The staircase leads to the upper gallery, of the Corinthian order. In buildings of lesser importance the vestibule leads into the staircase hall, which may be a square or elongated apartment, adorned by columns or surmounted by a domical ceiling or skylight; sometimes it has a gallery round it. It is here the visitor imbibes his inspiration of the place, and it is here the architect should put his best art. Rather broad and dignified than lavish in ornament, the key-note of the prevailing treatment ought to be seen in the hall—whether it be of a private house or a public institution. The staircase ought to look an integral part of the hall, be divided or broken into flights, so as not to form a raking and unsightly feature as it very often does, a kind of afterthought placed against one or two adjacent walls of the hall. Architecturally considered, the very plain, raking soffit destroys all structural effect if allowed to predominate—one reason why a staircase hall on a small scale is generally so unsatisfactory. To produce agreeable effect, the horizontal lines of the steps or treads, ought to dominate. Masons, we know, like the spandrel step and raking stair soffit—they look lighter; but the architect prefers the steps to be left square or the undersides moulded on the soffit, a treatment generally adopted in important new buildings. But we need not say more on the staircase, except that it is one of the difficulties of artistic treatment when combined with a hall of small size. The vestibule is incomplete without an inner hall as the *pièce de résistance* in which the staircase may or may not be placed. Better, of course, if space allows, are recesses or lateral staircases on either side, allowing the hall to be free, these being separated by columns or arches in the form of an arcade from the main hall or corridor.

The advantage of placing the vestibule on the same axis as the hall is apparent, though we occasionally find violations of a rule so important as to be almost an axiomatic one. As an instance, an architect places his entrance tower and vestibule on the centre of the main façade, but disposes his inner hall on one side so that the visitor, after crossing the vestibule in a right line, would be diverted by a blank wall of corridor into the inner hall quite on one side. He would pass into the vestibule, take a right angle movement into a corridor, and pass to the inner hall through an arcade. A devious route or entrance is not always to be despised, however. For domestic and collegiate buildings we can find admiration in the indirect entrance. There is the pleasure created by expectancy—something to be revealed at each turn of our progress, the charm of indefiniteness as we thread our steps through vestibule and corridor into a well-lighted court or hall such as we meet with in many of the old colleges of the universities, at Hampton Court, and other places. There is a fascination in the intricate passages and vestibules of the old feudal hall, in the unravelled plot or plan. On this class of buildings we are not now engaged. Our object is to show that a skilful study of plan in the entrances of our public buildings is the avoidance of intricacy for its own sake, directness of approach, but so managed by an artistic concealment of bounds, by leading the eye out of the smaller into the greater, out of the plain into the more decorated, as to engage the visitor at every step; so the old peristyle of the Pompeian house led the guests, so the portico and pronaos led to the cella or the hypæthron.

The plans for the Imperial Institute show how architects differ in their treatment of the vestibule and hall. Mr. Collcutt has his main entrance leading to a tower vestibule square in plan, with four arches, two transversely leading to a corridor running lengthwise, and the axial opening leading to an inner hall or cortile and grand staircase, beyond which is an octagonal ante-hall to the reception hall; these are all in line with the entrance. The well-lighted cortile between the quadrangles is a feature that might be turned to good account, with lateral staircases separated by arcades. The portico, vestibule, and central hall in Messrs. T. N. Deane and Son's design are arranged with the object of increasing effect, the whole being axially disposed. Messrs. Aston Webb and Ingress Bell have a vestibule giving access to a square entrance hall divided by piers into nine compartments, the principal staircase in two flights ascending right and left beyond and forming a climax, a central entrance between the flights leading into the reception hall. Mr. A. W. Blomfield has a large octagonal entrance hall surmounted by a dome, a vestibule of the width of one side of octagon giving access to the reception room; these are axial. Mr. T. G. Jackson shows a tower entrance hall, but on one side of the inner hall. Dr. R. Rowand Anderson has observed an architectural gradation in his plan. Where the axial plan cannot be adopted, the architect has the choice of two alternatives. He may adopt a lateral inner hall, the staircases being arranged on either or both sides, with the main hall or apartment beyond, but centrally placed; or otherwise the vestibule may become the approach to a transverse corridor as we find at the Bolton Town Hall, and at the Manchester Town Hall. In both these buildings there is an opening in line with the axis of vestibule into the great hall, and in the latter instance the architect, Mr. Waterhouse, has succeeded in sustaining the effect by the lighted courts and bays on either side. To give interest and concentrated attention to the vestibule, the artistic architects have reserved their skill for the display of a well-lighted cortile or an open quadrangle as is the case of Somerset House. If this cannot be attained, an inner hall is the most promising of the means of securing the necessary vista. The imagination seeks for a continued revealing of beauty by a vista through a succession of varied courts or apartments, and is at once disappointed if a blank wall stops the way, beyond which there is nothing but barrenness and poverty.

TECHNICAL SCHOOL BUILDING.

LATELY we referred to the want of treatises on particular classes of buildings, and especially of those which have had

their origin during the last half-century, and we particularly dwelt upon the value of details of a technical kind or for a special purpose. The general spread of technical education has called for a new class of construction. The technical school, though known for many years in Germany, Austria, and other Continental nations, is comparatively a new institution in England, and when the promoters of technical instruction began to provide laboratories for physical and chemical instruction, they found English models of schools quite unsuited to their wants. Not only was it necessary to provide buildings on a different plan, but also to provide in their construction for requirements which were unknown to the old school builders. The systems, classification, and fittings of the polytechnic schools and Real-Schulen of Germany have been, more or less, introduced during the last few years ; and to the labours of Mr. A. Waterhouse, R.A., Mr. E. Hughes, Mr. E. N. Clifton, Mr. Henry Currey, Mr. E. C. Robins, F.S.A., Messrs. Mills and Murgatroyd, Messrs. T. N. Deane and Son, and others, we owe a class of buildings which may be regarded as types of structure to follow. Mr. A. Waterhouse, who was the architect of Owens College, Manchester, one of the earliest buildings of this class, fully illustrated in this journal, was one of the pioneers in this class of construction. He carried out a scheme of arrangement prescribed by Professor Sir H. Roscoe, the eminent physicist, and the chemical laboratories of this college continue to be models for the architect, and the medical school is also one of the most complete of its kind.

Mr. E. C. Robins, F.S.A., the author of a comprehensive treatise on the design and construction of buildings of this character,* has done good service in collecting and arranging for comparison several recent structures of this class, and in condensing a large amount of information on their construction and fitting up. As a member of the Executive Committee of the City Guilds, Mr. Robins accompanied Professors Armstrong and Ayrton in a tour of inspection of the polytechnic schools of the Continent. The results of this tour have been summarised. Mr. Robins describes and illustrates several of the more important, such as the Strasburg New University, the Conservatoire des Arts et Métiers, Paris, Professor Hofmann's chemical laboratories of Bonn and Berlin, the Munich University chemical laboratory, the Graz University chemical laboratory, the laboratories of the Royal Trade School, Chemnitz, the physical laboratory, Wurzburg, the Technical High School, Hanover, the Royal Technical High School, Stockholm, Sweden, the chemical laboratories, Zurich, &c. The author has thrown together, in a rather discursive form, observations on the advantages of technical education. As the architect of the Merchant Venturers' School, Bristol, and a member of the Executive Committee of the City Guilds, the knowledge and data he has acquired have been practically applied. Chapter I., which deals with English and foreign technical education, enters at some length into the rational methods of instruction. The author quotes at length from the Royal Commissioners' report on technical education, and gives an analysis of the second report in the following chapter, which is a valuable contribution. Nothing is more certain than the want experienced or good workmen in building ; but this has been brought about by the subdivision of the trades by specialisation of labour and the introduction of machinery. Skilful and artistic workmen have decreased, because a portion only of a trade has to be learned. By technical education in our schools we seek a corrective for this tendency. Few of our ordinary workmen now understand the principles of their trade or have rightly learned the proper adaptation of the materials they convert. English workmen are improving, no doubt ; but they are yet far behind the German in technical knowledge. Instruction in the use of tools and materials is of primary importance, and should be acquired in the elementary school. Fifteen years ago apprenticeship schools for workmen existed in Paris, and in the primary schools manual instruction is given. The author furnishes much useful evidence from professors of technology bearing upon the technical schools for workmen in Germany and Switzerland ; of these the *technikums* may be mentioned as the chief. The City and Guilds of London Institute is doing much the same for English working men, though it will be some time before the system is in working order or will give the results the schools do abroad.

The examples of foreign laboratories which the author has given will be found of value to promoters and architects engaged in school and college buildings, for, as we have hinted, the experience necessary in the design of good buildings can only be obtained by a study of foreign works. Mr. Robins has collected the data, and to some extent has formulated general principles. Chemistry and physics, mechanics, engineering, anatomy, and architecture necessitate specially-designed buildings, as these require laboratories, lecture and work rooms, drawing and modelling rooms. The rooms should be grouped upon some plan, and should be specially lighted, heated, and ventilated. The main laboratory and lecture rooms must form the centre of a chemical group of buildings ; the working benches for students, with sinks and draught closets, have to be arranged on the benches or along the walls. On the Continent separate laboratories for students of qualitative and quantitative chemistry are provided. At the Munich University the laboratory is divided into two parts, one for organic and one for inorganic chemistry, the former on the ground floor and the latter on the first floor. These laboratories are lighted on both sides, and have cross ventilation. Adjoining the former are a series of rooms for the director, and a combustion room. These are placed on each side of a corridor leading into the main laboratory. At the other end of it are conveniences, and a suite of living-rooms for assistants. In one of the laboratories (for beginners) one table is given to two students ; but in the advanced students' laboratory one table is assigned to each, and the laboratory for the former class accommodates 32 students, and for the latter 16. The floors are of wood with asphalte borders and gutters, 3ft. wide, on which are the wooden sinks and draught closets. The gutter carries away the water from sinks. The subordinate rooms given to this division include a room for heating sealed tubes (cannon-room), glass-blowing room, small combustion room, specimen room, washing-up room, in which is the hoist, a large combustion room at the end, and on the other side of corridor a large sink room with shaft, and a balance room. The private laboratory block: similar rooms are provided, with a consulting room and students' library adjoining the inorganic laboratory on the first floor ; the subordinate rooms comprise a filtration room, blowpipe room, melting and air-bath room, specimen room, washing-up room, stink chamber, balance rooms, sulphuretted hydrogen room, with other subsidiary rooms. A large square lecture-hall adjoins the latter block. The plan of the Physiological Institute, Berlin, is a good type of building of its class, with a central lecture-hall, instrument and assistants' rooms in front ; the first floor is arranged for chemical researches and spectrum analysis, and the second for optical and photographic work. For a technical school, the Royal Trade School, Chemnitz, appears to be well arranged in two balanced wings, with central block given up to grand staircase and teachers' rooms. The well-appointed Technical High School at Hanover has a very complete and architectural plan arranged round fine quadrangular courts, presenting a palatial appearance. A large space on the first floor is devoted to a series of lecture and drawing rooms for architecture and building, with inner corridor approach. These are divided into four classes of students. Rooms for building construction, models, technology, lectures, and collections occupy one ordinary wing ; mineralogy and geology, practical geometry, and mathematical instruments, with lecture-rooms in front of each, form the centre wings, and the department for physics and chemistry the extreme wing. On the ground floor are the engineering rooms below those for architecture and arranged similarly, and a very large space is given to drawing. The last plate illustrates the arrangement of another great school, the Royal Technical High School, Berlin, which cost £400,000. A chemical laboratory is by no means an easy building to plan. The larger the number of students, the more is it necessary to provide separate rooms for different kinds of work. Probably the most economical plan is a quadrangle with the rooms arranged round, as this plan shortens the distance and labour of superintendence. The Munich laboratories at the Academy of Sciences are planned on this principle. With regard to ventilation, descending extract flues have been provided. The draught closets, where all kinds of unpleasant odours are created, have flues carried up, and inlets for fresh air are introduced under the windows. The English examples include a few of the more important buildings. Of course, we have plans of the City and Guilds of London Central Institute at South Kensington, by Mr. A. Waterhouse, R.A.—a study deserving attention. The basement is occupied by rooms for delicate experiments in physics, in which vibration has to be minimised, mechanical workshops, joiners' shops, engineering, drawing, laboratory, &c. On the ground floor in front, physics is taught in one wing, including an optical laboratory, physics class-room, and engineering lecture-room ; and in the other wing are rooms for the engineering professor, lecture-room for mathematics, professors' rooms, and mathematical drawing room, all arranged along a corridor. In the rear are two lecture theatres, one for chemistry, the other for physics and mechanics, with preparation rooms in connection. The second and third floors are devoted to the chemical laboratories and class-rooms, the juniors' laboratory being on the third floor, behind. The Finsbury Technical School affords another good example of planning. Other plans are given of the Yorkshire College, Leeds, by Mr. Waterhouse ; the Merchant Venturers' School, Bristol, by the author—a good scheme, with a great hall ; the Manchester Grammar School Laboratory, by Mills and Murgatroyd ; Oldham School Laboratory, by Messrs. Woodhouse and Potts, Birmingham ; Mason's Science College, by Mr. J. A. Cossins—a cleverly arranged plan ; Medical School of St. Thomas's Hospital, by Mr. Henry Currey ; Owens College, Manchester, by Mr. Waterhouse ; Oxford Physiological Laboratory, by Messrs. T. N. Deane and Son ; and the Cambridge University Laboratory, by Mr. J. J. Stevenson. The chapter on fittings for applied science instruction will be found of service. Drawings to a large scale are given of students' working tables, with the mode of extracting the gases by flues below the tables ; sinks and draught closets in use at Manchester, and in the Finsbury College, Merchant Venturers' School, Bristol, and other institutions. In the chapters on heating and ventilation we find the author has adapted the formulæ and diagrams given in J. L. Bacon and Co.'s treatise. Chapter IV.

* Technical School and College Building. By EDWARD COOKWORTHY ROBINS, F.S.A. London: Whittaker and Co.

contains full descriptions of buildings for secondary educational purposes, and includes ink photos of South Hampstead High School for Girls, Milton Mount College, Gravesend; Walthamstow Hall, Sevenoaks Congregational Ministers' Boys' School, Caterham, and plans of elementary schools designed by the author. Mr. Robins's treatise, as the only comprehensive work on the subject yet published in England, is of value to the architect engaged in buildings of this class, and the plans and details add greatly to its practical usefulness.

THE EFFECT OF SEA-WATER ON CONCRETE.

THOSE who use Portland cement concrete will be interested in the discovery to which the *Scotsman* drew attention recently. It appears that the Aberdeen harbour seaworks have suffered considerably. The concrete blocks have been seriously affected by the sea, and the authorities have been rather puzzled to account for its destructive action. Very great reliance has been hitherto placed by engineers and architects on Portland cement concrete; but this good opinion has been somewhat shaken, if all that we hear of certain hydraulic works can be substantiated. We take our information from recent accounts that have come to us. Indications of failure have been observed for some time in important sea walls constructed of concrete, and the Aberdeen harbour works, if what we learn is true, confirm the misgivings which are entertained. The action of sea-water on concrete has been suspected of late years; but up to this time a satisfactory explanation of the damage sustained has not been given. Experiments have been recently made by direction of the Aberdeen authorities by Professor Brazier, of Aberdeen University, and Mr. William Smith, the harbour engineer. The decayed concrete has been ascribed to the force of the sea and wind, though the action was chiefly noticeable in the graving dock in still water. The writer in the *Scotsman* says: "It is the action of the sea-water under pressure in still water that has rendered the nature of the damage in the present instance so conspicuous." The quay walls and breakwater were constructed fifteen years ago, the graving dock two years ago, and in all these works a disintegration of the surface of the concrete by the chemical action of the salt water has been going on. The entrance walls are said to be built of Portland cement concrete, composed of one measure of cement, two measures of sand, and three measures of stones, with large rubble stones incorporated in the walls. The wall surface is plastered with Portland cement mortar up to 3ft. of low water, the mortar being made of one measure of Portland cement and one of sand; the upper part of wall is faced with granite. During the process of emptying the water from the graving dock, a hydraulic pressure varying with the tides of from 5lb. to 11lb. per square inch is put on this concrete skin, the water forcing its way through the pores of the skin, producing cracks and saturating the quay walls. The chemical action is hastened in proportion to the exposure, and is increased by the passage of water through the body of concrete. Various injuries are reported—*e.g.*, the joints of the ashlar facing have opened in parts, owing to the loosing of the concrete surface beneath. The engineer consulted Professor Brazier. Test briquettes were prepared for analysis with a view of discovering the proportion of magnesia contained, and which was supposed to account for the damage. The Portland cement, it was found, had not contained more than one-half per cent. of magnesia, whereas the decayed concretes showed an increase in the quantity of hydrate of magnesia of 13½, 15, 22, and in one case as much as 40 per cent. This could only have been derived from the sea-water. Another deleterious substance found in the decayed concrete was carbonate of lime, which could hardly be traced in the Portland cement of the same standard. The concrete taken from the south breakwater showed it to have undergone a similar chemical change. The outer quay walls surrounding the side of the graving dock were built of plastic concrete or Portland cement concrete, mixed in the usual way with a certain quantity of water, and allowed to set two to four hours, then broken up and deposited within frames under water in skips with opening bottoms, the concrete being left *in situ* in the frame. These walls do not show the same action or decay. Portions have been rebuilt with Roman cement concrete under water, but no decay has been noticed in them, and the only protection to the Portland cement concrete from the chemical action of the sea is apparently a non-porous lining or facing of stonework.

Every care is said to have been taken in the concrete used; the cement had withstood the mechanical tests, and the concrete had set hard. The same failure of Portland cement concrete was noticed by Mr. Harrison Hayter, vice-president of the Institution of Civil Engineers, two years ago. After a time the concrete expanded, vertical walls of the material lifted some inches, and the surface cracked and flaked off. In every case a white "cream-like" substance was observed in the concrete, which Mr. Hayter had analysed and was found to contain 80 per cent. of magnesia hydrate, consisting of about two-thirds magnesia oxide and one-third water. In every case of decayed concrete magnesia was present. Professor Brazier's experiments are confirmatory of the fact that these deposits of decayed cements contain magnesia, but he believes the substance comes from the action of the sea-water, and is not present in the Portland cement, as Mr. Hayter thought to be the case. We cannot enter into the details of the experiments made by Prof. Brazier on the cement blocks, and the results he obtained by digesting some of the cement in sea-water, from which it appears that the amount of lime and magnesia contained in the sea-water in its original state is accounted for after the cement had been separated from the water, there being a gain of lime and a loss of magnesia amounting to nearly all the magnesia contained in the sea-water. Hence the same authority concludes that Portland cement cannot resist the action of sea water.

TWO WEST-END CHURCHES.

THE members of the Society of Architects visited on Saturday afternoon two churches just built from designs by their past-President, Mr. H. Roumieu Gough—those of St. Cuthbert, Philbeach-gardens, Kensington, the new parish church of Hammersmith. The former church is now being roofed-in, while the nave of St. Paul, Hammersmith, was opened in 1885, and the chancel was reconsecrated on the 2nd inst. Mr. Gough accompanied the party, and explained the leading features of the buildings, both of which have been illustrated in our pages, St. Cuthbert's on Oct. 14, 1881, and St. Paul's on Aug. 27, 1880.

The interior of St. Cuthbert's Church, Philbeach-gardens, was not seen to advantage, as the centre is still blocked up by the unsightly iron structure in which services have been held for some years past. The church is built of red bricks, with Bath-stone facings, and consists of a nave and chancel 28ft. wide under one roof, and 125ft. in total length; the nave is of seven bays, and has north and south aisles, each 12ft. 6in. wide, with apsidal baptistery at west end. The church is lofty in its proportions, being 43ft. to springing of roof, 59ft. from nave floor to underside of barrel vault, and 62ft. to ridge. There is no tower, but the bell turret at the west end is carried to a height of 106ft. from ground, and over the chancel arch a flèche of woodwork covered with copper rises 72ft. above the ridge, or 134ft. from floor. The most novel feature of the church is the east front, which, although facing the street, contains no window, the space being occupied with two tiers of canopied niches, hereafter to be filled with statuary of Apostles and Fathers of the Church, the figures being somewhat over life-size.

The barrel vault to nave is groined with wooden ribs, and is bolted to an iron lattice girder roof, over which is a steep-pitched outer casing of common rafters and purlins covered with Imperial green slates. The aisles are divided from the nave by an arcade of clustered Devonshire marble columns carrying a lofty clerestory of double lights. On the south side of chancel is a morning chapel (separately roofed), and on the north side an organ chamber and vestry, with processional path, formed in the thickness of the walls behind the altar. In a crypt beneath these buildings and chancel are Sunday schools and parochial rooms. At the north-west angle is a residence for the vicar, the Rev. H. Westhall, with access to the church on the ground floor and by small west gallery. Messrs. S. Belham and Son, of Buckingham Palace-road, S.W., were the builders, and the Baron de Sziemanowicz, of Hurley-road, Kennington, executed the carving in this church, and also at St. Paul's, Hammersmith. The cost has been about £11,000.

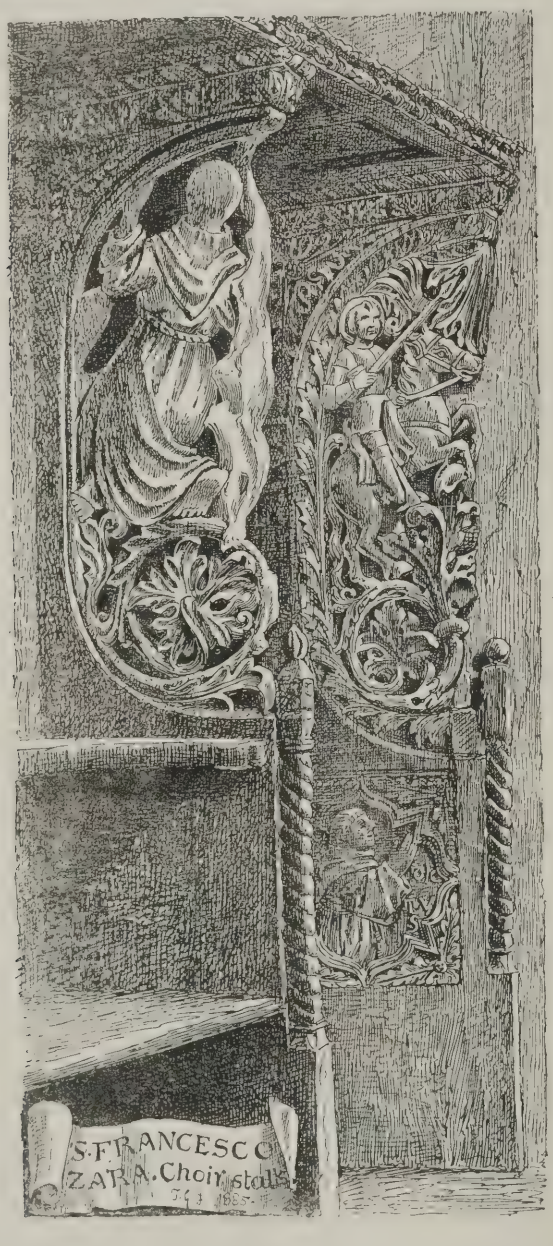
Having partaken of tea and coffee hospitably provided by the vicar, the visitors proceeded to inspect Hammersmith parish church. The new building replaces a smaller one consecrated in 1665. The older portion of church consists of a nave of six bays with side aisles, divided by an arcade of grey Bath stone resting on black Belgian marble pillars. The spandrels and internal masonry of the walls are of a warm sandstone from Ancaster, in courses left rough from the chisel, contrasting with the blue Bath of the archivolts, and the lighter dressed Box-ground and Corsham freestone of the clerestory. The clerestory is pierced by triplets of single light in each bay, and the ceiling is a plain pointed vault of plaster, with longitudinal, cross, and diagonal ribs on the face, decorated by stencilling, and supported by wall shafts of grey stone, resting on corbels. A semi-octagonal baptistery projects from the centre of nave at the west end. The new chancel, of the same width (30ft.), and height (45ft. 6in.) as nave, is two bays in length, with a morning chapel and aisle on the south side, organ chamber and vestry on the north, a choir vestry projecting eastward from the chancel, and communicating, ambulatory-like, with the chapel and vestry on each side of the sanctuary. The chapel is apsidal-ended. The piers separating the chancel from the adjoining aisle and organ-chamber are of black Belgian marble, which takes a good polish, with capitals and bases of the same material. There are sedilia on the south side of sanctuary, and the east end has a large three-light window, below which, behind the altar, the wall is divided into three compartments by an engaged arcade of black marble, plastered between, and decorated by stencilling. Round the sides of sanctuary and aisles is a dado of grey Leopold marble, the chancel and sanctuary and passages to nave all paved with Rust's glass mosaic, the risers of the steps being of marble. A dwarf perforated screen with moulded capping, all of Leopold marble, separates the nave from chancel. The ceiling of the new chancel forms a pointed vault plastered, with cross ribs springing from wall shafts between the clerestory windows. It is decorated with ornament up the ribs, and with a series of stencilled gables above the cornice the predominating ground colour being grey. The seats are carried out in a very substantial manner in teak, by Mr. John Lister, Aston, Rotherham. A large tower is in progress of erection over the end of north aisle or vestry, which is intended to have pinnacles at the corners. A pleasing contrast in tone is derived by the use of the warm Mansfield stone in the external walling with the Bath-stone dressings, and the replacement on the aisle walls of the tablets and memorials from the older church adds much to the internal effect. The nave and chancel are of the same height externally, and the church, when finished, will present a dignified appearance from the Broadway. The contractors are Messrs. Chamberlen Bros., builders, of Hammersmith, who have well executed the work, from the designs and under the supervision of Mr. Gough. Messrs. Jones and Willis supplied the iron fittings, and Messrs. Belham and Son, of Pimlico, the grisaille lights in the four lancets at west end.

DALMATIAN ARCHITECTURE AND CROATIAN ART.

MR. T. G. JACKSON'S admirable work on Dalmatia* is distinguished by a freshness and undoubted thoroughness, which gives it an importance and interest of the first order; in fact, the history of architectural art has

* Dalmatia: the Quarnero and Istria with Cettigne in Montenegro and the Island of Grado. By T. G. JACKSON, M.A., F.S.A., Hon. Fellow of Wadham College, Oxford. Oxford: At the Clarendon Press, 1887.

received no more valuable addition since the days when Street published his "History of the Brick and Marble Architecture of Italy," or Sir Gilbert Scott printed his instructive lectures on the Dome and its Pendentive at the Royal Academy. In these days, when almost every style of building has been copied, adapted, and "revived," it is at least refreshing to find some less familiar phase of architecture so clearly and so cleverly brought before students of the art. Advocates of "a new style," changing once again their allegiance, have already stated that probably in the Dalmatian buildings as thus set forth for the first time will be found the elements for a development of the inevitable "new style." An increased knowledge of architecture and an extended

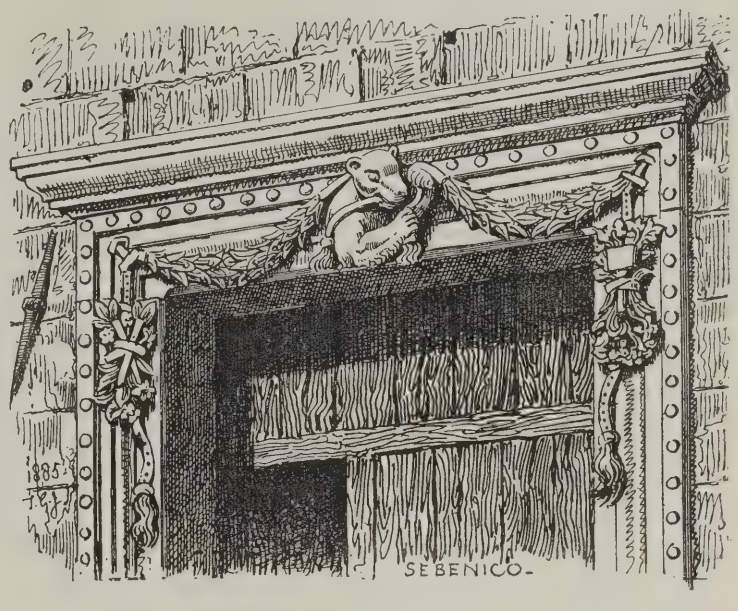


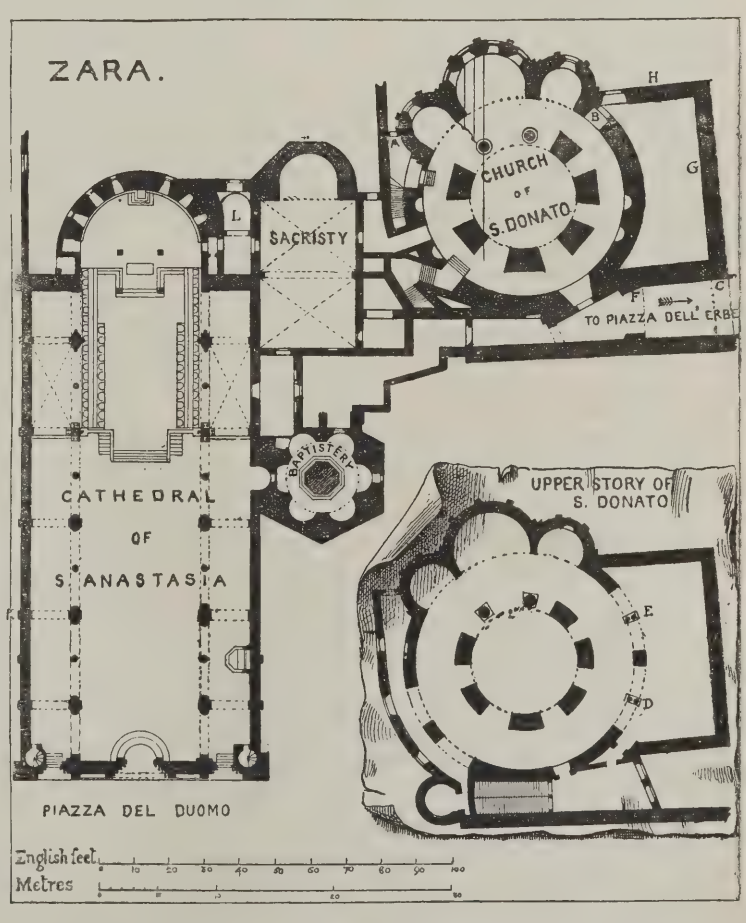
field of study alone can solve this problem, and so in this sense Mr. Jackson's book cannot fail to clear the ground for future efforts by informing us of many notable triumphs of the past hitherto comparatively unknown. Beyond this point we do not for a moment suppose he would follow those who profess to see in these drawings from Dalmatia a "new start" for architecture in its application to the everyday wants of the present time, and there seems indeed nothing in his book to favour such an assumption. Its pages are too busily occupied with historical information and descriptive particulars of the actual to enter upon so speculative and comparatively valueless a question as to what will or will not constitute a new style. The earlier part of the volumes is devoted to an almost complete description of all the architectural monuments of importance on the mainland of Dalmatia, the islands of the Croatian shore of the Quarnero, and the Litorale of Istria from Pola to Aquileja. To this is added an account of the Island of Grado, which is so intimately connected with Dalmatia as the metropolitan see of the Venetian dominion as to belong to the subject, although it differs from the Aquileja part of Istria. Grado is unknown to English art students save by report, and many of the places described by Mr. Jackson are certainly unknown to them even by repute. "Few persons," says our author, "have any idea of the beauty and extent of the art treasures of these countries, which indeed, so far as I know, have never before been explored from end to end by a professional student of architecture." The task thus referred to, no doubt, was a laborious one; and the several incidents of travel so graphically recorded in the pages before us give one a fair idea of the many difficulties of exposure and fatigue, sparse fare, and inadequate quarters which had to be overcome and encountered before the knowledge, not otherwise to be obtained, could be in any sense considered complete. Travelling in Dalmatia down the coast in the Austrian Lloyd's steamers is simple enough so long as the tourist is satisfied with a glimpse at the four or five chief towns which may thus be secured; but experience alone can tell the hardships to be undergone when once the beaten track is left by the traveller. That Mr. Jackson was well repaid for his three trips goes without saying, and all lovers of architectural art can but feel indebted to him for the unreserved way in which his studies and sketches have been placed before the public. His books are fully illustrated with plates and cuts. The subjects embrace not a few general views of towns and landscapes, costume drawings, and illustrations of church plate, furniture, and silversmith's work, in which Dalmatia is unusually rich. By the courtesy of the author and publishers, we are enabled to-day to present our readers with two plates, reproduced from Mr. Jackson's originals, which number among the illustrations of his work, and three of the letterpress blocks are here printed as typical examples of those which enrich his volumes.

To follow, however briefly, the history of Dalmatia through its four periods is quite beyond the limits of space at our disposal. These periods are divided thus—first, Dalmatia under the Romans and down to the fall of the Western Empire, A.D. 476; second, Dalmatia under the Byzantine Empire down to the arrival of the Hungarians, A.D. 1102; third, Dalmatia contested by Hungary and Venice down to the final Venetian occupation, A.D. 1409-1420; and, fourth, Dalmatia under the Venetians down to the fall of the Republic, A.D. 1797.. The materials for such a concise history can only be collected in the country. The works of local historians, of which there are many, only exist very often in MS., and even when printed seldom are found beyond the province. Then it is of prime importance for the writer to allow for the bias of politics, of creed, and race in a country where such feelings run so high as in Dalmatia. A most useful map of the islands and coast of the Adriatic, drawn to English and Austrian scale, prefixes the first volume. A review of the social condition of the country follows the historical *résumé*, and the chapter concludes with an account of the present state of the province. Added to this is a chronological table of the kings of Hungary down to 1526. Dalmatia, though nominally a kingdom, has never had any independent national existence, and even its geographical boundaries have been differently fixed by different writers and at different times. The natural scenery of Dalmatia is as singular as its geographical formation, and is in the strongest contrast to that of the opposite shores of Italy. The luxuriantly wooded mountains of Umbria, and the lagunes and marshes of Romagna and Venetia, are confronted in Dalmatia by stony deserts and mountains of arid whiteness which at the first view seem covered with new fallen snow; while the muddy sea that beats on the flat shores and harbourless coast of Italy is exchanged on the opposite side for sapphire depths of crystal clearness, which interlace the intricate network of natural breakwaters and penetrate into countless havens of matchless security. There are some few rivers of considerable size; but there are neither brooks nor springs, and most of the people have no water to drink but such as falls from the skies, and is collected in cisterns. In the interior the people and country both become ruder and less cultivated, and the place seems lost in a semi-barbarism. The architecture of Dalmatia has so much in it that is peculiar and distinctive that it is entitled to rank as a style by itself among the various national styles of Mediæval Europe. It is entirely urban and confined to the maritime cities, for the sea has in all ages been the parent of Dalmatian civilisation. The Slavonic conquerors gradually received the religion, and in a rude way imitated the art of the Byzantine Empire; but they never developed an art of their own, and the silversmiths' work which has been produced in purely Slavonic districts in modern times is but little removed from the Byzantine art of the eighth and ninth centuries. The maritime Dalmatians were brought into contact with the nations of Western Europe, and, above all, with Italy, their style being chiefly based on the Italian, though the Dalmatians cannot be described as mere copyists. Their artists, whether of the old Illyrian stock or, as their names imply, Slavs and Albanians, there is something about their work which reminds one of Northern Gothic, which it is suggested may be due to the influence of Hungarian rule, under which French and German artificers were possibly employed.

The first place naturally seen by the traveller on entering upon the Dalmatian soil is Zara,

by way of Trieste and Pola. It occupies a level peninsula, slightly raised above the sea, combining more advantages than any other of the Dalmatian ports, and which have caused it to be always strongly fortified. Behind, in the distance, are the mountains of Velebic on the left, and the mountainous island of Ugliano on the right. The Duomo resembles the Lombard Churches of Italy, and Zara is particularly rich in buildings of the earlier styles, chiefly used now, however, as haylofts and cellars. One exception to this rule is the Church of the Holy Trinity, known as St. Donato, which is not likely to be overlooked, though the building is not much seen from the interior of the town. From the distance, the lofty central drum with its pyramidal roof is the most conspicuous building that appears above the city walls. We print a plan of the sacred edifice, which during the past hundred years, has been put to a variety of uses. St. Donato is a round church of the same type as that of St. Vitale at Ravenna, and the Cathedral of Aix-la-Chapelle, though it differs from both in many particulars. It has a circular space in the centre surrounded by a circular aisle, and from the aisle three apses project eastward, of which the middle one is larger than the other two, and all three apses are vaulted at the level of the vaulting in the aisle. Above these apses and this aisle is an upper story like a triforium opening into the central space. The ascent to this upper church, as Constantine Porphyrogenitus called it, is by a stair which winds round the outer wall landing in a kind of atrium, from which the building is entered. Here the catechumens worshipped, and having a separate entrance at A on the plan, they could attend the services without mixing with the congregation. The construction of the church is very rude, and is equally plain inside as out. The central dome has now fallen in, and the space is covered with a wooden ceiling. The circular aisle opens into the central space by eight round arches, and is ceiled with an annular barrel vault which forms the floor of the upper gallery. The additional space opening into the main building by the arches D E made the gallery level worthy of the name of the upper church above the first. Bishop Donatus is thought to have built the edifice at the beginning of the ninth century, and under the foundations of this church have recently been found the huge fragments of more than one magnificent Classic building entablature with Corinthian enrichments, marble columns, and running scrollwork in the best style of Roman architecture — pride spiritual crushing pride temporal. St. Pietro Vecchio, St. Lorenzo, St. Domenica (a most interesting church), and St. Orsola, which is built on a plan resembling the ancient baptistery of the Duomo, are among the churches of Zara. The cathedral is dedicated to St. Anastasia, and its plan is given herewith showing a basilica; but the traditional proportions of the ancient basilicas are not observed, for the nave is three times as wide as the aisles. The church was not begun before the 13th century, and it is said to have been erected by the Crusaders, who left money for its endowment. Mr. Jackson gives a very careful description of the building, furnishing several views and details. The apse has a magnificent Cipollino marble baldacchino over the high altar, loftier than the famous one at St. Mark's, very chaste in style, though dating only from the 14th century. The choir stalls are specially good examples of woodwork, resembing the well-known stalls of the Frari at Venice. The façade of this church is the finest in Dalmatia, and the exterior generally is grander than the interior. The sacristy is an apsidal building, and formerly a church of greater antiquity than the present Duomo. The passage at L on plan was evidently an early chapel. The baptistery is clearly shown by the plan. The most perfect souvenir of Archbishop Maffeo Valaresso, who commenced the unfinished campanile in the Corso a few yards from the east end of the cathedral, is the very beautiful and quaint pastoral staff which he gave to the church in 1460. It is of silver parcel gilt, very richly ornamented. We hope to illustrate Mr. Jackson's drawing of it at an early date, when a detailed account of the piece will follow. Passing St. Maria, with its Italian-like tower, we reach the Franciscan convent and church of St. Francesco, founded by St. Francis himself when he visited Zara in 1212. The church was dedicated in 1282, but has been modernised. The woodwork of the stalls forms the only attraction to the architect, and these are of uncommonly good design, as will be seen by our illustration printed beneath. They are among the finest to be found in Dalmatia, besides being earlier in date and in a purer Gothic style than any others. They were made in 1394 by Giovanni de Borgo San Sepolcro, a Tuscan settled at Venice, and cost 456 golden ducats. St. George on horseback, St. Francis receiving the stigmata, and St. Benedict, with other saints of the Franciscan order, are represented. The chalices of St. Francesco and the ark of St. Simeone, dated 1380, are among the other art treasures of the city. Novigrad, San Michele d'Ugliano, with its castle; Nona, in Illyric Nin, the Aenona Civitas of Pliny, visited for its small domed and cruciform church of St. Nicholas, and the tiny Byzantine cathedral church, now half ruined, of St. Croce, with a nave 8ft. 7in. wide, are illustrated; and Vrana, leading on to Sebenico with its crowded quays, picturesque piazzas, and steep, winding alleys, a Venetian citadel on the coast, is fully described. The cathedral church at Sebenico is entirely constructed of masonry. Indeed, not only Italy, but Europe, may be challenged to show another chuch of this size in which neither timber nor brick is employed, everything being constructed of good, squared stone, marble, and metal. In England, a few rude churches in Pembrokeshire, the chapel at Abbotsbury, the treasury at Merton College, Adel Church, near Leeds, and St. Cormac, at Cashel, in Ireland, are similarly constructed; but these and others which could be mentioned are of a diminutive scale. At Sebenico, the





whole of the great cruciform church is covered by a waggon roof of stone, the underside of which forms the ceiling, the effect being very simple and imposing. The details of the church, the pointed arches to the arcade, the pulpit, the plan of the cathedral, and its general external outline all serve to furnish subjects for several admirable sketches in line and watercolours. Most of the work thus shown is very late in date, and there are no traces of any other public buildings of greater antiquity than the 16th or 17th century. One building, or, rather, doorway—for nothing but the doorway remains—must be visited. It is a house in the contrada of St. Gregoria, and here, carved by Giorgio Orsini himself, is the great architect and sculptor's doorway, enriched by the bear that symbolised his ancestral house of the Orsini, while on each jamb, amid pendent swags and bouquets of flowers, hang the mallet and chisels of his sculptor's art. We illustrate the doorway herewith.

Spalato deservedly occupies considerable space in the second volume of Mr. Jackson's book, with illustrations of the Duomo, the Campanile Baptistery, once the Temple of Æsculapius, and the six-apsed circular church of S. Trinità, never illustrated before. The domestic architecture seen in the narrow streets of Spalato abounds in charming fragments of Venetian detail, and some of the old palaces of the ancient nobility have really fine windows, and many a graceful staircase or arcade. The Roman capital of Dalmatia, Salona, or Salonæ, on the lower slopes of Cabani, has a Christian basilica of great interest and very curious plan, with a series of apses resembling nothing known elsewhere. The next chapter is occupied by Traü, which alone would claim an article to even briefly describe its buildings and unique cathedral. The glory of the church is its western portal, a work of great beauty and marvellous finish of execution, equal to any instance of Romanesque or Gothic art. The loggia at Traü is beautifully illustrated by Plate XXIV. Jak, with its church of almost French design, Poglizza, Almissa, Dernis, Knin, Lesina, bring the reader on to the Island of Curzola from the Duomo, of which place Mr. Jackson shows some especially refined detail, and also the Franciscan cloister of pointed work situated in a little bay close to the shore, "the loveliest cloister in Dalmatia," though Mr. Jackson's delightful drawing of the Dominican convent cloister at Ragusa leads one to fancy that it has not a few competitors for interest and picturesqueness at any rate. The Palace of Ragusa is certainly a noble architectural composition, and the sculpture of the capitals is beyond all praise, while the beautiful drawings of this work are eminently practical and artistic. The statuette of St. Biago over the high altar is another piece of work well worthy in its way of special attention, and it, too, is represented by a very fine drawing. There is a notable chalice and paten with an ostensorio, also of very peculiar design, in the church at Mezzo. At the Greek convent of Savina there are several similar art treasures and examples of church plate. Some crosses of enamel and filigree, carved wood set in silver, some Byzantine-like hanging lamps, and "countless other wonders that made us open our eyes," adds Mr. Jackson. The Petohljebnica, a five bread platter consisting of a tazza from which rises a cup with four branches supporting two little cruets and two little platters, with several other things of like kind, are illustrated. One of the lithographs herewith represents the magnificent ciborio or baldacchino over the high altar in the Duomo at Cattaro. The reredos is formed by a gleaming pala of silver gilt, which evidently is not in its original state. In the top panel is a figure of our Lord in the centre; in the middle panel below this is St. Trifone, with a model of Cattaro. On either side of these figures are three others of saints, with flowing drapery and well-modelled hands and faces. The ciborio is formed by four slender octagonal columns of red marble from Lustiza, supporting a canopy formed by a series of three stages, all octagonal on plan, with little columns carrying trefoiled arches, and each with a sloping roof. A gilt angel surmounts the whole. It is wonderful that so slender a piece of construction should have escaped the earthquake in 1667, which destroyed the towers and west front of this cathedral. Both pala and baldacchino seem to be of the same date, towards the latter part of the 14th century. Want of space obliges us to pass over Parenzo, where in the Duomo there are some wonderfully beautiful marble work and carvings to be seen, and we leave the Island of Arbe with a similar regret, which extends also to Aquileja and Trieste. From Grado Cathedral we are enabled to illustrate the particularly interesting pulpit, which consists of two parts, belonging to widely different periods. The pulpit itself, and the six columns which carry it, are of white marble and of Byzantine work. The pulpit is sexfoil on plan, and rises 7ft. above the pavement. Four of the sides are carved with the four beasts of the Apocalypse, and on the fifth side towards the east is a large cross. The Arab-looking tester or canopy gives a strange Oriental air to the interior view of the church. It consists of six marble colonnettes, supporting six ogee trefoiled arches, corresponding with the six sides of the pulpit below, on which rests a dome of brick, plastered and painted red and white in scrolls and chequers. It dates from the 15th century, and may have been imitated from the picturesque little pulpit which rises out of the northern ambo at St. Mark's, Venice. The mosaic pavement in this basilica is very remarkable, with Latin and Greek inscriptions side by side, and the patriarchal chair at the east end of the church, with its tester over it, is also most interesting. The duomo has not before been described by any English architect, and Mr. Street was only able to cast a longing look that way from the campanile of Aquileja, while his account is taken from Eitelberger's article. There are other churches in Grado also mentioned by Mr. Jackson, and with these his labour of love closes. His book is a scholarly treatise, rich in facts, eminently readable in style, and graphic in descriptive power. His technical experience has enabled him to avoid all that is unworthy of record, and a practically concise account of his travels is the result, and for this the best thanks of all architects are due. Mr. Henry Frowde, too, is to be congratulated on the admirable printing and general get up of these three useful volumes.

VIBRATION OF BRIDGES.

AN exhaustive and learned paper on this subject, by Mr. S. W. Robinson, member of the American Society of Civil Engineers, appears in the "Transactions" of that society. The author's object is to present facts and figures in connection with the application of a so-called bridge indicator to railway bridges. The indicator is an instrument which analyses the movements, reducing them into the vertical and horizontal components. It was applied to bridges on the New York, Pennsylvania, and Ohio Railroad and other lines, and resulted in 193 diagrams. Vibratory movements were discovered, due to a combination of circumstances, including speed of train, car length, panel length, time of vibration of loaded bridge, rigidity of bridge flooring, &c. Besides this cumulative vibration, there was one due to unbalanced locomotive drivers. Mr. Robinson gives a series of diagrams of an interesting character. Three distinct vibratory movements are recorded. One line traced by the indicator shows the vertical movements, a line full of vertical ridges or jerks; a second line represents the lateral movements of the bridge, and another horizontal line is the line of reference. The indicator was placed at the panel point nearest mid span. These records of vertical and lateral movements were carefully devised; thus, deflection of the bridge, as where a train moves upon the bridge, is noted by a sudden rise in the pencil above the straight line. The statical deflection of bridge at a corresponding time is noted also by the movement of the paper strip as it travels along. The indicator used by Mr. Robinson may be briefly described as a clock movement for uniformly moving a strip of paper before two pencils, one recording the vertical and the other the horizontal movements upon it. The speed of the paper was about 15in. per minute. The table giving the results from all the diagrams is of value; the cumulative effects are also given in other tables. It may be mentioned that the Bollman truss gave few indicator records, while the Pratt truss is particularly susceptible of elastic vibration, as the upper and lower chords are connected firmly by bars into a whole, so that if one point is depressed by weight the whole truss is affected thereby. In cumulative vibration the impulses succeed each other at intervals, which are in keeping with the vibration period, or "in time." The author enters mathematically into the subject, and into the causes of those non-systematic lateral movements due to the wandering of trucks from side to side on the clearance between gauge of rails and wheels, and to crooks and joints in the rails. The most potent cause of bridge vibration is repetition of impulses, and is found to arise from the non-balance of the drivers, there being an impulse downwards when the excess of balance is downward, and *vice-versa*. The vibration occurs when the times of revolution of the drivers coincide with the periods of double vibration; the effect is then cumulative, and intense vibration is the result. A bridge is free from vibration when the revolution and vibration periods are not in harmony; hence when a body of soldiers crosses a bridge they break step for the purpose of avoiding cumulative vibration. The conditions favourable to vibration of this sort is thus stated:—*Primary:* Under suitable train-speed—(1), Non-balance of driving wheels; (2), yielding stringers in bridge floors, with equality of panel and half-car length. *Secondary:* (*a*), Vertical vibration of car on its springs; (*b*), equality of driving-wheel circumference and panel length; (*c*), excess of non-balance of drivers down at mid-panel; (*d*), free pedestal blocks, as on expansion rollers; (*e*), fish-shaped trusses, &c. The author observes that cumulative dynamic effect can be reduced mainly by counterbalancing the machinery so as to occasion no vertical components of non-balance: by giving rigidity to bridge stringers or making them very deep, not less than the depth of floor beams, and by making panel length so that no multiple of it will equal length of any car; by substituting sliding for expansion rollers. Generally, all trusses, like the Pratt, with upper and lower chords vibrate; but the Bollman, Fink, &c., will not. We recommend all railway engineers to study Mr. Robinson's useful paper.

THE SHORTCOMINGS OF SOME MODERN SANITARY METHODS.

AT the anniversary meeting of the Sanitary Institute of Great Britain, held at the Parkes Museum, Margaret-street, W., on the 14th inst., Sir Douglas Galton presiding, medals and certificates awarded to exhibitors at the Exhibition at York, in 1886, having been presented by the chairman, Dr. G. V. Poore delivered an address on "The Shortcomings of Some Modern Methods of Sanitation." The lecturer made a vigorous attack on the practice of mixing putrescible matter with water—*i.e.*, on the method of dealing with excrement by means of water carriage. He pointed out that recent investigations have shown that the decomposition of organic matter depends upon the growth of microbes. When organic matter is buried not too deeply in the soil the microbes are of a kind which cause oxidation and nitrification, and prepare the organic matters for absorption by the roots of plants. When mixed with water the microbes produced are different, and those offensive changes are caused which are known as putrefactive, and ammonia and carburetted hydrogen are formed, and oxidation is prevented. The mixing with water prevents and delays the only natural use of organic refuse—viz., that of forming food for plants. This practice, therefore, may be regarded as one which is antagonistic to natural law, and it is evident that such an antagonism is worse than hopeless. The mixing of organic refuse with water in cesspools and sewers causes putrefaction of it, and these putrefactive changes are not only most repellent to our senses, but are a great and universally acknowledged cause of diseases of various kinds. Further, many diseases of the zymotic class have of late years been shown to depend upon living organic particles, which possibly multiply in putrefying liquids, and are disseminated in the most perfect manner possible when organic matter containing them is mixed with water and allowed to flow to rivers or wells. No method of "sewage treatment" can be considered as reliable for the removing or rendering innocuous of zymotic organisms. This practice

of mixing with water involves a neglect of the great principle of "resisting the beginnings." The "Water System" inevitably produces a fouling of our rivers. Of this fact the Thames is a glaring example. With increase of water-carried sewage, pure water is getting daily more difficult to obtain. The financial and economical results of the water-carriage system have been disastrous. The lecturer contended that we have no right to borrow money for sewers, because they must be a source of expense and never a source of profit to those who come after us. The results of co-operation were most disastrous when persons co-operated to commit a blunder, and each generation ought to be at the sole charge of its own sanitary experiments. It was pointed out that water carriage, by enabling houses to be built without any curtilage whatsoever, was a great cause of overcrowding, the greatest of all sanitary evils, and this system of "water carriage" was not limited to towns, but was common in country districts where there was no possible excuse for it. The lecturer said he was a strong advocate for the dessemination of sanitary knowledge; but he was no advocate for legislation, by means of which blunders were often stereotyped. He advocated the encouragement of independence by householders, and he contended that those who did not use the sewers should not be compelled to pay for them. Our present method of levying rates was a distinct premium on jerry-building and overcrowding. If an equitable adjustment of sanitary rates were instituted, and the Pollution of Rivers Act were enforced against individuals, and if water were supplied by meter, sewage schemes in such places as the Thames Valley would very quickly become unnecessary, and people would subject organic refuse to immediate burial. The outcry for allotments was good, and if the allotments were near the houses, so much the better. Sewage farmers advocated an acre to every 100 persons; but it was clearly better to let the 100 persons live on the acre of ground, and thus save the expense of sewers, and reap the benefit of the produce. If every cottage (for the average five persons) had one-twentieth of an acre of ground, the sewage difficulty would disappear, and there would be an increase of health and contentment. A "Workman's City" built on this plan would accommodate 64,000 persons to the square mile, or, making allowance for roads, 50,000 to the square mile.

Sir D. Galton, in thanking the lecturer for his address, alluded to a proposal lately made for buiding a "sanitary house" in London, and stated that the scheme fell through because it was impossible to build a sanitary house on the area allotted to it, and at the same time pay the rent and interest. Until people insisted upon getting sufficient area on which to build, they would not get healthy houses.

THE SCIENCE AND ART DEPARTMENT.

THE report for 1886 of the Department of Science and Art was published on Tuesday, and states that the statistics of science schools for the last ten years show that the slow but steady rate of increase which obtained in previous years was somewhat accelerated last year. The number of schools examined increased by 140, the number of classes by 213, and the number of students under instruction by 6,028.

Of the 1,682 schools examined in May, 1886, 1,259 were in England and Wales, 226 in Scotland, and 197 in Ireland. The number of students who came up for examination from them was 54,462, or an increase of 5,965 on the previous year. In addition to these, 4,014 self-taught students and pupils from classes not entitled to claim payments on results presented themselves for examination. Many students came up in more than one subject, the number of papers worked at the examination by the 58,476 students who sat being 114,432, or an average of nearly two papers per student. This average is generally increasing; 44,997 candidates were successful in passing in one or more subject, and of these, 23,230 were successful for the first time. In the previous year 37,133 were successful and 19,058 for the first time.

In 525 art classes 31,491 students were taught, 15,855 students sent 256,422 works to the annual examination, to which 164 prizes were given; 14,269 were personally examined in the second grade, of whom 5,606 were successful and 1,336 gained prizes. In 1885 the corresponding numbers were 488 classes, 23,410 students, of whom 14,332 sent up 207,046 works; 12,257 were examined, 4,639 passed, and 1,257 won prizes.

During the year seven new schools of art and three additional branch schools have been opened, raising the total number of schools of art from 198, with 18 branches, to 205, with 21 branches. In these schools 40,134 students have been taught, of whom 27,600 submitted to examination 332,040 drawings, paintings, and models, while in the previous year of 39,660 students, 25,275 sent 284,490 works.

The number of objects acquired for the art division of the South Kensington Museum in 1886 was greater than for the year 1885, and the Museum gained, both by gift and by purchase, several examples of art of great importance. Mr. George Wallis, the keeper of the art collections, reports that the number of objects acquired by purchase, gift, or bequest in 1886 was 1,835, as compared with 509 in 1885—viz., general art collection, 1,295; Indian section, 156; school examples, 384.

The expenditure of the department during the financial year 1886-7 amounted to £410,337, which was apportioned as follows:—Expenses of administration, including central staff office expenses, £27,571; direct payments, prizes, &c., to encourage instruction in science, £88,674; direct payments, prizes, &c., to encourage instruction in art, £89,835; services common to both science and art instruction, £56,257; institutions supported or aided by the State through the Department, £56,051; and South Kensington and Bethnal-green Museums, including expenses of circulation of science and art objects to country institutions, £91,949.

THE CONVENT, OLDHAM.

EXTENSIVE alterations and additions have been made to the Convent, Oldham, and the work, which has extended over a period of twelve months, has been brought to a termination, the new portion being opened on Saturday last. Upon the ground floor a large refectory has been built, with passages adjoining, while the existing rooms have been considerably enlarged. The first floor of the extension consists of dormitories, corridors, and bath-room, while the chapel, which is of lofty proportions, is on the second floor, being entered from the portion previously erected. It has an elaborate open-timbered, hammer-beam roof of 16th-century design, enriched with delicate tracery. The chapel walls, to a height lineable with the window bottoms, are covered with oak panelling, the head of each panel being filled in with intricate tracery, transitional in character, and the panels alternating in design. On each side of the chapel are ten stalls, the arms of each stall being filled in with quatrefoils, cinquefoils, and other enrichments, the seats being made to lift up; the miserere carvings, which are under the seats, being of exquisite workmanship, the whole varying in design and detail. At the extreme end of the chapel, adjoining the entrance, is an elegant, though boldly designed, screen, consisting of eight compartments or bays, the upper portion of each being filled in with delicate enriched tracery, the whole being crowned by a bold Perpendicular cornice.

At the other end of the chapel is the altar, a splendid piece of workmanship of Decorated Gothic design, consisting of an elaborate crocketed centre pinnacle and side pinnacles, between which are ornamental gablets filled in with rich tracery, crowned with angels, and supported by boldly-designed arches resting upon clustered columns, with moulded bases and foliated capitals. The centre pinnacle, which is of richer design, and rises to a greater height than the others, overhangs a Decorated niche with groined roof, in which is the Crucifix, whilst the tabernacle, which has a brass door of rich design, stands well in front upon the altar table. The side niches are filled in with statues. The altar table, which is executed in stone, stands upon black marble columns, with enriched foliated caps and Decorated bases, the black columns producing a pleasing contrast to the principal portion, executed in oak.

The whole of the chapel floor, and the principal portion of the fittings, are of light-coloured oak, whilst the stone tracery windows are filled in with stained glass, two of the windows containing representations of Our Lady, St. Joseph, St. Angela, and St. Stanislas, the whole being of exquisite beauty, rich in colour, and harmonising in design. The brickwork has been executed by Mr. Haines; the masonry by Mr. Staley; the joiner's work and slating by Messrs. S. Ashton and Sons; plumbing, glazing, and painting by Mr. Hearne, all of Oldham. The plans of the building, and details of the altar, screen, and other fittings have been prepared by Mr. A. Banks, architect, Oldham, who has superintended the erection of the work.

THE PLUMBING TRADE IN AMERICA.

THE Convention of the National Association of Master Plumbers, at New York, has adopted thirteen sections as a substitute for the previous apprenticeship law of the association. From these resolutions, we find that the term of apprenticeship to the trade shall be five years, and no boy to be taken until he is 16 years old. Each employer is to make a return to the apprenticeship committee of the list of apprentices in his employ, with their ages, addresses, &c. A record of apprentices and their addresses will be kept, and for each apprentice so recorded the secretary shall issue an apprentice certificate, to be retained by him so long as the apprentice is in his employ. When the boy takes another place, the certificate is given to the new employer, to be filled in with date of beginning of service, and so on, until the certificate shows the proper time has been served. Any boy wishing to learn the trade sends his name and address to the secretary, who will notify to him when to appear for examination. A beginner in the trade will be required to work six months on probation, at the end of which period he is to appear before the committee for re-examination, and if found worthy his certificate of apprenticeship shall be issued, the time already spent in the trade being allowed on it. When the five years shall have been served, the apprentice is to receive a diploma, giving the date of service, signed by the president of the Association. Boys having a diploma from any trade school shall be allowed a deduction of the last year from the term of apprenticeship. These are the main points of the resolutions. Under the recommendations, every apprentice is protected by his certificate, which becomes at once his passport and a record of his service. As an encouragement to the apprentice to make the best of his time, no better rule could have been devised. The last resolution is to the effect that no master plumber can discharge an apprentice owing to want of work without providing employment with another who has work and can teach him.

THE PROFESSION OF A CLERK OF WORKS.*

By THOMAS POTTER,

Author of "Concrete: its Use in Building," "The Construction of Silos," &c.

(*Continued from p.* 80.)

TO be a good correspondent is an undoubted advantage to a clerk of works; the happy knack of being able to express a good deal in a few words and to explain matters intelligibly and to write plainly, are items which should not be lost sight of, and which a good many, in other respects excellent men, are deficient in; and I submit that a good plan to obtain proficiency in condensation is to—if time permits—strike out every unnecessary word in the first draft of letters, and then rewrite them, repeating the operation if time permits, "boiling down" till in the fair copy there is not a word more than is wanted, and no repetitions. It will be said that in many cases there is insufficient time to take all this trouble; but it should be looked upon as an absolute necessity, and, moreover, each occasion this course is pursued the less need there will be for "boiling down," till eventually there is none. Many persons of business, with but little time to spend uselessly,

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and who know the handwriting of certain correspondents addicted to verbosity, will pass their letters on one side, to be read last or at leisure, and feel it anything but a pleasure to wade through a lot of irrelevant matter and numerous repetitions. The unfortunate example set by many persons—some architects included, who can do otherwise if they like—of writing so unintelligibly that errors are often occasioned thereby, should not be copied; there is no reason whatever why the clerk of works must go and do likewise, but there are many reasons why he should not. In inclosing sketches for any needed alteration or explanation, it is always advisable to make them plain, and, if possible, to scale; moreover, to send tracings, keeping the originals in case the architect may make any remarks in connection therewith, which would need a reference to the sketch; but which he had omitted to return or desired to retain. There is no need to expiate on the necessity of as good a knowledge of drawing as the clerk of works can by instruction and practice obtain. With many persons, this knowledge is undoubtedly a gift, aided, however, by perseverance; whereas, on the other hand, aspirants to the position of clerk of works should remember that the man who never attempts to make a sketch or a working drawing other than as a matter of necessity is never in a fair way of becoming an expert draughtsman. The acquired knowledge of construction which a clerk of works possesses, or should obtain, before he fills that position is a great aid to elementary and detail drawing; he probably knows how to make, or has himself in some previous capacity delineated on chalked boards or lining paper, full-size working drawings of masons', joiners', or carpenters' work, and no better initiatory practice could be desired; thence to making ordinary details to scale is a comparatively easy step, and so by degrees the amount of proficiency obtained as a draughtsman gradually increases *pro ratâ* to the capacity and energy of the individual. Many thoroughly good men fail, however, to become experts in this direction, while others appear to have a talent for drawing, sometimes at the cost of decided inferiority in other respects. It by no means follows that because a clerk of the works is an inferior draughtsman, his knowledge of plans and of the correctness of details is likewise faulty; indeed, it may happen to be just the reverse, in a similar but opposite way, that an architectural draughtsman may be clever and correct in making drawings, and yet be unable to say why he follows out certain well-known principles of construction. A recommendation which may be of use to those who are about to become clerks of works, but obviously unnecessary to those who have been in that position long enough to find it out for themselves, is not to buy or use inferior instruments because of their inexperience in draughtsmanship, any more than a person learning to write should practice with bad pens. Nor is it prudent to purchase second-hand instruments or unredeemed pledges, unless one is an excellent judge of such things; for, like watches, many are made to sell, not to use, and are treated in a similar way—viz., fraudulently stamping thereon some well-known maker's name, such as Stanley, or Elliot, to influence purchasers. Buy instruments of manufacturers whose names are upon them, and whose reputation won't admit of their being placed upon trashy articles. For a guide to the use, cost, and purposes of drawing-instruments and their accessories, drawing-paper, drawing-boards, &c., there can be no better guide than "Stanley's Drawing Instruments," price 5s., published by Stanley, Great Turnstile, Holborn; Heather's "Drawing and Measuring Instruments," a cheaper work, costing Is. 6d., one of Weale's Rudimentary Series, also contains a good deal of practical information on mathematical instruments and how to use them. As it is not the clerk of works' place to set out buildings and builders' work generally, neither is it, as before stated, to give levels for floors, doorways, window-sills, and the like; but the circumstances are somewhat different, and in this way: instead of using a long parallel board or straight-edge with a spirit-level let into the edge thereof, or a similar board and a mechanic's spirit level, it would be exceedingly beneficial if it were more the practice to employ a surveying level on tripod stand. He could fix the correct position of window-sills, door-sills, string-courses, &c., at as many points as were necessary with the utmost precision, and in a fourth of the time required for ascertaining the same by the ordinary arrangement. For buildings of small area, in streets and confined spaces, it is not always practicable to do this; but where plenty of space exists it is often possible to determine the exact position of a large number of objects, say, for instance, window-sills on a similar level, with one adjustment. Even the wall-plates of the roof can in this way be bedded with the greatest nicety. The simplest method is to set the level, accurately adjusted, at the most advantageous point, to command a view of the largest number of places where similar levels are required; then stand up a wooden rod, the bottom of which rests against or on the brick joint, door-sill, or other bench mark that is the datum point or level from which all heights are taken, and is, of course, within the line of view of the spirit level. The rod has previously been cut off to the length that the datum point is below the bed of window-sills, or whatever series of levels are required to be given. A pencil mark made on the rod at the exact point where the hair-line crossing the object-glass of the level cuts it is all that is required, for the rod can then be moved to any place where levels are needed, and whenever the pencil mark coincides with the hair-line on the glass, the top of the rod is the exact point required. The operation is so simple that to go wrong is all but impossible, if the operator only sets his level correctly, and is sure that the pencil mark and hair-line come together. What is known as a drainage level or builders' level answers fairly well for the purpose, and is made by most of the mathematical instrument makers, costing from £4 to £5, including a tripod stand. The object-glass is, however, small, and the field or range of vision therefore very limited; but a much superior instrument for the purpose, if the clerk of works can afford to purchase one, is a 12in. dumpy level—the one known as Gravatt's, which costs from £9 to £12, but may be procured occasionally second-hand at about half the original cost. The compass attached thereto is of but little use to a clerk of works, and only adds to the price. An instrument of this kind is useful, too, for giving the level of foundation trenches, the concrete formation for receiving the first course of footings, inclinations for slopes, levels for roads and terraces, and the fall for drains. If the level is a good one, and the clerk of works is located in a country district, he may for practice employ any spare time he may have during the long days of summer in taking ground levels in the neighbourhood, and thereby obtain sufficient practice to enable him to use the instrument when employing it at and about building operations. For primary and simple instructions as to the use of the level and levelling staff, "Heather's Treatise on Surveying Instruments," price 1s. 6d., one of Weale's, is a useful work; so are "Levelling," by Scott M'Donal, published by Batsford, 52, High Holborn, and "Popular Instructions in the Art of Levelling," published by Simpkin, Marshall, and Co., the former costing 6d. and the latter 1s. In taking for practice a long-distance level, where the instrument has to be shifted from time to time, it is very necessary to go back over the same ground, commencing at the point where on the first occasion the operator finished, and if the difference of level between the two extreme points is found to be alike in both cases, it is complete evidence of a correct "taking"; if otherwise, just as clear evidence of errors somewhere in the calculation, and the ground must be gone over again and again, and until the difference of levels, whichever way they are taken, come alike. For squaring foundations and setting out walls, there are several kinds of instruments. The cross-staff head is a circular or octagonal brass tube 4in. or 5in. in length, and 2in. or 3in. in diameter, and with several very fine slits or hair-lines which are cut or fixed at mathematically correct angles to each other. The cross-staff head has a movable socket which is fixed on a rod or staff driven into the ground, and another rod or staff is fixed at any distance within sight. The imaginary line between the two rods forms the base line; for instance, the front wall line of a long range of buildings; a rod being placed at each corner or angle, wherever by looking through the slits at right angles to the base line another rod can be seen (which must be moved about till it is visible through the sights), the third rod is then at right angles to the base line, as from the centre of the optical square. The head is moved with ease to bring it to its correct position. Obviously this instrument does not give a square line with sufficient nicety, on account of the nearness of the sights to each other, for buildings of any pretensions, although it may often do for setting out ground work. The price of plain cross-staff heads varies, according to size, from 5s. to 12s., and an iron-shod staff is 2s. 6d. extra, or tripod stand 7s. 6d. A much handier instrument for a clerk of works to use for squaring is a semi-circumferentor, which, as its name implies, is a half ring of brass, 5in. or 6in. in diameter, with movable sights at each end of its diameter, and therefore 5in. or 6in. apart; two other sights are fixed to a brass bar which revolves on a pivot, and this brass bar is brought into position whereby the movable sights are set square, or at any desired angle with the fixed ones, by means of graduated marks on the brass rim of the circumferentor. A tripod stand is necessary for accurate work, and which should have a hook on the under part of the head upon which a steel point plumb-bob can be suspended, to ascertain the exact points or position of the base line. A line held in the hand with another steel point bob attached to it, and moved about till it comes within sight of the operator, who is looking through the "sights" of the semicircumferentor in the same way as with the optical square, gives the position required. A good instrument will define a square line, if accurately taken, within an inch in 60ft. to 70ft.—quite near enough usually for any building. An instrument for levelling, and another for setting out square lines and angles, comprise practically all the outdoor mathematical instruments a clerk of works requires, or can be expected on the largest works to possess; but it may not be out of place to call attention to smaller matters which are often considered too trivial to demand consideration. The safest form of lineal measurement for building details is undoubtedly a wooden rod; a tape is not reliable where great accuracy is required, and needs two persons to take dimensions over six feet, whereas a rod is usable single-handed. When the building is of some importance, it is advisable to have sufficient rods and of different lengths, and it is better to have them by successive five-feets—5, 10, 15, and 20, for example; if the rods are painted black and the figures white, they will keep cleaner than if not painted at all, and the latter are more readily distinguishable than common pencil figures. Where they are likely to have constant use and for some considerable period, it is advisable to have them iron shod to save the ends wearing away. The figures should be plainly painted, and of the Arabic character, not the Roman, which may possibly cause errors, such, for instance, as IX. being taken for XI., and similar blunders quite possible when dimensions are hurriedly taken, and perhaps in semi-daylight. The ground square is best made of dry deal, and painted to prevent moisture causing it to expand so readily as an unpainted one, whereby it would be rendered uncorrect. Nor should it be made with the sides taper, a usual thing to do for convenience and lightness in handling, because if contraction or expansion takes place it is not then uniform. A ground square and measuring rods do not necessarily form a portion of the clerk of works' possessions, but they are usually available for his use when required. Although the builder is not bound to provide any particular form of measuring rods or ground squares, any more than he is to supply special descriptions of other tools or appliances for carrying out the work, yet small favours of this kind are more readily granted at the commencement of a building than is sometimes the case when the contract is more advanced or nearer completion. What are the complete duties of a clerk of works is a question which can only be answered in a general way, for, after all is said and done, it must simply be a matter of arrangement dependent on the three things: 1st, what the nature of the work requires; 2nd, what the architect requires doing; and, 3rd, what the

clerk of works is capable of performing. There is no trade unionism among clerks of works, no hard and fast line as to what they ought to do or ought not to do. Occasionally something of the kind crops up with too sensitive members of the calling; but it may be safely assumed that anything in connection with the works which an architect would not consider *infra dig.* to perform himself, cannot be objected to by a clerk of works, unless it be derogatory to his position, or is of a nature to interfere with his prime duties of keeping watch and guard over the work generally, or cannot be performed in addition to his ordinary work within the time during which he is supposed to be attending to his employers' interests. If the building is a small one, requiring no special knowledge and but a moderate amount of general supervision, it is not likely that a man of superior qualifications would be appointed or accept the appointment; on the other hand, if the proposed works are of an extensive character, requiring considerable skill and other attainments, the duties would go with the qualifications, and the *quid pro quo* would probably be to a certain extent commensurate therewith. But whatever may be the sum total of his attainments, the clerk of works should remember his is a position of great trust and responsibility, and no amount of good nature or sympathetic fellow feeling should be allowed to interfere with the just performance of his duties. If, at the commencement of the works, he is found to be of a yielding disposition, or easily persuaded to permit the use of indifferent materials or workmanship, he will never afterwards regain proper authority; on the other hand, a firm and decisive course of action, practised in a quiet and courteous manner, will insure him respect and attention to his instructions, and the confidence of his employers.

(*To be continued.*)

CHIPS.

Count Gleichen's full-sized bust of the Earl of Beaconsfield was sold at the sale of the effects of the defunct Beaconsfield Club for £42 to an hotel-keeper at Bournemouth. It cost the club £350.

Mr. Harry Hems, of Exeter, has just been commissioned to execute a life-sized medallion of the Queen in oak for the Working Men's Conservative Club at Newbury, from a desigh by Mr. J. H. Money, architect, of Newbury. Her Majesty is represented wearing the State veil and Imperial crown.

The new reredos at St. Nicholas's Cathedral, Newcastle-on-Tyne, was dedicated on Friday. It has been erected from designs by Mr. Johnstone, of that city.

Messrs. H. and R. Miller, of Castle Bank Works, Edinburgh, have completed the erection of a clock and bell in the tower in the Pitlochry new church to the memory of the late Mr. Archibald Butter, of Faskally. The clock has three illuminated dials, 4ft. 6in. in diameter. The bell is 15cwt.

On Thursday, the 14th inst., a meeting of the Yorkshire Association of Medical Officers of Health was held at Hull. In the morning, Dr. J. W. Mason, the medical officer of health for that borough, received a number of the members at his office at the town hall, and subsequently conducted the party to the new Sanatorium on the Hedon-road and other places of interest in Hull. In the afternoon the visitors met at the town hall, Dr. Hime, of Bradford, the president, being in the chair, when some business was transacted, including the formation of a new class of "associates," and papers were read and discussed.

The Sunderland Corporation have purchased Mr. John Blair's picture of the Tweed at Norham, which was exhibited in the last spring exhibition of the Royal Scottish Academy. The picture has been hung in the Corporation Galleries.

Particulars have just been published of the great bell for the Cathedral of Cologne, recently solemnly inaugurated. The bell weighs 27,000kilos., or about 26 tons 13cwt. The clapper alone weighs 800kilos., or nearly 15¾cwt. Its perpendicular height is almost 14½ft.; its diameter at the mouth nearly 11½ft. Twenty-two cannons taken from the French were assigned by the Emperor William for its manufacture; 5,000kilos. of tin were added. It was cast by Andreas Hamm, of Frankenthal, and £1,050 were paid for the casting. It will be known as the Kaiserglocke, or Emperor's bell; and as the two other large bells in the cathedral bear the epithets respectively of Pretiosa and Speciosa, this one is styled Gloriosa.

OUR COMPETITORS' COLUMN.

MANY of the writers in this, our eighth competition, have gone considerably beyond our invitation, and dealt at length with the merits and demerits of existing societies, and offering suggestions for their improvement and organisation. We simply asked for suggestions as to sessional papers, and we award the prize to Mr. Charles T. Taylor, of 18, Clegg-street, Oldham, whom we placed second in last week's competion.

We now offer another prize of One Guinea for the best short essay, naming the architect who, during the past thirty years, has

MOST DECIDEDLY INFLUENCED ECCLESIASTICAL ARCHITECTURE IN ENGLAND.

To be sent in by July 22.

And another prize of One Guinea for the best paper giving

THE EXPERIENCES OF AN ARTICLED PUPIL,

comprising such hints for self-improvement and the best utilisation of time and resources as may benefit others. Papers giving actual personal experience will be preferred. To be sent in by July 29. This will conclude the series for a few weeks, when the column will be revived, together with a new series of the Designing Club.

SUGGESTIONS TO ARCHITECTURAL SOCIETIES.

I think this subject, coming, at it does, at the present time, is a very opportune one, inasmuch as just now we might say that the architectural profession is in a state of spirited agitation, principally owing to the prominent position the important subjects of Federation and Registration hold in the minds of the majority of the profession. For a period now of between two and three years, the discussion both at society meetings and through the press has been carried on, and during that time we have found that the support accorded to the same has greatly increased, thus proving that the more the subject is brought before the attention of architects the more support it will receive. Now, the question is, Ought this scheme to be successful? Is it worthy of the support of architects? For my own part, I most decidedly think it would be beneficial both to architects and the public generally; consequently, it deserves the undivided support of each and every one of us. Granting that the scheme is entitled to our support, I think it is the one subject which ought to be dwelt upon and discussed more than any other at meetings of architectural societies next session. The subject generally proves to be a very interesting one, and affords ample of opportunities for discussion, as we are able to prove after having read papers on the same delivered before societies. Essays and papers recommending a course of studies for students preparing for the Institute examination would be very useful, as it is advisable to popularise these examinations as much as possible, more especially amongst the younger members of the profession; but at present it is no small matter to make up one's mind where to commence, as the list of subjects and the books recommended by the authorities is so extensive and varied. I think, therefore, the more information we get on the same, with approved courses of study laid out, the better it will be, as students will begin to feel more interested, consequently more will offer themselves to undergo the test. The subject of architectural competitions is also one that might be dealt with at great length and with great advantage to the profession, as there appears to be not the slightest appearance of anything like a unanimous opinion on the matter. True that a great number signed a memorial undertaking to refrain from competing in an open architectural competition without the drawings were to be adjudicated upon by a professional man; but even this appears to have accomplished very little, as we hear day by day of unsatisfactory and unfair awards being given. Some more comprehensive measure than the memorial is required; but the difficulty is to suggest a better. I, therefore, recommend such subjects (as, say, suggestions for the conduct of architectural competitions) as being fitting ones for papers and discussion, as then opinions and ideas might be interchanged and some benefits derived. Notes on professional practice recommends itself as a suitable subject to deal with, including such questions as the giving of certificates, professional charges, and claims, responsibilities, supervision, travelling charges, quantities, specification, and the duties of clerks of works. I think the whole of the foregoing subjects offer themselves as suitable ones for papers, &c. I have no doubt they would be appreciated by members more than any other, as the whole of them bear directly on an architect's practice, therefore, of course, being of great interest to us all. Architects, as a rule, are deficient in the knowledge of law as relating to the profession; such questions as easements, prescriptive rights, light and air cases would perhaps not involve such exorbitant costs to the client if sound advice could be given by the architect in the first instance. This subject might be treated in such a manner as to be very instructive to members of architectural societies. As there are comparatively very few lectures given under this title, dilapidations and valuations might be classed under this head.

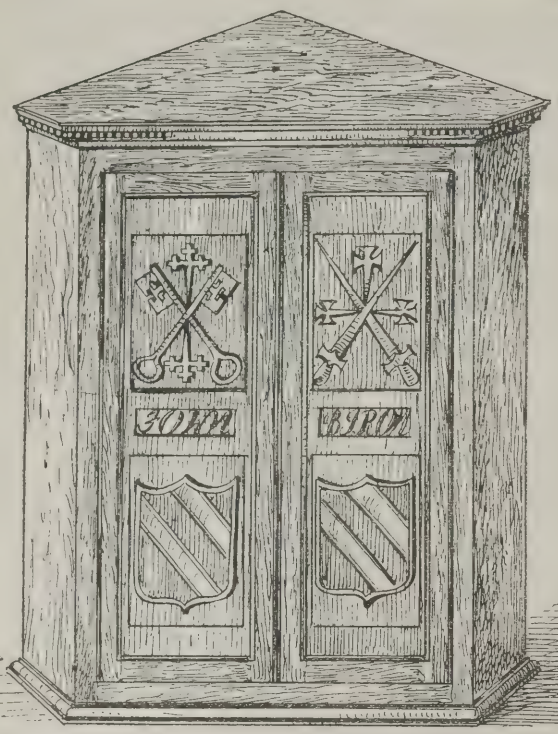
Lectures on special buildings would come useful to architects generally, because, as a rule, an architect is called upon to design almost all classes of buildings without having the opportunity of making any one class a speciality: therefore, if he could have the benefit occasionally of a good paper, well illustrated, on these special buildings, such as technical schools, breweries, dairy farms, theatres, fire-engine stations, &c., it would be greatly to his benefit. Perhaps an occasional lecture on perspective and draughtsmanship would come in useful, the former, of course, just dealing with the rudiments and general rules, as unfortunately the books treating of the subject are compiled in such a manner as to be of very little service to a student. Of course, such subjects as sanitary science, including drainage, plumbing, ventilating, and warming would require attention, else we should find ourselves falling behind on account of the rapid rate at which the different branches of this science have progressed during the recent years. Lectures on construction, &c., and on the different materials required in the erection of buildings are always instructive, and are generally listened to with interest. We must not neglect the art branch of our profession, therefore, it would be advisable to reserve a few evenings for the benefit of same. It would be a good idea in an architectural society to have short readings on those evenings devoted to art, from such works as Ruskin, Fergusson, &c., each member to take his turn at reading. This, I think, would be very instructive, to be concluded by discussion on matter read. A lecture showing the advance of building operations, also one showing the advance of art during our Majesty's reign, comparing the buildings of to-day with those erected 50 years ago and subsequently, would be interesting. A lecture on recent large competitions, comparing competitors' instructions, giving details of each, showing which might be considered to be successful and which failures. I might instance Admiralty and War Offices, Edinburgh Municipal Buildings, Edinburgh Free Library, Birmingham Assize Courts, Imperial Institute, and Liverpool Cathedral. Criticism on above designs would be very interesting, as they are the latest examples of English architecture.

CHARLES T. TAYLOR.

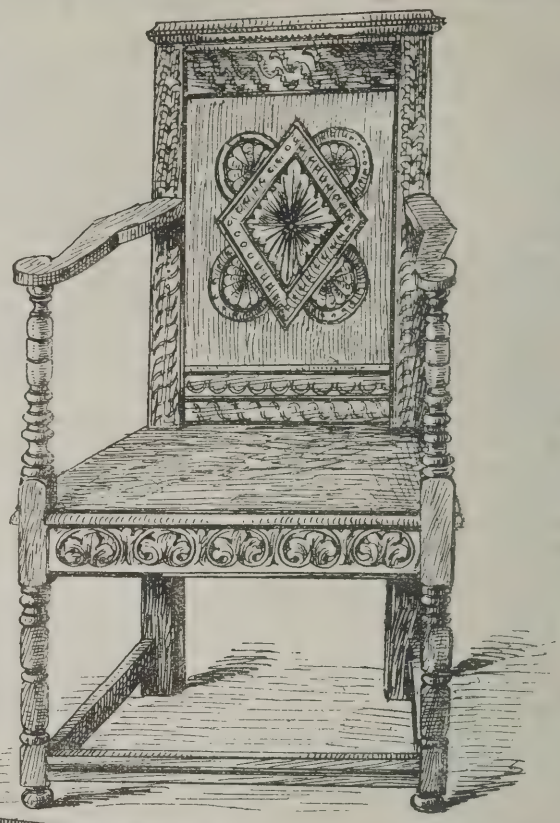
18, Clegg-street, Oldham.

Some friends of the veteran engineer, Mr. Thomas Hawksley, waited upon him on Tuesday week to congratulate him on his 80th birthday. The Attorney-General, who was at the head of the party, gave a brief address, complimenting Mr. Hawksley on his long and useful labours, and on his continued health and energy. In acknowledging the address, Mr. Hawksley said he claimed to be the originator of the constant service system, and was glad to think that the first town to adopt it was his native town of Nottingham. A committee has been formed, with Sir Frederick Bramwell as chairman, and Dr. W. Pole as secretary, to present Mr. Hawksley with his portrait, to be painted by Mr. Hubert Herkomer, A.R.A., as a mark of respect suitable to the occasion.

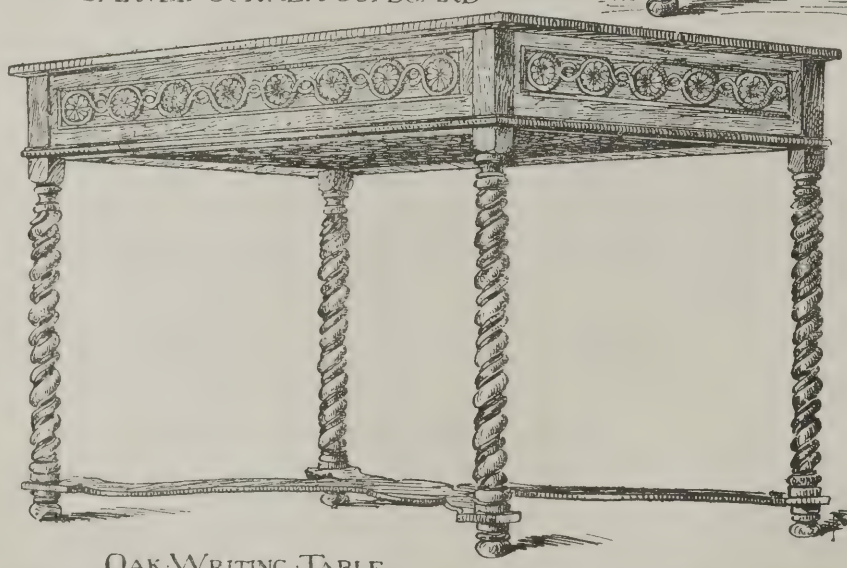
The memorial drinking fountain to the late Dante Gabriel Rossetti, erected on the Chelsea Embankment, immediately opposite his house, No. 16, Cheyne Walk, was unveiled on the 14th inst. by Mr. Holman Hunt. The fountain was designed by Mr. J. P. Seddon, and is executed in light-coloured grey granite, the chief feature being the bronze bust of Rossetti, by Mr. Ford Madox Brown, the model of which has been exhibited at the South Kensington Museum.



CARVED CORNER CUPBOARD

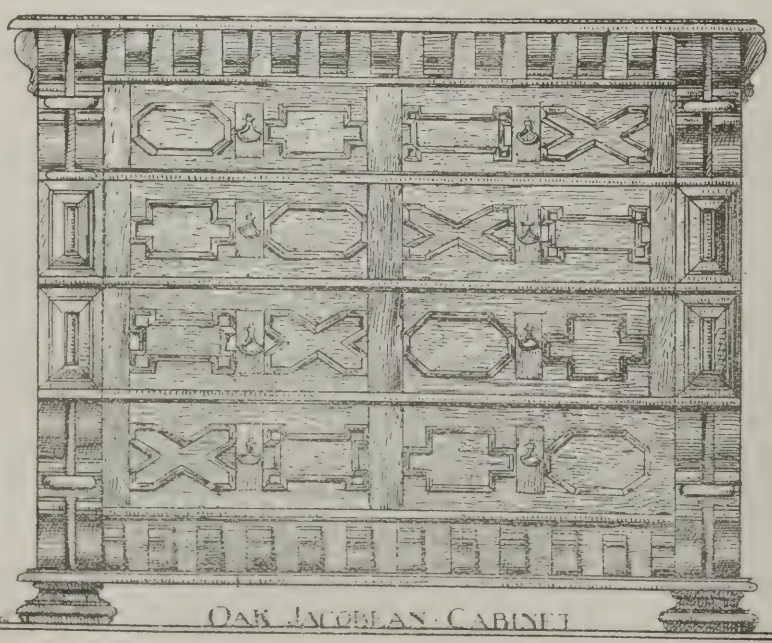


OAK ANTIQUE CHAIR

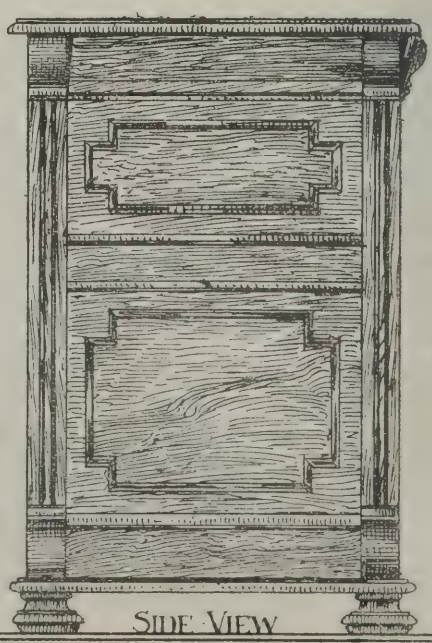


OAK WRITING TABLE

AT THE
SALE ROOMS
SKETCHES AT
A RECENT SALE
AT
MESSRS. PHILLIPSON & NEALE'S



OAK JACOBEAN CABINET



SIDE VIEW

CONTENTS.

The Vestibule and Hall Architecturally Considered ... 121
Technical School Building... 121
The Effect of Sea-water on Concrete 123
Two West-end Churches 123
Dalmatian Architecture and Croatian Art 123
Vibration of Bridges 126
The Shortcomings of some Modern Sanitary Methods.. 126
The Science and Art Department 127
The Convent, Oldham 127
The Plumbing Trade in America 127
The Profession of a Clerk of Works... 127
Our Competitors' Column 129
Our Lithographic Illustrations 131
At the Sale Rooms... 131
Old Cabinet, Newcastle-on-Tyne 131
Axbridge Church 131
Architectural and Archæological Societies 131
Archæological... 131
Wayside Notes 150
Building Intelligence 152
Engineering Notes... 153
Correspondence 153
Intercommunication 155
Our Office Table 156
Parliamentary Notes 156
Legal Intelligence... 156
Stained Glass 156
Tenders 157

ILLUSTRATIONS.

DETAILS OF SOME OF THE DESIGNS FOR THE IMPERIAL INSTITUTE.—PULPIT IN THE DUOMO OF GRADO.—CIBORIO AND PALA IN THE DUOMO OF CATTARO.—OAKFIELD, NEAR CHESTER.—POST OFFICE, KNUTSFORD.—SKETCHES AT THE SALE ROOMS.—OLD CABINET, NEWCASTLE-ON-TYNE.—AXBRIDGE CHURCH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE IMPERIAL INSTITUTE.

WE continue our series of illustrations this week with two double sheets of detail elevations submitted by the selected architect, Mr. T. E. Colcutt, and by Messrs. Aston Webb and Ingress Bell.

PULPIT IN THE DUOMO OF GRADO-CIBORIO AND PALA IN THE DUOMO OF CATTARO.

FOR description see p. 123.

OAKFIELD, NEAR CHESTER.

THIS shows the various additions it is proposed to make for Mr. B. C. Roberts to his present house, which is inconvenient and unsightly. Some time ago the wing on the left of the picture was built, containing the ball room, which was illustrated in these pages; and the stables seen in the distance were built last year. It is now proposed to case the whole front and sides of the house with red stone, to insert a bay window and mullion and transom windows throughout, and rebuild the porch. The estimate of Mr. Richard Beckett, of Hartford, has been accepted, and Messrs. Grayson and Ould are the architects.

NEW POST-OFFICE, KNUTSFORD.

THIS building has been recently erected by the Committee of Freeholders, and is situate in the old market square of Knutsford, a picturesque old town in Cheshire about 14 miles south of Manchester, and lately honoured in being the headquarters of the Prince of Wales during his recent visit to Manchester, he being entertained by the lord of the manor (Lord Egerton of Tatton), by whom also the site for the new post-office was presented. The buildings have a frontage of 50ft., the size of post-office being 32ft. by 17ft. A shop and dwelling-house are provided in addition to the requirements of post-office; but have been arranged so as to be added when additional accommodation is found necessary. The elevations were designed to harmonise with the surroundings, the style selected being somewhat typical of the various examples to be found in the neighbourhood. The design was selected in competition, and the works have been carried out by Mr. Hy. Pemberton, of Knutsford, under the supervision of the architect, Mr. W. Owen, A.R.I.B.A., 134, Deansgate, Manchester.

Mr. Joseph Bentley, stone merchant, of Rastrick, near Leeds, died suddenly in a street on Friday. Mr. Bentley was 47 years of age, was a large employer of labour, and a member of the local board.

Plans by Mr. E. Harbottle, of Exeter, have been accepted for the remodelling of the town-hall of Sidmouth.

AT THE SALE-ROOMS.

WE illustrate to-day a sheet of sketches from a sale that recently took place at Messrs. Philips, Son and Neale. The oak Corner-Cupboard looks as if it had belonged to the City at one time, as it has the Civic Arms carved on it, and across the bar dividing the panels is the name, possibly of the owner, John Biron. The chair next is a well-made Jacobean Arm Chair of a sort which one sometimes comes across in the vestry of a country church. The oak Writing Table had its sides carved, and was supported by turned legs. The Jacobean Cabinet was rather a good example of that period, and the different and alternate panels in the front give a quaintness to the whole.

OLD CABINET, NEWCASTLE-ON-TYNE.

WHEN I measured the cabinet at the old Castle, of which I send drawings, I made inquiries as to its originality; but the keeper could give me no information regarding it, as it was there before he was put in charge.

GEORGE C. SMITH.

AXBRIDGE CHURCH.

AXBRIDGE is an irregularly-built market town situated at the foot of the Mendip Hills, whose lofty heights shelter it from the N. and N.W. winds, and thus render it peculiarly favourable to the growth of early vegetables, and more particularly the luscious strawberry, of which baskets are daily despatched to Liverpool, Manchester, and the north. The town is supposed to have derived its name from the Celtic "Acs-byrig," the town near the river, and was anciently the centre of a royal hunting forest or chase. Members were returned to Parliament during the reigns of the first three Edwards; after which it was by the desire of its inhabitants disenfranchised. It appears to have been a place of some importance to the Romans, as several of their public roads here intersect one another. The corporation have preserved a series of ancient grants, charters, and other documents, among which are grants from Henry I., Edward I., Edward III., Henry VI.; also an ancient MS., apparently written about the middle of the 15th century, purporting to have been compiled from the ancient charter granted by Edward the Confessor in consequence of his miraculous preservation, as he supposed, from being precipitated over the Cheddar cliffs when hunting near them. The church stands on the side of a hill, and the present building dates from the later part of the 15th century, having probably been built by Henry VII., a statue of whom stands in a canopied niche on the west side of the tower, a similar niche on the east side containing a figure of St. John the Baptist, patron saint of the church. The nave roof is an interesting specimen of work of the date of 1636. The aisle roofs are divided into panelled compartments by beautifully moulded ribs, the intersections of which are covered with square, flat bosses of various designs and excellent workmanship. The edges of the ribs spread into a species of foliation which, though simple in detail, has an extremely rich effect. The characteristic 15th-century font, which was until recently encased with a thick coating of plaster and whitewash, is octagonal, and supported at the corners by eight demi-angels. The church has recently been restored, and may now rank with the finest of those "perpendicular" fanes for which Somersetshire is so justly famous.

W. JANE.

All Saints' Church, the Pavement, York, was re-opened on Sunday week after having been restored from plans by Messrs. Fisher and Hepper of that city. The contractors were: Mr. Hebden, for masonry; Mr. Hartley, plumbing; Mr. Milburn, carving; Mr. Gladin, lead work for the roofs.

Major Tulloch, C.E., an inspector of the Local Government Board, attended at the Castle, Leicester, on Thursday morning, for the purpose of holding an inquiry into the subject matter of an application made by the Billesdon Rural Sanitary Authority for sanction to borrow £15,000 for works of sewerage for the parishes of Humberstone and Evington, near Leicester. Mr. J. B. Everard, the engineer, explained the plans of the scheme.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

CAMBRIAN ARCHÆOLOGICAL SOCIETY. — A preliminary meeting, held at Denbigh, under the presidency of Colonel Mainwaring, the president for the year, of the above society, has been held with reference to the coming visit of the society to Denbigh in August. Major Lloyd Williams was elected local secretary, and Major Conran treasurer. It was agreed to get up in the Town Hall a loan museum, in which old works of art, paintings, furniture, and the many geographical specimens from the caves of Cefn, Tremeirchion, &c., will be got together. A number of day excursions to places of interest in the Vale of Clwyd were arranged, and in the evenings meetings will be held, and discussions take place on the local caves, the Roman road from Chester to Conway, the foundations of Strata Florida Church, which are now being uncovered by Mr. S. W. Williams, and other subjects.

EAST LONDON ANTIQUARIAN SOCIETY.—On Saturday week this society visited St. Alban's Abbey, the remains of Verulamium, and St. Michael's Church. An hour and a half were spent in an examination, necessarily rapid, of the most interesting features of the cathedral. By the courtesy of the Archdeacon, the party was enabled to inspect every part of the building. Special attention was given to the Mediæval paintings, the brasses, and the screen work. After a few words in the Lady Chapel from Mr. T. S. Widdowson on the history of the Abbey, the members walked down the hill, by the path along which St. Alban had been led out to martyrdom, to the Silk Mills, where Dr. Griffith, of Sandridge, took up the office of guide. He exhibited a copy of Stukely's plan, and engravings of the glass found at the beginning of the century. After detailing the nature of the place and the disposition of the city, so far as could be seen from this spot, the party walked along the eastern wall to the road which runs parallel with the southern wall. By permission of the Earl of Verulam, the party was enabled to follow out the whole line of the Roman wall to St. Michael's. Here the Vicar met the party, and explained the chief features of the church.

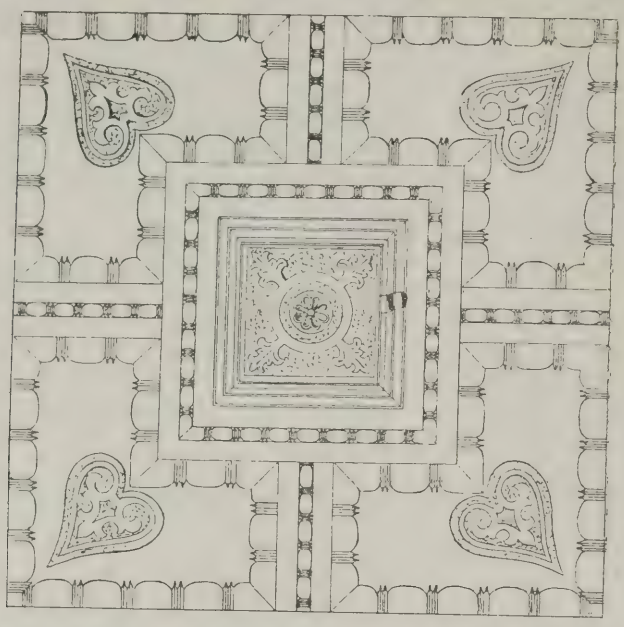
THE ROYAL ARCHÆOLOGICAL INSTITUTE.—The annual meeting of the Archæological Institute will be held this year at Salisbury during the first week in August, under the presidency of General Fox-Pitt-Rivers. The Bishop of Salisbury will preside over the Antiquarian section, the Dean over the Historical section, and Precentor Venables over the Architectural section. The meeting will begin on Tuesday week, the 2nd prox., when the Mayor and Corporation will publicly receive the members of the Institute at the Council-house, and the president will deliver an address. Among the places to be visited besides the city of Salisbury itself are Stonehenge, Old Sarum, Britford, Downton, Wardour Castle, Wilton House, Boyton Manor, the Saxon church at Bradford, and the two Romano-British villages near Rushmore.

ARCHÆOLOGICAL.

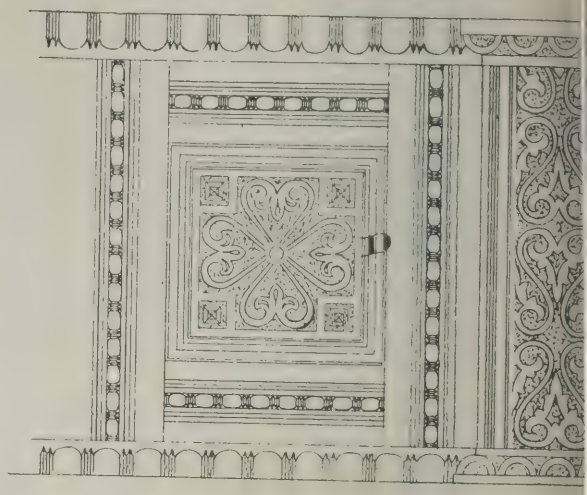
OLD MALTON.—The work of restoration at the old Priory Church of St. Mary, Old Malton (the only Gilbertine Priory left in England), is proceeding, and as the floor is being cleared out to its original level (there having been about 4ft. of rubbish above the old floor) some very interesting discoveries are being made. The bases of the octagonal pillars on the north side of the nave are being laid bare, and some beautiful carving is displayed. The Norman pillars on the south side show traces of the great fire which nearly destroyed the church some years prior to the dissolution of monasteries by Henry VIII. Other discoveries of interest are being made, including a carved niche in the north wall, fragments of the old tiled flooring, &c. A large number of human bones have also been turned up, and these are all being put into a large coffin for reinterment.

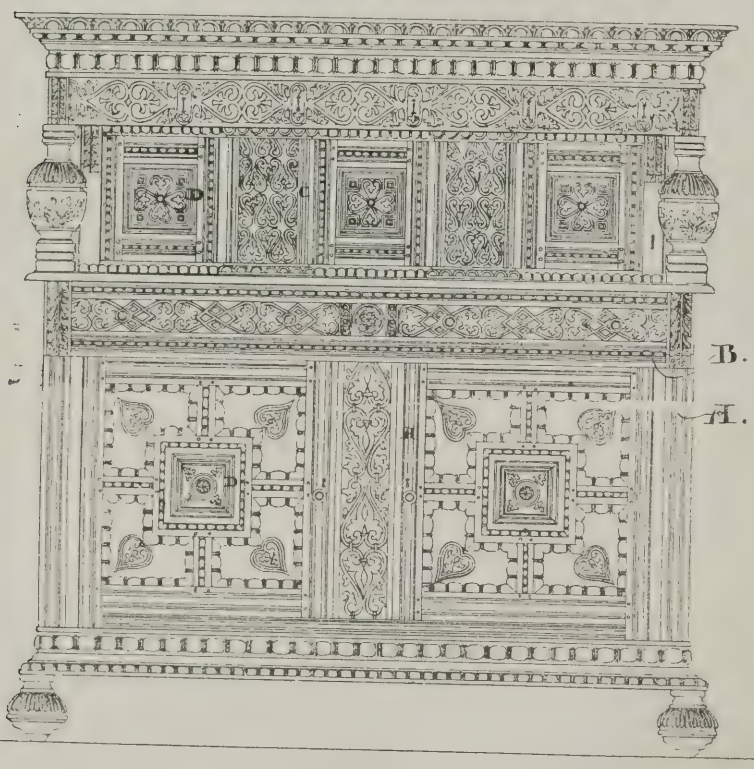
The tender of Mr. G. Dobson, of Colchester, has been accepted at £3,680, for adding a tower and spire to the church of the Holy Trinity at Wandsworth, from designs by Mr. G. Patrick.

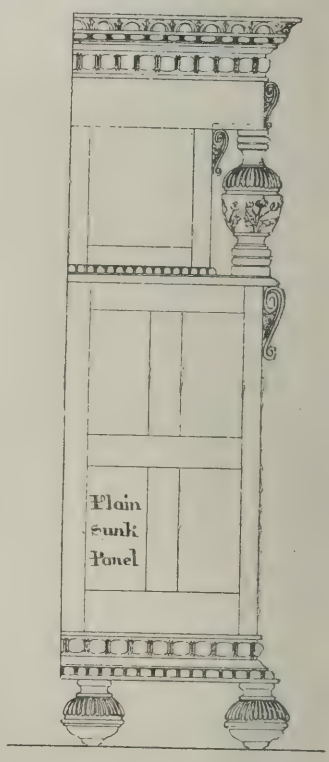
Lower Panels
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Upper Panels and Pi
¼ full-size

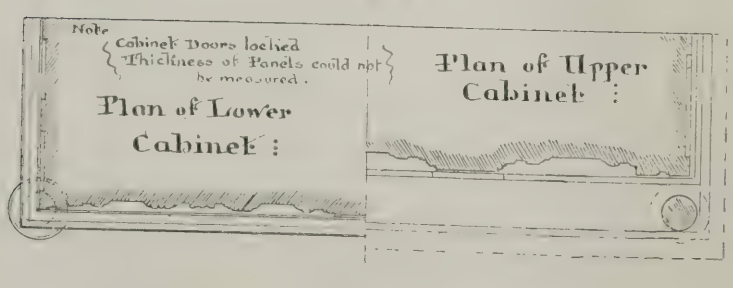






Front Elevation:

Side Elevation:

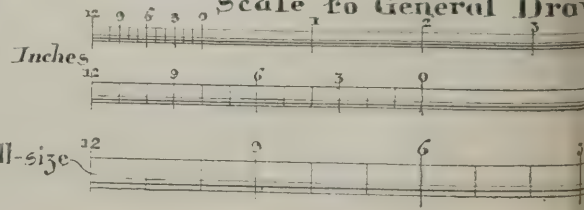


Old Castle: Newca

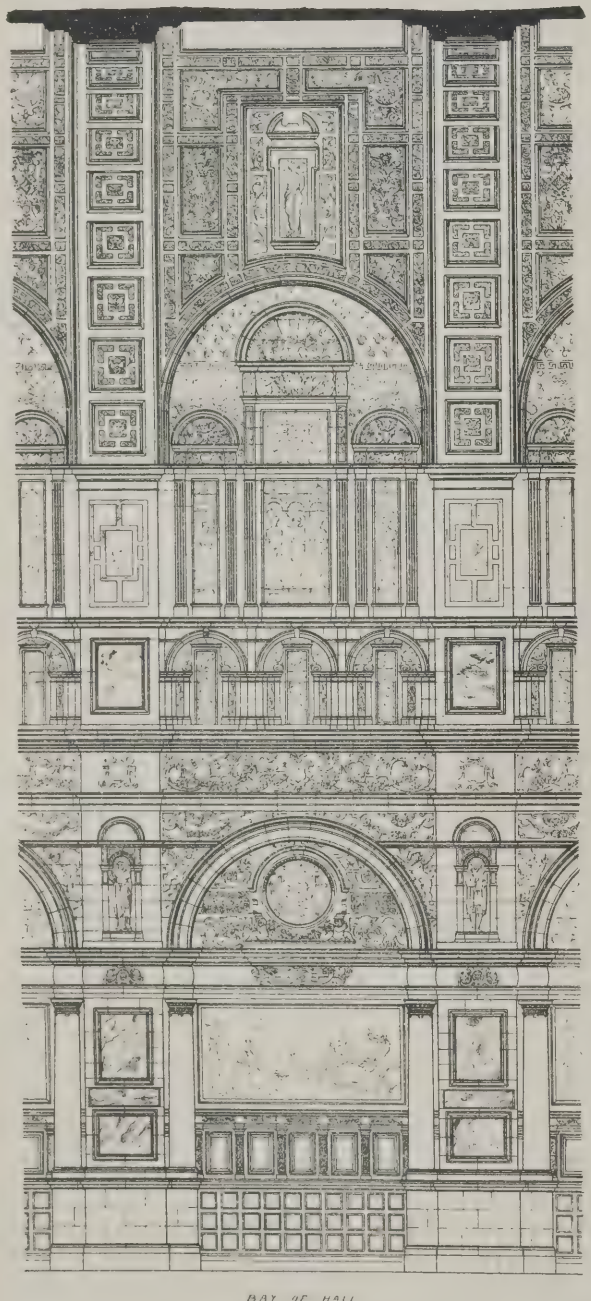
Measured Drawing

Elizabethan

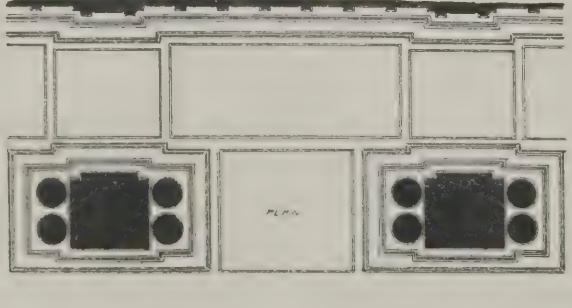
Scale to General Dra



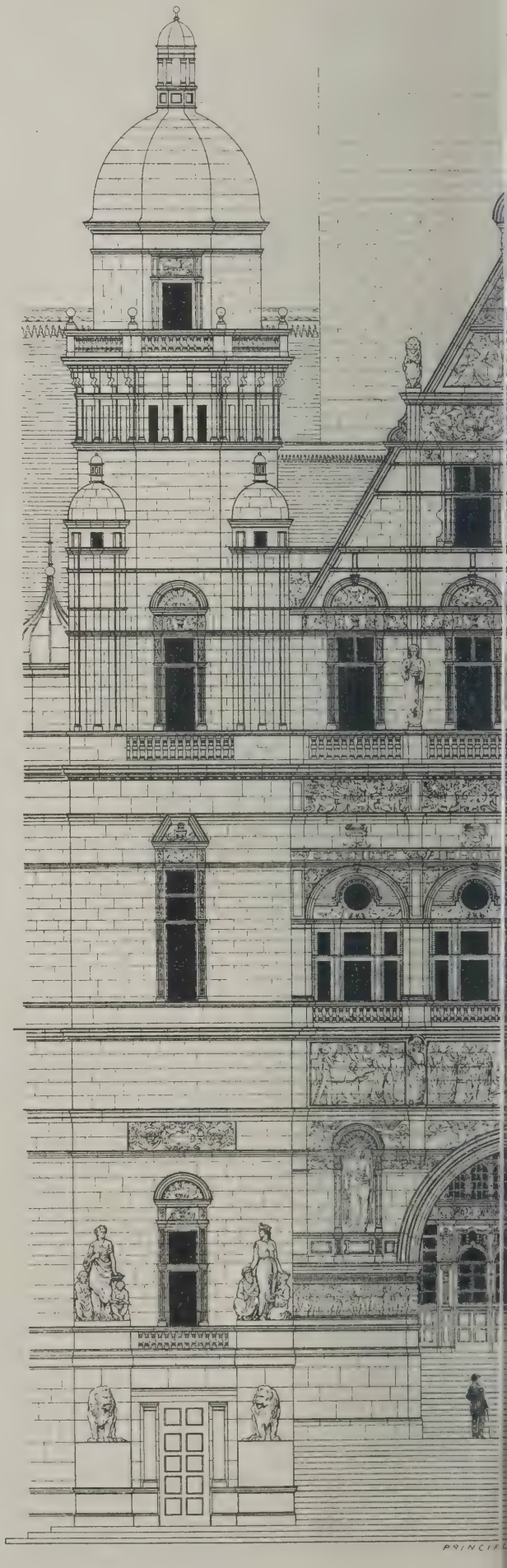
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BAY OF HALL



PLAN



PRINCIP

IMPERIAL INSTITUTE BUILDINGS, SOUTH KEN



ENTRANCE

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

IGTON, SELECTED DESIGN, T. E. COLLCUTT, ARCHITECT.



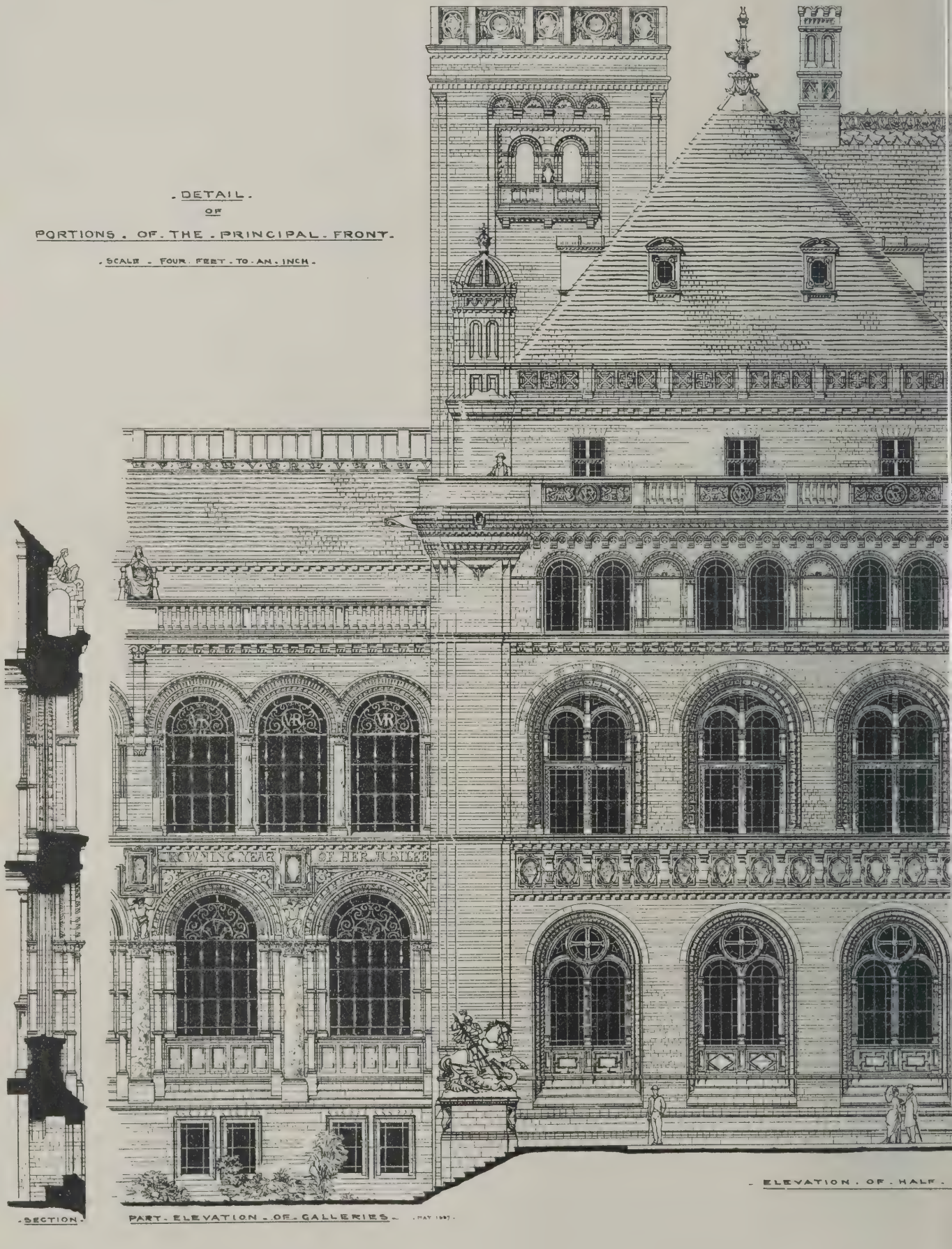
Oakfield, Nr. Chester.

Grayson and Ould, Archts.

"PHOTO-TINT," by James Akerman, 6 Queen Square, London W.C.

- DETAIL -
OF
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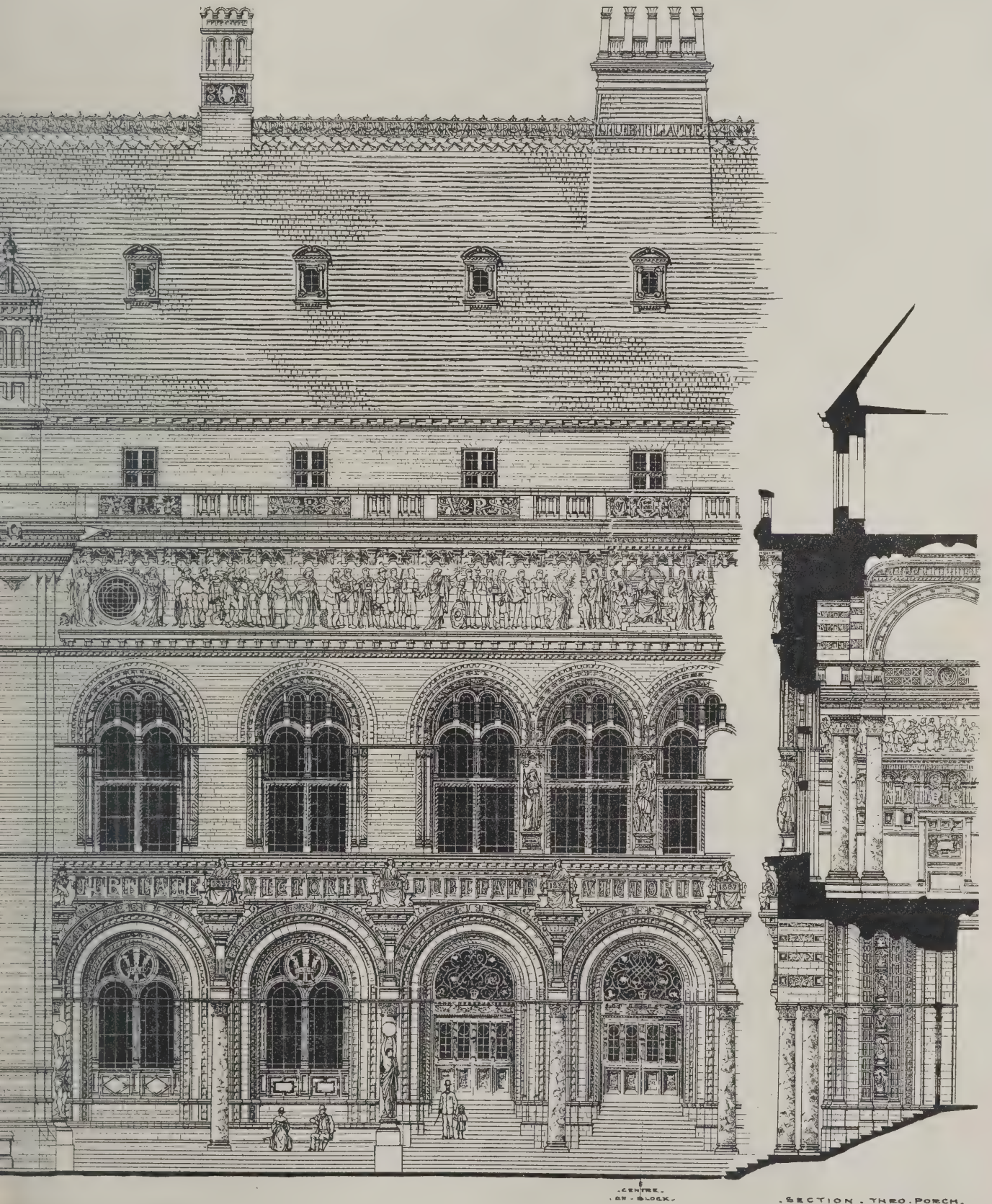
- SCALE - FOUR . FEET . TO . AN . INCH -



- SECTION -

PART - ELEVATION - OF - GALLERIES -

- ELEVATION . OF . HALF -



. CENTRAL . OR . INSTITUTE . BLOCK .

. CENTRE . OF . BLOCK .

. SECTION . THRO . PORCH .

AND . GENERAL . CONFERENCE . ROOM .

Aston Webb
T. Ingress Bell
ARCHITECTS.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.

, DESIGN BY MESSRS. ASTON WEBB & INGRESS BELL ARCHTS.,

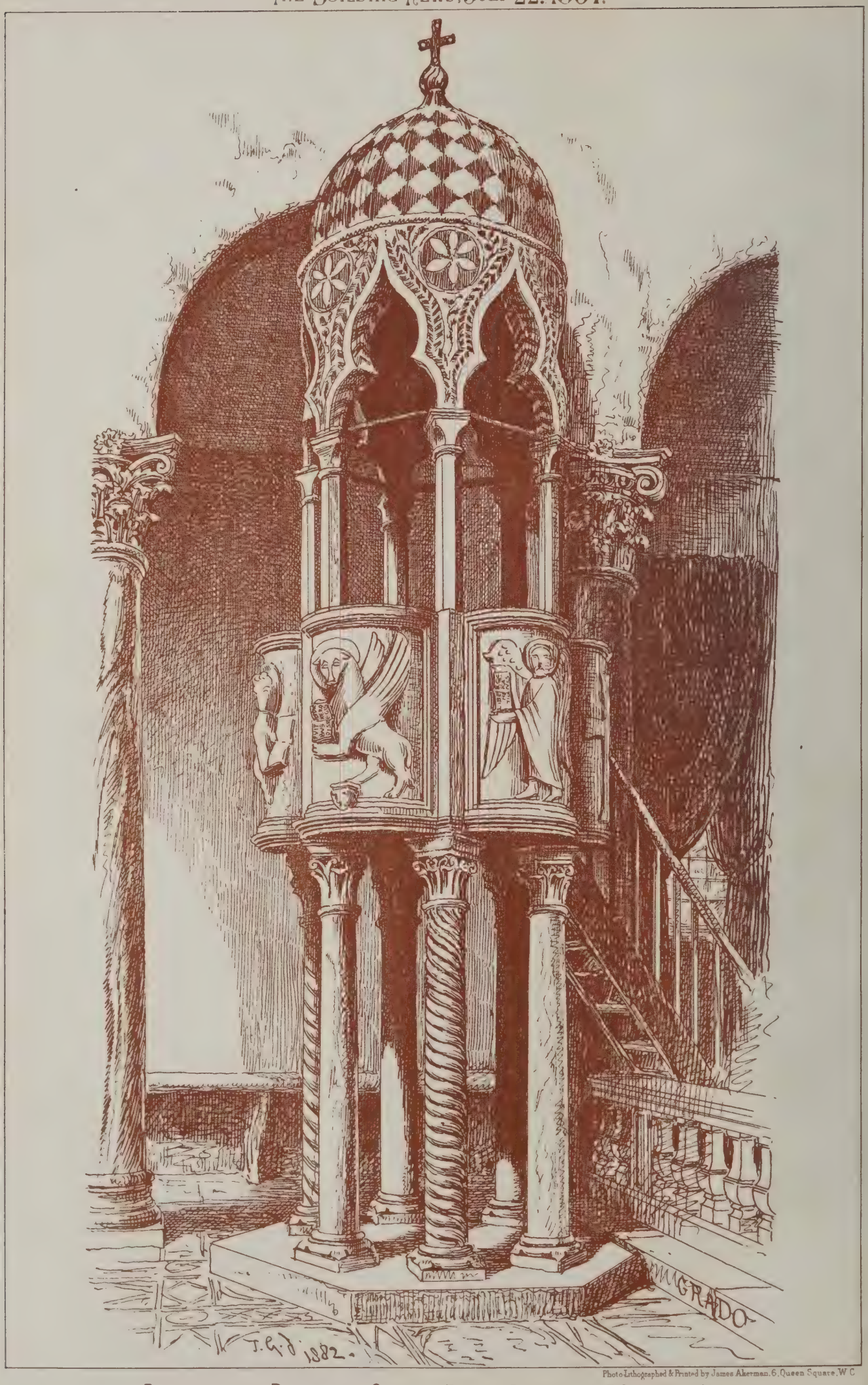


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

PULPIT IN THE DUOMO OF GRADO, FROM A DRAWING BY T. G. JACKSON, M.A.

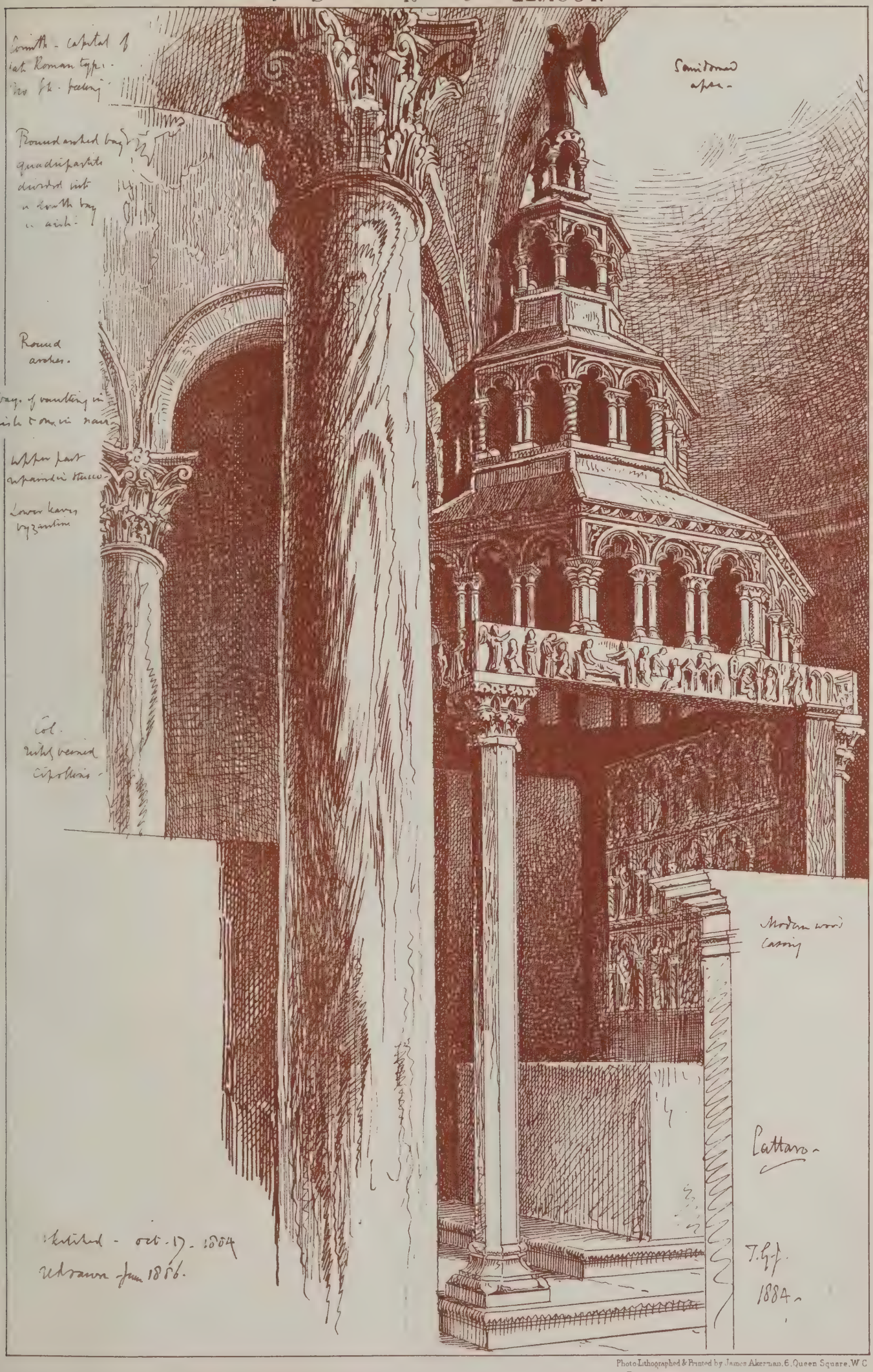


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

CIBORIO AND SILVER GILT PALA IN THE DUOMO OF CATTARO.

FROM A DRAWING BY T. G. JACKSON, M.A.

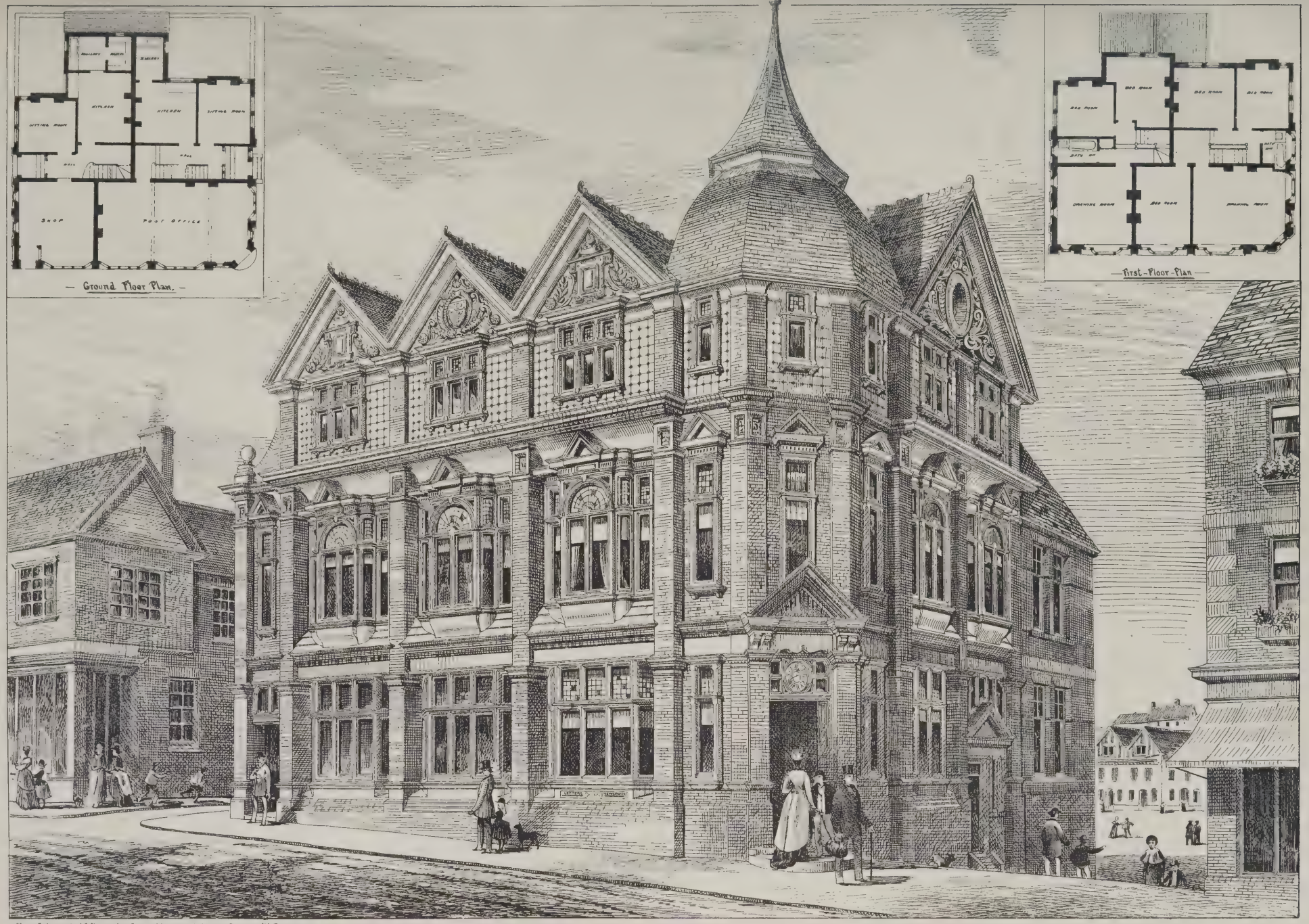
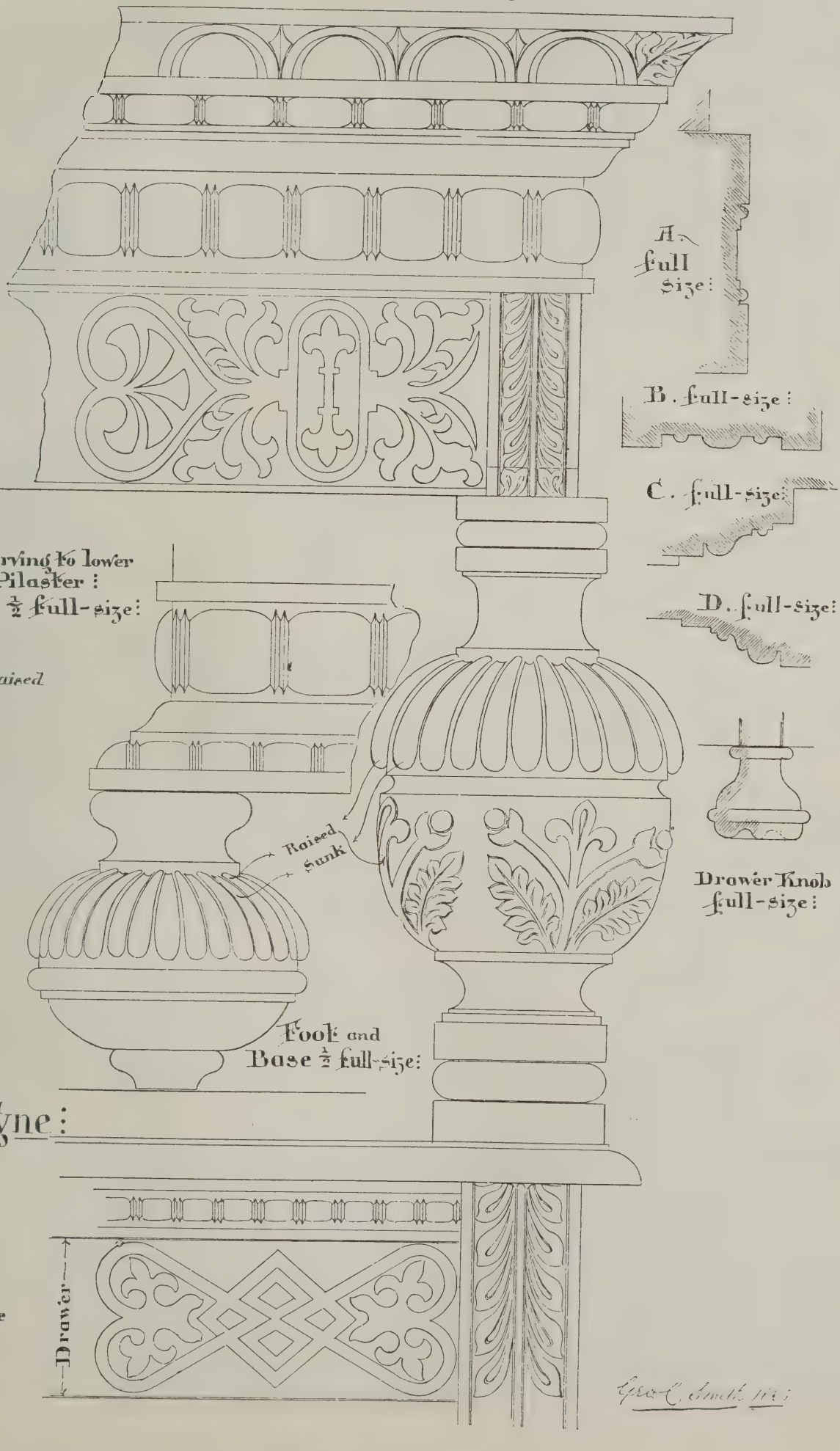


Photo-Lithographed & Printed by James Akerman 6 Queen Square, W.C.

POST OFFICE KNUTSFORD Wm OWEN A.R.I.B.A. Architect

Cornice: Frieze: etc.
½ full-size



pon-Tyne:
old
pinek:

Feet
½ full-size
Inches

WAYSIDE NOTES.

"THE rolling heap of thunder cloud" has been a very conspicuous object in the heavens latterly, and has brought in its train some refreshing showers, and cooled and cleared the air, besides furnishing the artist with some grand sky-scapes. It is well that our interesting telescopic spire in Fleet-street remains intact; for although it has been said to lack grandeur by reason of its regular gradated composition, it is nevertheless a very pleasing, if not imposing, object, and an undoubted ornament to the Metropolis. From a personal visit to the church, I gather that the reports about the damage to the base of its spire are wholly incorrect. What seems to have taken place is that the electric fluid, after passing comfortably down the conductor, did not find its way so easily when it reached the earth. This, doubtless, was very dry at the time, and did not afford a very good connection. Consequently the "flash" resented this hindrance to its course by knocking up one or two flagstones of the pavement where the lightning-rod enters the earth. Thus it came about that a few pieces of York slab were mistaken for architecturally-wrought stonework!

Electric lighting appears to be steadily, if slowly, making headway. The last town that I have noticed as about to adopt the light is that of Weston-super-Mare. A novel feature in this way is an electrically-illuminated omnibus, running from Liverpool-street to Victoria. Recently passing through the neighbourhood of Chislehurst, in Kent, I observed a board which states that "houses will be erected on this estate to suit purchasers," and that "electric lighting will be supplied to each house." This house-to-house installation, however, would most likely have been quite general by this time had not the enterprise of the various lighting companies been so hampered by the Electric Lighting Act, which, although drawn up with the best of motives, must, nevertheless, be considerably amended if the full capabilities of this method of illumination are ever to be given a fair trial. At present, in the majority of instances, if a householder requires the electric light he must make it on the premises. To draw a fair comparison between gas and electric lighting, therefore, it is necessary to consider the cost that we should incur if we had to manufacture the gas in our back gardens.

Every architect should possess an intelligent knowledge of the general system of electric lighting, although the superintendence of most installations is, or rather ought to be, left to trained electrical engineers. Much of this work, unfortunately, is often looked after by wholly incompetent gasfitters, carpenters, and plumbers, who have no business with the fitting-up of the electric light. The amount of this careless work, which has done so much harm to the cause of electric lighting, is beyond comprehension; and the number and importance of the buildings that are carelessly and unscientifically wired are incredibly great.

What shall we say of the decision of the City authorities to do without a permanent architectural adviser? At first sight it would seem a piece of false economy; but, on mature consideration, it is perhaps wise of the Corporation to decide not to appoint a successor to the late Sir Horace Jones at a salary of about £2,000 a year, but to employ a City *Surveyor* at the comparatively modest stipend of £800 per annum. Such, at any rate, would be the opinion of any lucky architect who might be "called in" to advise the Corporation on architectural matters. But, doubtless, the "architecto-phobists" score, or think they score, a point by the action of the City Fathers.

It is very odd that, although a contractor has been favoured with a knighthood, not one architect (let alone artists and men of letters) has, I believe, been the recipient of any Jubilee honours. The *Echo* of last week asks if anyone can "inform the world why Mr. Thomas Lucas, of Ashtead Park, Surrey, and of Lowestoft, Suffolk, has been created a baronet." Perhaps Sir Thomas is considered to have earned his laurels by the part he took in that extraordinary industry, the Suakim-Berber Railway, an undertaking, however, which is possibly looked upon by the public as more meritorious than any amount of writing or building-designing. The fact of no member of our profession having been knighted must be rather a damper on the high spirits of the enthusiastic embyro architect, as he is usually the gentleman given most to speculating on future honours.

I have noticed lately that quite a large number of old churches have been, or are, in course of restoration. Norfolk and Devonshire especially seem to considerably top the list, and from the numerous paragraphs in the "B. N." *re* restoration, the two counties appear to be vying with each other to get through the most of this doubtful kind of work. I believe it was in a certain town of the latter county that the enlightened inhabitants decided to pull down their old tower and build a brand new one! Of course it is the Jubilee year that has reinvigorated the restoration movement. When Mr. Churchwarden realises the (to him) wretched and dilapidated state of his building, he naturally thinks one of the best methods of celebrating the J——e will be to have his architect friend down from London or elsewhere, and to get him to remove a few square yards of the old golden-stained stones and other time-hallowed work, which straightway disappears for ever.

In the matter of holiday touring and sketching, I would recommend anyone who may be desirous of getting his drawings reproduced in the professional journals to endeavour to strike out in fresh woods and pastures new, as if he can but secure some little-known and unsketched subject he unquestionably stands a better chance of getting his drawings published than if he simply produces an averagely veritorious likeness of some well-known and hackneyed building.

In our own country, and certainly in Scotland and Ireland, there must be much old work which has never been introduced to printing ink in any shape or form. And on the Continent it would be often well to run through the known towns and stop at the smaller and less frequented villages to hunt up something new. One gets so sick and tired of seeing sketches of the typical Normandy chateaux, Flemish town-halls, and the hackneyed cathedrals everywhere, that it would be an interesting relief to get some new thing. When a building gets so overdone by sketches, the only course left is to make a set of drawings of it from a lot of different points of view! For do we not read of a certain personage who was so fond of a particular English Cathedral that he had representations of it from all possible points of site—from the north, south, east, and west, &c.—a gentleman, was it not, by the name of Pecksniff?

It is reported that the older routes to the Continent by way of Dover and Folkestone are feeling the effects of the competition of the Harwich service of boats to Antwerp and Rotterdam. Certainly the latter route, though lengthy, is very well managed, and the steamers are good. Although I have never been *to* the Continent viâ Harwich, I have returned thence by way of that East Anglian town.

And a very pleasant journey it was: running down the placid Maas in the evening, with a crimson sunset sky reflected in its waters in a very charming manner, and which outlined in the deepest purple the flat horizon of the quaint Dutch country, only broken by the masts and sails of the swiftly-passing home-returning craft that for the moment looked black against the brilliant sunset. And when the sun had sunk in the west, and nothing but the crimson stain was left in the sky, the dark surface of the river was radiant with the glowing light of phosphorescence, causing the spray from the ship's bows to resemble a fountain of liquid silver, and which shone out of every little wave in our wake whenever they curled themselves and broke into foaming spray. No less beautiful, by contrast to this warm-coloured autumn evening, were the cool tints and chilly air of the following morning, when, after rolling about in the North Sea for many hours, the brilliant star and moon lit night gave way to the cold grey tints of early dawn. For at daybreak we were in the track of those steamers of many types that follow one another in a ceaseless run round our eastern coasts; we were apparently in a fleet of looming hulls and twinkling side and head lights. I have seen few seascapes that have equalled in beauty that of this early September morn, when, after passing through the racing ground of countless merchant vessels, we sighted the old English shores—low-lying hereabouts, it is true, but very quaint and interesting in the early morning light.

GOTH.

CHIPS.

The receiving orders under the Bankruptcy Act of 1883 announced in Friday's *London Gazette* includes the names of Thomas Mitchell, late of Oldham and Manchester, now of Chorlton-on-Medlock, architect and surveyor; Faulkner Lee, Devonshire-street, Great Portland-street, surveyor; Richard Curtis, Aldersgate-street, E.C., builder and contractor; Arthur Martin Bailey, Southampton, builder; Thomas Wyatt Ediss, Newhaven, builder; and Henry Tommy, Wem, Salop, builder and contractor.

Mr. James Wallace, a well-known builder in Newcastle-on-Tyne, died on Thursday in last week aged 83 years.

The Eastbourne Corporation were the complainants in a County Court suit, before Judge Martineau, on Friday. They sued a builder named Cornwall for £45, rent of land on the sea front. The defendant contended that the official seals were not affixed to the agreement between himself and the Corporation, but admitted being in possession of Corporation land for building purposes. The Judge gave a verdict for the Corporation.

At the last meeting of the School Board for Leeds Mr. W. Landless, of Glasgow, was appointed from among 66 candidates clerk of works for the Central Higher Grade School (Messrs. Kelly and Birchall, architects), at a salary of £5 5s. per week.

An address has been presented to the chairman of the Metropolitan Board of Works on behalf of the district surveyors of the Metropolis, offering their congratulations on his elevation to the peerage. In reply, Lord Magheramourne has expressed the hope that his relations with the district surveyors may continue to be of the same cordial character as they have been in the past.

The Bishop of Liverpool will consecrate the new church of St. Benedict's, Everton, on Tuesday week, August 2, and the new chancel of the parish church, Haigh, Wigan, on the following day.

A new Baptist chapel in Cromwell-road, Skeldergate, York, has been opened this week. Messrs. Benson and Minks, of Blake-street, York, designed the building, which seats 300 persons, and the work has been carried out by Mr. Jackson, the contractor for the stonework, &c., and Mr. Dent, the woodwork contractor. The frontage is of red Lincolnshire bricks with stone dressings, and the building has an open roof, stained, the walls being plastered, with wooden dado around.

Sir Richard Wallace has just accepted the tender of Messrs. James Vernon and Sons, of Lisburn, for the enlargement of the assembly rooms in that town, at a cost believed to amount to nearly £2,000, and has also offered £500 for the enlargement of the Cathedral Church of Connor and Dromore in Lisburn by the addition of a chancel.

A new Primitive Methodist chapel at Mablethorpe, on the Lincolnshire coast, was opened last week. It is built of red and white bricks, with pitch-pine seats and other fittings, and accommodates 130 persons. Messrs. Dabb and Allott were the contractors.

The Marquis of Hartington opened the new municipal buildings at Barrow-in-Furness on Friday. Designed by Mr. W. H. Lynn, R.H.A., of Belfast, the buildings form a parallelogram in Duke-street, one of the main thoroughfares, the principal entrance being in Cavendish-square. There is a central tower 170ft. high, with wings north and south. The south wing is devoted to municipal offices, and that to the north on the ground floor to the Free Library and museum, and on the first floor to the civic department, with council chamber, reception-room, and banqueting-room. The building is of red sandstone. The tower is fitted with a clock and bells, furnished by Messrs. Gillett and Co., of Croydon.

A new pier has been erected at the Blue Boar-hard, Rochester, a spot where the wreck of a previous pier has for many years stood. The new structure is of wood, and has been built by Mr. Hocking, from the plans of the city surveyor, Mr. William Banks.

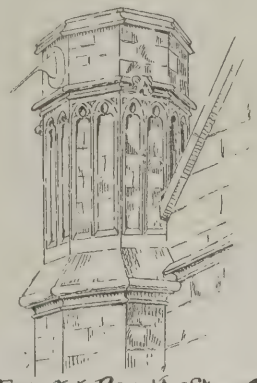
Axbridge Ch. Somerset



Wood Angel
N. Chancel Aisle



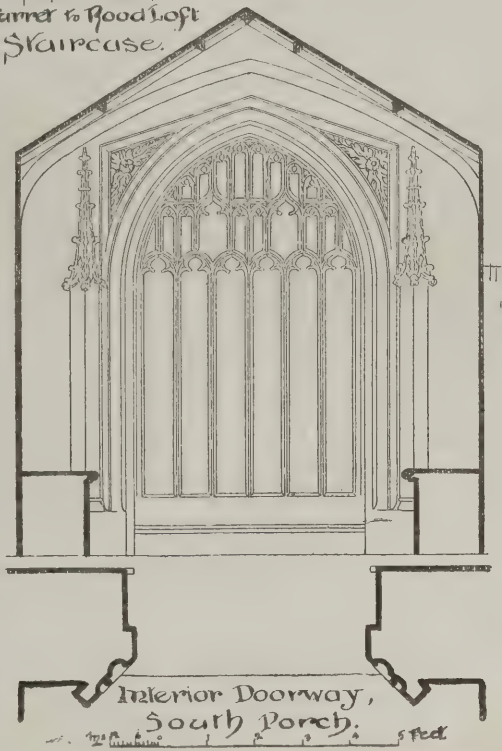
Capital of Pier
N Chancel Aisle



Turret to Rood Loft
Staircase.



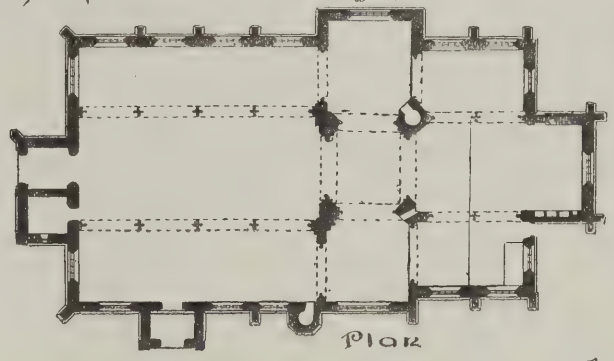
Roof South Aisle.



Interior Doorway,
South Porch.



North West View.



Plan





Bosses Aisle Roof



Rowe. Wyatt del.

Building Intelligence.

ABERDEEN.—The new swimming baths being erected at the foot of Constitution-street are now approaching completion. The baths are near the sea, and salt water is to be introduced into the building through 9in. diameter cast-iron pipes. The building is two stories in height. The front portion on the ground floor contains the entrance lobbies and staircase, ticket office, keeper's rooms, waiters' rooms, and refreshment room; and on the upper floor the principal features are a billiard room and smoking room. On the left-hand side of the front building are situated the steam-boilers and pump room, immediately above being the cisterns and filter. The swimming baths are in the rear wing, and measure 109ft. by 48ft., the main bath being 75ft. by 30ft., with a depth at one end of 3½ft., and at the other of 7ft. Dressing boxes are ranged along the sides. About 800 people can be accommodated in the promenade or gallery. At one end of the bath space has been left for a gymnasium. The baths will be supplied with both fresh and salt and hot and cold water. The architects were Messrs. Jenkins and Marr, C.E., and the cost of the baths will be about £6,000.

CANTERBURY.—The sanctuary of Canterbury Cathedral has just been beautified by the placing of sculptured figures on the stone screen on either side of the altar. The figures are as follow:—Angel of Peace, St. Ithuriel, St. Gabriel, St. Michael; angel with violin, angel with censer, angel adoring St. Uriel, St. Raphael, angel with organ (St. Cecilia), angel with censer. Three more figures have yet to be added. Over the doorway on the south side a figure of the guardian angel has been placed. The sculptors are Messrs. Wall, of Cheltenham. Some diaper work of 14th-century character at the base of the screen also adds to the ornamentation of the east end of the choir.

ELIE, N.B.—The Wood Memorial Church, Elie, which has been built from designs by Mr. Sydney Mitchell, Edinburgh, was recently opened. In plan the church is cruciform, and consists of a broad nave with double transepts on each side and a semi-octagonal apse. The tower is placed in the centre of the front, a very frequent arrangement in old Scottish churches. It rises from the ground without any buttresses, and finishes with a parapet corbelled out from the wall face, and from the inside of this rises an octagonal wooden spire. The spire is made up of two slopes, which gives it the slightly curved form which distinguishes many Scottish spires from the cone-like outline of those in England. The fenestration of the nave consists of simple narrow pointed windows, arranged in pairs, while those in the transepts are arranged in triplets. The whole interior of the church is lined with pressed red bricks, specially made, being only 2½in. high, instead of the usual 3in. All the arches and the jambs of doors and windows are of dressed stone. The apse is raised two steps above the general level of the church. It is lighted by six windows, arranged in pairs, separated by a column of black Frosterly marble. The pulpit, of wood, panelled, stands on a stone base. The passages and apse are laid with tiles, the rest of the church being floored with wood. The church is seated for 400, and cost about £4,000.

EDINBURGH.—The new public baths in Infirmary-street, constructed from plans by Mr. Morham, city architect, at a cost of £10,000, will be opened on Monday next. The baths include a large swimming pond for men, a smaller one for women, and a complete set of plunge baths in each of the two divisions into which the building is divided. The men's bath is 80ft. in length by 40ft. in breadth, and varies in depth from 3ft. to 6ft. 6in. Around it is a broad platform, on which is a series of dressing-boxes for the bathers. At one end of the bath is a club or reading-room, and adjoining it is an apartment for the bathmaster and a store for napery. At a height of 11ft., and carried on iron columns, there is a gallery with open iron front. In this gallery are placed the plunge baths—31 in all, and lavatory accommodation is provided on both floors. The women's swimming bath is 50ft. by 25ft., and in depth runs from 2ft. 6in. to 6ft. It has only dressing-boxes on one side, and above these is a gallery on which are placed nine single plunge baths. In both swimming baths the bottom is laid with white tiles, with broad black bands; the sides and platform are red cement, and the walls are lined with white enamelled bricks. All the woodwork is of pitch-pine, varnished. Both baths have open-timber roofs. Over the entrance hall eight first-class plunge baths have been fitted up. The boiler is 28ft. in length by 7ft. 6in. in diameter, and there are two steam injectors in the men's bath and one in the women's. A chimney rises to a height of about 100ft.

FORD, LIVERPOOL.—The new church, built at a cost of £6,000, in connection with the Convent of the Good Shepherd at Ford, was opened on Sunday week by Dr. O'Reilly, Roman Catholic Bishop of Liverpool. Two hundred penitents at present find refuge in the home, and it is principally for their convenience that the new church has been built. The new church is so built as to accommodate three congregations, each invisible to the other and yet each able to see the altar. The large nave has been divided by an arcading and screen. On one side are seated the 200 penitents, and on the other the sisters, whilst in a transept the general public are accommodated. At the end of a church is a gallery, in which are the choir and the organ. The naves are each 88ft. in length, and the width across is 52ft. Over the altar rises to the height of 72ft. a lantern tower, the height of the roofs of the naves being 54ft. The transept for the general congregation is 40ft. long. There is adjoining this transept a small Lady chapel. Confessionals have been built for the sisters, the public, and the penitents, and off the corridor on the eastern side of the church are a number of parlours, connected with the convent by covered passages. All the buildings have been constructed with red brick and dressed with stone from Bootle. The architects are Messrs. Pugin and Pugin, of London; the contractors, Messrs. Robinson and Robinson, of Liverpool; and the clerk of the works, Mr. Travis, of Bootle.

HIGHAM, SUFFOLK.—The parish church of Higham is about to be restored from plans by Mr. E. Fearnley Bishopp, of Ipswich. The contract for the first section of the work has been taken at £965 by Messrs. Henry Everett and Son, of Colchester. It is proposed to place a new roof over the north aisle, and to build a new north porch; to rebuild the north arcade and reframe the nave roof. The building is to be refloored throughout, the high pews in the nave and aisles replaced by open benches, and new oak altar railings, prayer desk, and stalls will be erected in chancel; the western gallery is to be removed, and all stonework and glazing repaired. A new pulpit will also be erected.

HYDE.—On Saturday week the foundation stones of the Victoria Jubilee Wesleyan Day and Sunday Schools were laid. On the ground floor are infant school, 48ft. by 31ft. 6in., with classroom adjoining, the latter 25ft. by 15ft. 6in., and containing gallery; lecture-room, 22ft. by 16ft.; classroom, 25ft. by 15ft. 6in.; tea-preparing room, 16ft. by 8ft. 6in.; boys' and girls' lavatories and latrines. On the first floor will be a spacious assembly hall, 65ft. by 31ft. 6in., with an open-timbered roof in pitch-pine, and on one side will be large classrooms for the young men and women, each measuring 25ft. by 15ft. 6in. The schools, which are in the Gothic style, will be faced with local bricks, relieved with sandstone dressings, and Ruabon terracotta, and slated with blue slates, capped with red ridge tile. The contract for the work has been let to Mr. S. Robinson, Hyde, the designs having been prepared by Mr. A. Banks, Oldham, who was the successful architect in a limited competition.

LEEDS.—The Leeds School Board received a report on Friday from a committee recommending that Mr. J. P. Kay be appointed architect of the Moortown School, Mr. Corson of the Green-lane School enlargement, and Messrs. Kelly and Birchall of the Richmond-hill School. Mr. Wilkinson asked what were the terms upon which the architects had been appointed. Mr. Fawcett (chairman of the committee) said that some time ago a memorial was presented to the board from the Leeds and Yorkshire Architectural Society, asking that the erection of the schools should be taken out of the hands of any special architect, and should be left open to the profession generally. The committee had a meeting, and came to the conclusion to comply with the request; but they felt that they ought to know exactly what they were going to pay. The work they intended to include in the architect's commission was a little above what was ordinarily included. It embraced the survey of the sites, the taking of levels, the drawing of sketch plans, the preparation of quantities, lithographing, and so on. It was upon that basis that they agreed with Messrs. Kelly and Birchall for the work at the Higher Grade School for 4 per cent. The committee sent out a lithographed circular asking what commission they would charge on the erection of schools, so that the board might know what they would have to pay. They got answers from all the architects with the exception of two or three. Mr. Kay, of Park-square, agreed to do the work at the Moortown School for 3½ per cent., which was accepted, as were also the offers of Messrs. Kelly and Birchall for the Richmond-hill School at 3½ per cent., and of Mr. Corson for the Green-lane School at 4 per cent. Canon Bullock asked how it was that Messrs. Kelly and Birchall had taken the Richmond-hill School at 3½ per cent. while they were paid 4 per cent. for the Higher Grade School, which was a larger job still. Mr. Fawcett said he had no doubt that the Richmond-hill School would pay Messrs. Kelly and Birchall much better than the Central Higher Grade School. Mr. Kelly had had to go to Scotland and into almost every county in England for the purpose of gaining information on the subject of the erection of the Higher Grade School. That would not be necessary in regard to the Richmond-hill School. The recommendations were adopted.

NORTH SHIELDS.—The foundation-stone of the Tynemouth Victoria Jubilee Infirmary was laid in Hawkey's-lane, North Shields, on Tuesday. The buildings face south, and are planned on the pavilion system. The administrative block occupies the central position, with sick-wards, as wings, 24ft. apart, on either side, arranged at right angles to the longitudinal axis of the buildings, with which they are connected by a corridor. Each ward is 32ft. long, 24ft. wide, and 13ft. high, and contains eight beds (but when the building is extended northwards each wing will have eight more), and a separation ward 12ft. square, for one bed; adjoining these are two rooms for the nurse, and a duty room. At the south end of the wards is a large bay window seated round. The officers are placed at the extreme ends of the corridor, from which they are separated by double doors, ventilated between. Advantage is taken of the rising levels, to obtain a subway under the corridor, in which are placed the hot-water and other pipes. The administrative block contains, on the ground floor, matron's and board rooms, each 16ft. by 15ft., storeroom for sickroom requisites, bathroom, operating and drug room for medical staff; kitchen, scullery, storerooms, and pantries. The heating and coal cellars are placed in the basement. On the first floor are situated the doctor's rooms, bedrooms for matron, nurses, and servants, bathrooms, &c. Over the central entrance will be erected a tower, and in the north-west corner of the grounds are the wash-house, laundry, and drying closet in the north-east corner a small mortuary. The walls, which are hollow, are to be built of thin, red bricks with stone dressings, and the roof to be covered with green Cumberland slates. Mr. F. R. N. Haswell, F.R.I.B.A., of North Shields, is the architect.

OLDHAM.—The Primitive Methodist chapel and schools, Lees-road, Oldham, have recently been reopened after extensive alterations and additions. The chapel has been supplied with new pitch-pine pews and rostrum, and the upper floor of the school has been divided so as to form a number of classrooms. Other improvements have been effected, a new staircase has been erected, and special attention has been devoted to the ventilation of the chapel. The whole of the work has been carried out by Mr. Lees, builder, Oldham, from designs prepared by and under the superintendence of Mr. A. Banks, architect, Oldham.

WOODFORD.—Prince Albert Victor visited Woodford on Saturday afternoon, for the purpose of laying the foundation-stone of the build-

ings of Bancroft's School. This school was founded in 1728 by Francis Bancroft, a member of the Drapers' Guild, and has until recently been situated in the Mile-end-road, on the site now occupied by the People's Palace. The new buildings, to be erected at a cost of £50,000, which has been voted from the corporate funds of the Drapers' Company, will contain accommodation for a largely increased number of scholars, and in addition to 100 boarding foundationers, received in the old school, there will now be a day scholars' department for 200 boys. Mr. A. W. Blomfield, M.A., F.S.A., is the architect of the new building.

Engineering Notes.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.—The annual meeting of the Association of Municipal and Sanitary Engineers and Surveyors was held at Leicester on Thursday, Friday, and Saturday in last week, Mr. Joseph Gordon, the borough surveyor and engineer, in the chair. There was a good attendance on Thursday, among those present being Sir Robert Rawlinson, C.B.; Major Tulloch, Inspector of the Local Government Board; Mr. R. Vawser, of Manchester, and J. Lobley, of Hanley, past-presidents; Mr. Hewson, of Leeds; Mr. E. G. Mawby, York; Mr. Howcroft, Redcar; Mr. J. Gledhill, Heckmondwike; Mr. A. Creer, Lancaster; and Mr. J. G. Hodgson, of Rotherham. The members were cordially welcomed by the Mayor (Ald. Hart). The annual report was read, and showed that 44 new members had joined, including five graduates, while the total strength of the association was six hon. members, 285 ordinary members, and five graduates, and the balance in hand £288. The President then delivered his address, which dealt with modern water carriage, system of sewerage, with the difficulties it involved, of river pollution and sewer gases, and referred to what was being done in flood prevention and sewerage works in the borough. The afternoon was devoted to a drive round places of interest, including old Town Hall, the Roman Pavement, the Public Baths, Bath-lane, and various factories and workshops, followed in the evening by the annual dinner at the Masonic Hall. On Friday a paper was read by Mr. G. Strachan, of Chelsea, on "Asphalte and Concrete Pavements" in the morning, and in the afternoon members visited various works recently executed and in progress in the borough, and at 6.30 attended to a garden fête at Ashleigh, Knighton, the residence of the Mayor. On Saturday the Victoria Stone Company's Works at Groby, Bradgate reservoir and pumping station, Mount Sorrel Granite Quarries, and the Barrow Hydraulic Lime Works were inspected.

CITY OF LONDON AND SOUTHWARK SUBWAY.—An inspection of the works now in progress for the City of London and Southwark Subway was made on Friday by a party of visitors from the Society of Engineers. The party were received by Mr. J. H. Greathead, M.Inst.C.E., the chief engineer, at the pier at Swan's Wharf, behind which a staging has been erected, whence a shaft has been sunk to the depth of 80ft. in the river bed, and where a descent was made. The subway begins near the Monument, King William-street, passing under the streets and the river Thames, and terminating at the Elephant and Castle; but by an extension, now awaiting the Royal assent, the line will be carried to the Swan at Stockwell. There will be four intermediate stations—at Great Dover-street, the Elephant and Castle, New-street, Kennington, and at the Oval. The up and down lines are to be taken in two separate tunnels of iron, each 10ft. in diameter inside, and constructed almost entirely under the main thoroughfares from end to end through the London clay, and at such a depth and in such a manner as to avoid all interferences with pipes and sewers and property along the route. The mode of construction adopted is very simple; a steel "shield" overlapping the forward end of the iron tunnel, 26ft. in length, is driven forward by hydraulic power as the material is excavated from before it, and the flanged segments of the iron lining, 1½in. thick, are built up inside and under cover of the shield into successive rings about 1ft. 7in. long. As the shield is moved forward, the annular space around the iron tunnel, left by the advance of the overlapping steel plate of the shield, is filled up by a system of "grouting," the invention of Mr. Greathead, hydraulic cement being ejected from the inside of the tunnel by air pressure. At each of the stations, in addition to the stairs, there will be hydraulic lifts for raising and lowering the passengers direct between the street levels and the platforms. The hydraulic power for working the whole of them will be derived from the engine station at the Elephant and Castle. The trains will be propelled by a system of endless cables, and light trains, taking passengers every two minutes, will be run. The main contract for the subway is being carried out by Mr. Edmund Gabbutt, of Liverpool, Mr. E. Jones being the acting manager, and already both the tunnels have been completed under the Thames and for a considerable distance north and south of the river. The total cost of the work, which we described in greater detail in our issue of the 25th of February last, page 266, is estimated at about £550,000.

CHIPS.

The town council of Truro, at their last meeting, instructed the city surveyor, Mr. W. Clemens, C.E., to prepare a scheme for disposing of the sewage of the city, which at present empties in its crude state into the rivers Allen and Kenwyn.

Plans for proposed new business premises in Victoria, Vancouver's Island, B.C., have been prepared for Mr. Thomas Allsop, of Victoria and London. The buildings will be erected at the earliest opportunity on land fronting Government-street, to which they have a frontage of 60ft. The proposed premises consist, on the ground floor, of commodious shops or stores, and a main entrance to the office above. The latter will be provided with every modern convenience. Mr. R. Owen Allsop, of 37, Norfolk-street, Strand, London, is the architect.

The trustees of the Kirkleatham estate have offered 16 acres of valuable land to the local board for pleasure gardens. Mr. J. Howcroft, their surveyor, has received instructions to prepare plans for laying out the same. The board have also decided to extend the sewer outfalls through the rocks to low water, as recommended by their surveyor.

The alterations and additions to the vicarage of St. Paul, Lorrimore-square, S.E., are now approaching completion, from designs and under the superintendence of Messrs. Frederick W. Fryer, M.S.A., and Frank Golding, of London, E.C. Mr. Tinson is the builder.

The organ in Bromesgrove parish church was re-opened on the 14th inst., having been reconstructed and enlarged by Messrs. Nicholson, of Worcester.

It is now definitely arranged that Truro Cathedral shall be opened in October, in the presence of the Prince and Princess of Wales. The ceremony will take place probably in the last week in that month. The Archbishop of Canterbury will also be present.

A large block of premises has just been completed, being 372, Euston-road, N.W., on the site of an old building burnt down. The elevation is of red brick and Bath-stone dressings. The joinery is of oak. Adjoining these premises the beautiful Gothic entrance gateway to Messrs. Gray and Davidson's organ works, designed by the late Sir Gilbert Scott, and erected some 20 years ago in Caen stone, was found to be in such an advanced stage of decay that it was found absolutely necessary to rebuild with the exception of the base to plinth, which is of Aubigny stone. It has now been reproduced—with the exception of some slight modifications to meet contingencies of new building—in Bathstone. The sculpture and carving generally is the work of Messrs. Kelsey, of Regent's-park. The contractor was Mr. W. A. Rhodes, Hyde-park. Mr. Frederick W. Fryer, M.S.A., was the architect for the whole of the works.

In connection with the Jubilee celebrations, a new reredos was erected in Scholes Church, near Cleckheaton. The structure is of oak, consisting of three panels filled in with emblems, painted on zinc of a gold ground. A memorial brass lectern was also placed in the church at the same time. Both these works were executed by Jones and Willis, of Birmingham and London.

St. Sidwell's parish church, Exeter, is to have its chancel fittings made more complete by the acquisition of carved oak stalls. They are the gift of the late rector, and are being made by Mr. Harry Hems, of Exeter, from special designs prepared by Mr. R. Medley Fulford, of that city.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Correspondence.

ARCHITECTS AND THE REGISTRATION BILL.

To the Editor of the BUILDING NEWS.

SIR,—In most employments the rewards resulting from success, and the discredit of failure through incompetency, form as a rule sufficient security to the public against incompetent practitioners; but certain professions are productive of such serious evils when improperly exercised, and at the same time open to be followed by unqualified persons, that it is right, in the interests of the members of such professions and for the protection of the public, to subject such persons to the restraint of legal regulation.

On all sides it is agreed that the profession of architecture and its branches is one of these, and "Invicta," in his letter published in your last issue, gives additional evidence of the necessity of the proposed Act. In my letter I cited one case only of loss of life through the employment of a person incompetent to carry out the work intrusted to his care, with a view to show the desirability of the compulsory registration of architects. "Invicta" takes exception to my letter because I only mention

one case, and proceeds to show from his own personal knowledge that it is not the outsiders alone who bring the profession into disrepute and endanger the public, but that it is the architects themselves who in many cases are incompetent.

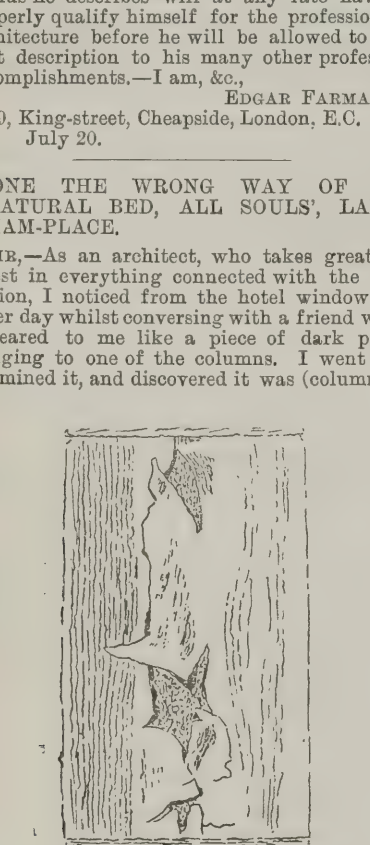
It is evident, however, that your correspondent is not aware of that unwritten law which in legislation of this kind jealously guards vested interests, and what was done in the other closed professions must be followed with regard to that of architecture; but after the passing of the Act, "Invicta" will learn, if he will read the Draft Bill, that the versatile genius he describes will at any rate have to properly qualify himself for the profession of architecture before he will be allowed to add that description to his many other professed accomplishments.—I am, &c.,

EDGAR FARMAN.

39, King-street, Cheapside, London, E.C.
July 20.

STONE THE WRONG WAY OF ITS NATURAL BED, ALL SOULS', LANGHAM-PLACE.

SIR,—As an architect, who takes great interest in everything connected with the profession, I noticed from the hotel window the other day whilst conversing with a friend what appeared to me like a piece of dark paper clinging to one of the columns. I went and examined it, and discovered it was (column A)



actually a portion of the stone peeling off like a skin, and writhing, as it were, under the heat of the sun.

Now, what has caused this? Some who know more than others (?) would say, "Oh, the wrong way of the bed!" It certainly is set the wrong way of the bed, and may have been bedded *hard* on the outer radius of the beds of the stone, which would be liable to fracture when the weight came thereon, and rain, frost, and other elements have penetrated and followed *down* some of the coarser particles of grit, and liberated the closer material, which appears to have been warped outwards by the sun's influence (see Cardinal point). But this is only one side of the question; for on walking round to the easterly side of the church I found a similar stone in the column marked B; but it is perfectly sound, although bedded the reverse of its quarry bed. I then thought that, apart from the sun's influence, prevailing winds might affect one more than the other. I only fixed the north point according to time and the shadow of my stick on the path, so that I do not give it as accurate; the magnetic north may be a few points west of my sketch.

However, the part affected on Column A appears to have had its weak point attacked by the winds from south to north, or within a few degrees of either—wet attacks. The Column B appears to have escaped the influence of the sun, especially the stone therein which is not placed on its natural bed, but it has been exposed to the winds from the south and east more particularly.

Here, then, is a fact that we have two stones forming part of two columns, one to the N.W. and the other to the S.E., say 100ft. apart, doing precisely the same duty, and both set the wrong way of the bed, yet one is "going" rapidly and the other appears quite sound.

I can only think that the stone shown in Column A must have been of a more open vein in parts, and if it had been placed on its natural bed the destructive attack as now shown would not have been developed thus; it would have appeared in horizontal honeycombed pittings or perforations.

Being an enthusiast in the profession must be the apology for these remarks.—I am, &c.,

H. T. PERCIVAL, Architect and Surveyor.

Calais.

CLERKS OF WORKS TO H.M. OFFICE OF WORKS.

SIR,—On behalf of my fellow-competitors and myself, I think it right to say that our best thanks are due to Mr. Isaacs, M.P., for his esteemed efforts in our behalf, and his kind and courteous treatment stands out in marked contrast to that which we have experienced at the hands of H.M. Civil Service Commissioners.

I think the correspondence which has taken place by your kind permission in these valued columns is *overwhelmingly* sufficient to prove that the reply framed for Mr. Jackson is evasive and untrue! I also wish to say no blame must be attached to Mr. Jackson for such, as I am thoroughly convinced a gentleman of his position will view with indignation the deception practised upon him. It is very evident there are those at Cannon-row who are on excellent terms with themselves, and entertain curious ideas as to their infallibility; but I think Englishmen in general rather appreciate those who have the courage to admit their faults than those who uphold wrongs.

The time may come when the authors of this statement of Mr. Jackson's may feel disposed to invest their private funds in bricks and mortar, and I hope they will still cling to the theoretical man of 25 minutes' practical experience, as it will then teach them a lesson not readily forgotten, and perhaps enable them to look a little more considerately on the claims of the practical man. Further comment is needless.

Trusting you will pardon me for again troubling you, and find room for this letter in your next,—I am, &c.,

T. F. MAY, Clerk of Works.

New Post Office, Leicester, July 18th.

DRAINAGE AND SANITARY FITTINGS.

SIR,—On p. 983 of BUILDING NEWS for June 24th, Mr. Bruce said, "I will encroach no further, although Mr. Buchan may make numerous absurd statements for sake of contradiction." It seems he has not been able to keep to his word, for on page 86 of the BUILDING NEWS of to-day's date there is another letter from Mr. Bruce, in which, so far as I can judge, it is he who is the individual who makes "absurd statements for sake of contradiction."

In his opening paragraph Mr. Bruce, in reference to the diagram on p. 52 of the pipe A C, with its right-angled branch B, accuses me of "a deliberate misstatement," in putting under it "Buchan's 1887 and Bruce's 1885 Round Opening or Eye B," and goes on to imply that there is nothing of the sort in his 1885 specification, but refers to "a metal gas and watertight cover for inspection eyes, made square, oblong, or round."

Now, it seems to me Mr. Bruce has both a bad memory and very little gumption, for Fig. 6 of *his own specification* shows the sort of pipe in my diagram on page 52, while line 42, page 4, says, "A4 is an upturned branch pipe." Further, I cannot see the word "oblong" in Mr. Bruce's specification, nor in the half-page of errata, or "clerical errors," prefixed to it; neither could my clerk see it. Perhaps Mr. Bruce will kindly point out the page and line in which "oblong" occurs, or, if this is a misstatement, he might apologise.

I think Mr. Bruce should have allowed Shoebridge's ghost to rest with Spencer's, *et sui generis*—it has only been a will-o'-the-wisp to him.

I am not aware, supposing it is true, that Messrs. Brown, of Paisley, have made traps with my sharp-edge and cascade, which are more self-cleansing than those made by my authorised makers, Messrs. J. and M. Craig, of Kilmarnock; that, therefore, either Messrs. Brown or Mr. Bruce are justified in making and selling them as "Bruce's traps." This is more an attack upon Messrs. Craig as *makers* than upon me as inventor and patentee. I do not admit the impeachment, however, either in the foregoing or in the further words on page 86, "Mr. Buchan . . . has not been able to construct a clean working trap with a good deep seal."

Seeing that "Buchan's" trap, as made by Messrs. J. and M. Craig, obtained the only medal for traps at Glasgow in 1880, the Gold Medal in London in 1884, and Messrs. Craig also got the Gold Medal in Edinburgh last year for their manufactures, and about 60,000 of these traps are in use, Mr. Bruce's assertions seem to me to be an ill-natured, impudent insult to the judges of these exhibitions, and also to the numerous architects and medical men who have specified and recommended them.

Mr. Bruce refers on page 86 to my lawyers having attacked Messrs. Brown, of Paisley, for selling so-called Bruce's traps with sharp edge and drop, which are considered to be an infringement of Buchan's prior patents, and he goes on to say, "I beg to inform Mr. Buchan that this trap will be made and supplied to the public on my responsibility until Mr. Buchan can make good a case of infringement against me." Now, in reply to this I beg to inform Mr. Bruce and the public that, although Mr. Bruce on the 9th inst. wrote to his manufacturers, Messrs. Brown, in his high-flown "responsibility" style, they yet, two days *after*, wrote to my lawyers: "In the mean time, and until the matter is arranged, we have discontinued the making of the traps."

Mr. Bruce, on page 86, attempts to show I am inconsistent in condemning the hollow or basin behind the edge of his Figs. 1 and 3 A.D. 1885 trap as nonsensical and ridiculous, and yet attacking his makers for infringement. This is easily explained, as I look upon the hollow as a sham, which, if made an inch or more deep, could be easily filled up with cement. (Is this, which some might style a dodge, intended?) But hollow or no hollow, my sharp edge with drop are shown by Bruce, and in the so-called "Bruce's trap" bought a few days ago, before I asked my lawyer to write Messrs. Brown, my sharp edge and drop are fully developed, while the hollow is so slight as not to be readily observed unless specially looked for, and, as I did, put a straight-edge in trap and try to slip a half-crown in below it. In forming a sharp square edge of my traps, Messrs. Craig's men, before 1885, sometimes left an infinitesimal depression or hollow like this behind the edge, but it was left for the genius of a Bruce—alas for the hope of a second Bannockburn—to patent this malformation as an *improvement!*

Then, as for the round-edged trap with drop shown in Figs. 5 and 7 of Bruce's 1885 specification, I beg to state that round-edged drop-traps were largely sold before 1885, and the public have often been imposed upon by having such palmed off upon them for Buchan's traps by unscrupulous merchants or their employés, and by tradesmen; but sometimes the imposition when discovered caused considerable loss to the tradesman or seller. These round-edged or emasculated traps allow the water to often flow away quietly below the paper and soil, leaving them exposed; so why Mr. Bruce in 1885 should show this round edge in his patent specification as if it were either a novelty or an improvement passes my comprehension.

As to Mr. Bruce's attempt to criticise my rough plan of Armadale Castle drainage, it reminds me of the beadle in the pulpit; but as

I am neither too old nor too conceited to learn, I give him a chance to teach me, so let him explain where he would have put the manholes to be better. Also, what use for going to expense of manholes at junctions of rainpipes with the leading drain? Also, what good to be served by ventilating the branch rain-drains?

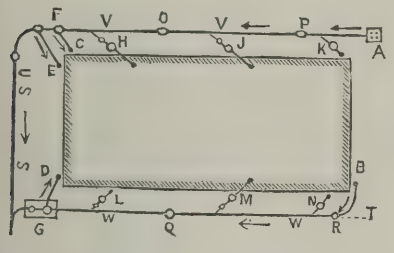
As to Mr. Bruce's assertion that the drains below the floors are put in "without any means of access at the branches," I may mention that when I told this to the man who did the work, he replied, "He's bletherin'. He does not know what he is talking about; access can be got in ten minutes."

As to the plan of putting in a manhole at the junctions of a number of the branch drains, in soft ground outside, the idea is pure bunkum, and would have been a useless waste of money, and not made such a good job for the inmates as the way in which the work is done, so I entirely disagree with Mr. Bruce as to these. I am all the more inclined to this as my style of work pleases first-class architects, and also my customers, who have had experience of the working of my style of doing things for a number of years back. In the circumstances of the failure of his uncalled-for attack upon Messrs. Craig and me, and the attack now by me for infringement of patent upon his makers, Mr. Bruce is hardly in the proper frame of mind—supposing he had the ability—to fairly criticise anything of mine at present. In the future I should not wonder although he consciously or unconsciously copies me still further yet, and so, whether intentionally or not, compliment me.—I am, &c.,

W. P. BUCHAN.

21, Renfrew-street, Glasgow, July 15.

P.S.—It may interest, and be useful to, your readers to show sketch of ground plan of ventilation of drains with air going same way as



the water. In this case, A shows the fresh-air inlet on ground, and which may have a self-acting valve-box below it to let air in but none out; C is the blow-off pipe carried up from the house-side of the trap; E is the blow-off from outer side of the trap for the sewer or main drain; if wished, E may be an air inlet; B is fresh-air inlet-pipe in wall, or carried up any desired height, and without or with self-acting inlet-valves or valve-box; D is the blow-off in connection with B for the drain W W; G is the manhole for disconnecting trap; F is disconnecting trap without a manhole, where trap not deep. It is unnecessary to refer to other details in this connection. W. P. B.

[This ends this matter.—ED. "B. N."]

PRICES OF MATERIALS AND LABOUR.

SIR,—I think there is a great need in the profession for an easily accessible and *reliable* list of current prices for the leading items both of materials and labour (including piecework rates). Of course, builders have these particulars at their fingers' ends, so to speak, and they can, with more or less difficulty, be ascertained by architects and surveyors; but it is inconvenient to have to do this just when one wants them for immediate reference, and for sundry reasons, well understood by merchants and others, the prices of materials quoted to professional men are not always reliable—*i.e.*, the real selling prices, though quoted as such; hence the difficulty in pricing quantities and checking builders' accounts with that accuracy and certainty which is to be desired.

I write to ask whether you do not think it would contribute to the still greater usefulness and success of the BUILDING NEWS if you were to publish such a list, either, say, weekly or monthly, as you would, no doubt, be able to obtain regular and reliable prices of both materials and labour, which would thus be always available for your readers.—I am, &c.,

July 18th. H. A.

[We have only recently pointed out why it is practically impossible for us to give such lists.—ED. "B. N."]

Intercommunication.

QUESTIONS.

[9346.]—**Green Timber.**—I will be glad to learn through your columns the number of cubic feet to a ton weight of green timber (or lately felled), oak, ash, beech, and elm.—GREEN.

[9347.]—**A Legal Question.**—A case has just occurred in which a builder has built a house by private contract and received the final certificate from the architect in due course when the house was completed now twelve months ago. The owner now asks the builder to pay for the certificate of the borough authorities, certifying the house is inhabitable. The builder having been kept waiting nine months for the balance of his contract and from other causes, considers he ought to be relieved of this, though they have no legal weight, but wishes to know if he can be compelled to pay. In the specification, where the only reference is made to it throughout the documents, it says, the contractor to give all notices and pay all fees; but does this fee come under the same heading the others do, and if it does, is it not the architect's place to ask for it before granting his final certificate? And if the architect does not ask for it, can the owner recover in this manner for his neglect? An answer from someone of experience in these legal matters would greatly oblige.—DOUBTFUL.

[9348.]—**Boundary Line.**—Can any practical surveyor give any information as to how to fix upon the correct boundary line of a field or plot of ground where no information is to be obtained from the title deeds? Does the centre of the hedge, where there is no ditch, form such boundary? If there is a ditch, is it the boundary? And where a field adjoins a public road, does the hedge belong to the owner of the field, and if so, how far may he come beyond the centre of the quicks? If anyone can give the title of any handbook that treats of all these matters he will much oblige—A YOUNG SURVEYOR.

[9349.]—**Concrete Floors.**—Will some of your readers kindly inform me of any tests showing the strength of concrete floors laid perfectly flat, and of equal thickness throughout, and supported on all four sides? I am anxious to ascertain the proper thickness to lay concrete—of course, properly mixed, and constituted, say, 6 to 1—under the conditions named, over voids up to 10ft. square to carry a closely-packed crowd.—KEW.

[9350.]—**Cheap Iron Roofs.**—Perhaps some of your readers can tell me of a publication giving examples of cheap kinds of iron roofs to roof a space of 40ft. by 80ft. without any intermediate supports. A work containing examples of the "graphic" method of calculating the various strains would be useful.—PERRY.

[9351.]—**Composition and Design.** — In the "Wayside Notes" of July 15th, in the last paragraph, mention is made of the "Laws of Good Composition," and the "Rules of Design." Will some reader give me the names of one or two reliable works on these subjects?—ONE ANXIOUS TO KNOW.

REPLIES.

[9331.]—**Mounting Photographs.**—I take the following from the first issue of the *Bookbinder*, W. Clowes and Sons, 13, Charing-cross, W.C., publishers:—"1. After trimming the print all round, moisten it slightly (the object being to have it limp, without stretching it), by placing it between sheets of damp paper over night, and it will be about right next morning. Damp the mount, also slightly, paste your print very carefully all over (using no more paste than is just necessary), lay it carefully on the mount, cover it with a piece of clean paper and rub it down well, and then place it in the standing-press between pieces of blotting-paper, and allow it to dry under pressure. It may be, perhaps, necessary to take it out of the press and change the blotting-paper. If all this be done properly, the photograph and its mount will lie quite flat. 2. Another plan is to paste the back of the print all over, allow it to dry; damp the mount, lay the print on the damp mount and pass them through the rolling machine, or place them in the standing-press under strong pressure. For this method we have to thank Mr. A. Cowen, a well-known photographer. 3. Take a piece of lithographic stone or a thick piece of glass; glue this all over with the gelatine, place the photographic print quickly down on the glued stone, rubbing it smartly all over, then pick it up and lay it down on the mount. All these actions must be rapid, and if done properly by this method, a photograph may be easily mounted even on thin paper without cockling. There are other methods, but with any one of these a binder may easily, cleanly, and properly mount a print of any size; the chief object being to get the print on to the board or mount before it has any time to stretch. As a final warning, see that the mounts are not boards made from wood pulp."—BOOKWORM.

[9345.]—**Sewage.**—A tank should be constructed at about 200 yards from the house, if convenient, made perfectly watertight, arched and covered over. A large manhole opening with iron plate cover should be formed in the arch for access to the tank, and a small hole for a pump should be formed in the arch. All the sewage from w.c.'s, grease-boxes, &c., should be discharged into the tank. The inlet-pipe should be a few inches above the overflow pipe. All the liquid overflow should be well filtered and purified before the water is discharged into a burn or exposed in any way. A small filter divided into two or three divisions can be constructed near the sewage tank at little cost. The liquid sewage, if pumped out of tank, will be found very useful for garden purposes, and the manure deposit should always be cleaned out before it reaches the level of the overflow pipe. The tank and filter should be well ventilated, and if situated among trees, a ventilation pipe can be fixed to a tree and carried up 18ft. or 24ft. A good disconnecting trap with deep seal, and well ventilated, should be placed on the sewage drain near the tank, and the drain from house should be well ventilated. If the rainwater is not stored for domestic use, a double system of drainage should be laid for the rainwater, as a large quantity of water should not be mixed up with the sewage in the tank, but arrangements should be made for the proper flushing of the sewage drains, in addition to good ventilation between the house and tank.—W. B.

[9339.]—**Alterations and Additions.**—I beg to thank "M. M." for his kind reply *re* above, and also to state that I have offered to do as suggested by him, and other fair and reasonable ways of disposing of the difficulty; but the owner refuses to entertain any of them. We have asked for arbitration, and offered to bear half costs, or to agree for costs to follow the event of decision. The work is to be seen, and speaks for itself; and moreover, we have actually expended a few pounds more than we claim, thus sacrificing our own time, railway-fares (as work was some distance from home), plans, specifications, &c. Any further advice would be fully appreciated.—A TWELVE YEARS' CONSTANT READER.

[9342.]—**Articles.**—The original indentures belong to the pupil, and must be given up to him at the expiration of his pupilage.—NORTH COUNTREE.

[9345.]—**Sewage.**—Cannot you lead the sewage to a place in the gardens convenient for use? Why not get all you can out of it?—NORTH COUNTREE.

CHIPS.

On Saturday last Mr. C. H. Hopwood, Q.C., of Liverpool, opened a new Liberal Club at Walsden. The building is on the main road from Rochdale to Todmorden, and is built of Yorkshire parpoints, with local stone dressings. The joiner's work is of pitchpine and white woods. The works have been carried out from the designs and under the superintendence of Mr. Jesse Horsfall, M.S.A., architect, Todmorden and Rochdale.

The sixth annual exhibition of the Norwich Art Circle, now open, is devoted to works of James Stark, one of the pupils of old Crome. Among the best pictures are the Duke of Sutherland's "Penning the Flock," a landscape with cattle, lent by Mr. George Holmes; "Road Scene with Ford," belonging to Mr. Harvard; and the Rev. H. H. Carlisle's "Sheep Washing—Morning."

A bust of the late Sir Harry Parkes, which has been placed in the crypt of St. Paul's Cathedral, was unveiled yesterday (Thursday) afternoon by Sir Rutherford Alcock.

The will of Mrs. Eliza Florence, late of 9, Prince's-gate, Hyde Park, who died on April 14th last, was proved on the 18th ult. by Henry Louis Florence and Ernest Badinius Florence, the sons and executors, the value of the personal estate amounting to upwards of £43,000. The testatrix makes special bequests to her two sons and her daughter, Ellen Eliza. The residue of her property she leaves to her three children, in equal shares.

A faculty having been obtained for the enlargement of St. Bartholomew's, Salford, by the deepening of the chancel, the carrying out of the work has been entrusted to Messrs. R. Neil and Sons, of Manchester. The total expenditure will be about £850. A stained glass window has been promised by the rector, the Rev. G. W. Petherick, in memory of his only son, recently drowned off the coast of Cornwall. The subject is Christ Blessing Little Children. The design has been furnished by Messrs. Holloway and Co., of Manchester.

Mr. John Bishop, of the firm of Barnard, Bishop and Barnards, ironfounders, of Norwich and Queen Victoria-street, E.C., died on Tuesday week at his residence in Norwich, aged 66 years.

The partnership between Messrs. W. and D. McGregor, of Acre Wharf, Belvedere-road, Lambeth, builders and contractors, has been dissolved.

The Ellesmere local board recently advertised for a surveyor, offering the munificent salary of £20 a-year! Five men offered their services; but the chairman said not one of them would be able to carry out the duties required under the Public Health Act, and he moved that the duties should be discharged by the Works Committee, who should meet once a month, and that a foreman of the labourers should attend to see what works were required, and report what work had been done, and receive orders for the ensuing month. This suggestion was adopted, and it was decided to give the fortunate foreman of labourers an increase of a shilling a week on his wages.

Princess Louise laid, on Monday, the foundation stone of St. Paul's Church, Vicarage-gate, Kensington. The new church, which is intended as a chapel of ease to St. Mary's, Kensington, will be built of brick in the Early English style, and will hold 1,000 persons. It is building from plans by Mr. Arthur Baker, of 14, Warwick-gardens, Kensington, whose design was selected in competition, and was illustrated by plan and exterior and interior perspectives in the BUILDING NEWS for the 11th of March last. The cost will be £10,000.

Our Office Table.

THE remains of Mr. Alexander Crawford, of Wyke Regis, Dorset, and formerly of Headingley, Leeds, were interred on Saturday in Headingley churchyard, he having died on the previous Wednesday. Mr. Crawford was, the *Leeds Mercury* remarks, by profession an architect, and a few years ago practised in Leeds. He was highly esteemed, and by few more than by his professional brethren, who admired his keen sense of honour and the strong desire he always evinced to uphold the highest standard of professional life. He was the second President of the Leeds and Yorkshire Architectural Society, and signalised his election to that office by an address of exceptionally beautiful diction. His practice was not large, owing to his retiring disposition; but he was a skilful designer, and always succeeded in gaining the high esteem of his clients. Mr. Crawford, who was 57 years of age, has left a wife and three daughters. Owing to the date of the funeral not having transpired until the day before, the architectural profession was only represented at the graveside by Mr. W. Hill, Mr. J. W. Connon, and Mr. G. F. Danby.

THE proposed setting back of the steps on the west front of the church of St. Martin's-in-the-Fields is giving rise to much correspondence. It seems that the Metropolitan Board of Works are acting in the matter on their own responsibility, and so far have not submitted any plan or scheme for the approval of the First Commissioner of Works. Mr. W. Butterfield mentions the interesting fact that the parish of St. Martin's possesses a beautifully-executed model of the present church, which dates back to the time of its building, and must have been made under the direction of the architect, Gibbs. After examining this model, Mr. Butterfield's scruples in recommending a setting back of the portico to half its present space are much lessened, as it shows a portico of the size to which he has suggested the existing noble one will have to be reduced if the far greater injury which the Metropolitan Board of Works proposes is to be averted. Mr. Ralph Nevill, F.R.I.B.A., suggests that the street could be widened without interfering with the church, as all that is required is to take down the flight of steps leading to the disused door of the former residence of the keeper of the National Gallery, and to carry the pavement over the useless area adjoining. The railings to the front area would start from the corner of the building. By this means a 40ft. road would be obtained, he says, at very small expense, and without damage to any architectural feature of either building.

MESSRS. DOULTON are exhibiting at their establishment, on the Albert Embankment, Lambeth, a reredos and font, executed for the Prince and Princess of Wales, for the English Church at Copenhagen. They are from a design by Mr. A. W. Blomfield, the architect of the church, and consist of terracotta with Doulton ware columns, and panels by Mr. George Tinworth. In the reredos are represented three subjects; on the sides "The Betrayal of Christ" and "The Unbelief of Thomas," and in the centre "The Ascension of Christ." On the front are illustrations of "The Finding of Moses," "Samuel and Eli," "The Infant Saviour in the Manger," and "Christ blessing Little Children," placed alternately with panels, from which they are divided by small columns of Doulton ware. The basin is a fine specimen of the same ware. These works will be on view until the end of the next week.

THE National Footpath Preservation Society have issued their second annual report, which proves afresh the truth of the adage that prevention is better than cure, at any rate in all matters of threatened encroachment on public rights. The Duke of Westminster is patron, and the Earl of Bective president; it has also a good array of distinguished names in the list of vice-presidents. The report is full of local records of all kinds relating to footpath preservation, full of suggestions and illustrations in connection with pathways, whether by land or by water. By carefully investigating alleged rights-of-way disputes, the association is often in a position to prevent money being wasted in unnecessary litigation. The number of members during the past year has nearly doubled. The secretary is Mr. Henry Allnutt, 42, Essex-street, Strand, W.C. The society has lately assisted the inhabitants of St. Ishmael's, near Milford Haven (South Wales), in an action at law, in which they successfully defended their rights of way to the sea-shore. A report of this case is also published by this useful society, which deserves to be yet more widely supported. The annual meeting of the Birmingham Association, which has similar objects as the National Society, was held in the town on Friday, Mr. R. Chamberlain, M.P., in the chair, when an encouraging report was read by the secretary, Mr. T. Grosvenor Lee, which showed that a large amount of good was being done at a very small cost, either of money or illfeeling.

THE city council of Manchester received and considered on Thursday, the 14th inst., a joint memorial received from the Manchester and Salford Sanitary Association and the Manchester Society of Architects urging the necessity of the codification and amendment of the building by-laws in accordance with modern requirements and the most approved sanitary principles. Alderman Heywood, who proposed that the memorial be referred to the Paving and Sewering Committee, explained that the City surveyor had been engaged for some time past in the preparation of a new code of by-laws, based upon the code which had been adopted by the Local Government Board. Several members of the corporation having pointed out that a clear and effective code of by-laws was demanded alike by conservators of public health and the equitable treatment of architects, builders, and property owners, the motion was agreed to.

THE summer meeting of the Institute of Mechanical Engineers will be held in Edinburgh on Tuesday week, August 2, and the three following days. Among the papers to be read are the following:—"On the Structure and Progress of the Forth Bridge," by Mr. E. M. Wood, of London; "The Machinery Employed at the Forth Bridge Works," by Mr. William Arrol, of Glasgow; "The Electric Light on the Isle of May," by Mr. David A. Stevenson, of Edinburgh; "The New Tay Viaduct," by Mr. Fletcher F. S. Kelsey, resident engineer; "The Dredging of the Lower Estuary of the Clyde," by Mr. Charles A. Stevenson, of Edinburgh; and "The Position and Prospects of Electricity as applied to Engineering," by Mr. William Geipel, of Edinburgh. Excursions will take place to the Forth Bridge Works. The Carron Iron Co.'s Works at Falkirk, the new Tay viaduct, the Edinburgh Water Works, the Electric Lighthouse on the Isle of May, the Exhibition at Newcastle-on-Tyne, and other places of interest. The President, Council, and members of the Institution will be received in the University Library Hall on Tuesday, August 2, by the Marquis of Tweeddale, the Lord Provost, the Chancellor of the University, and other dignitaries. The reading and discussion of the papers will take place in the Natural History Lecture Theatre. On the Tuesday the Institution dinner will be given in the Masonic Hall; and on the Wednesday there will be a conversazione in the Science and Art Museum and a lecture by Sir Wm. Thomson.

A COMMITTEE of the Town Council of Birmingham have recently acquired two fine suits of Persian armour, which are now exhibited in the Industrial Hall of the Art Gallery. Each suit comprises a shirt of mail, a helmet, a shield for the left arm, a brassard or guard for the right arm, and a battle-axe. The larger set consists of a shirt of chain-mail which weighs no less than 26½lb.; all the links, some thousands in number, are riveted, and are hand wrought. The helmet, which is hemispherical, and surmounted by a long spike, is inlaid or damascened with gold, and is also ornamented with medallions of household and hunting scenes, chiselled in low relief. Round the lower portion of the helmet runs an inscription in a debased form of the old Cufic writing. In front of the helmet is a nose guard and two small sockets in which were placed peacock or other feathers. At the back is a small curtain of chain armour for the purpose of protecting the back and shoulders of the wearer. The shield is circular, of chiselled iron, damascened in gold, and decorated with four projecting bosses, in appearance very similar to Kuftgain work; in the centre is a Cufic inscription, and the border is surrounded by the same, forming a band about 6in. in width. The surface of the shield is covered with drinking scenes, and with small figures of antelopes, panthers, and other animals. The arm-guard is similar in character to the shield and helmet. The battle-axe is of fine steel, and near the shank of the axe the steel is chiselled and enriched with gold, two figures of rabbits being worked into a required space with great ingenuity. The other suit of armour is entirely different in design, and has an inscription in silver.

PARLIAMENTARY NOTES.

THE METROPOLITAN BOARD OF WORKS.—Mr. O. Morgan asked the Home Secretary whether his attention had been called to the reports in the public press of a discussion at the Metropolitan Board of Works on Friday with reference to certain charges made against an official of the architect's department; and whether he could promise that a full inquiry would be made.—The Home Secretary replied that he had seen a report of the proceedings. He was informed that the Metropolitan Board of Works had, through a committee, made a full inquiry, and the report which had been presented was the result of that inquiry. He disclaimed the position of representative of the Metropolitan Board of Works.

LEGAL INTELLIGENCE.

WOOD'S PATENT MORTISE CHISELS.—In an action of John Wood and Co. v. Thomas Robinson and Son (Limited), Mr. Justice North, on the 14th May, by consent, perpetually restrained the defendants from selling, or offering for sale, as Wood's patent mortise chisel, any mortise chisels other than such as are manufactured or sold by John Wood and Co., and ordered the defendants to pay all the costs and expenses incurred. It is as well to note that proceedings will be taken against all persons manufacturing or selling chisels as Wood's patent chisels which are not manufactured by John Wood and Co.

STAINED GLASS.

WARNHAM CHURCH, SUSSEX.—This church, lately restored by Mr. A. W. Blomfield, has just received the addition of three stained-glass windows—one a Jubilee gift of the parishioners, the others the gift of Mr. W. H. Maudesly and his son. The figures in Jubilee window represent the Queen of Sheba and Queen Esther, with suitable inscriptions. These windows were designed and executed by Messrs. Heaton, Butler, and Bayne, of Garrick-street, London, who executed all the other windows at consecration, as well as the painted panels and reredos.

CHIPS.

Mr. Arnold Taylor, Inspector for the Local Government Board, held an inquiry at Accrington, on Friday, in response to an application to borrow £26,000 for works of private street improvement, and a similar sum for sewerage works, &c. It was stated that when the streets proposed were completed Accrington would be one of the best paved towns in Lancashire.

Mr. Percy Gardner, M.A., F.S.A., of the British Museum, Disney Professor of Archæology and late Fellow of Christ's College in the University of Cambridge, has been elected to the Professorship of Classical Archæology, recently founded by Merton and Lincoln Colleges, Oxford.

The foundation stone of St. Augustine's Church, Monsall, Manchester, was laid on Saturday. The dimensions externally will be 106ft. by 50ft. (exclusive of transepts), and the style of architecture chosen is Late Gothic. There will be accommodation for 500 persons. The roof is one span of 44ft. The total cost will be about £3,800. Mr. A. W. Smith, 17, St. Ann-street, Manchester, is the architect.

The memorial stone of a new church school was laid at Cheriton, near Folkestone, on Thursday, the 14th inst. Mr. Matthews, of Folkestone, is the contractor.

Mr. G. F. Watts desires it to be understood that his gallery of paintings at Little Holland House, Melbury-road, Kensington, is open to all who choose to apply for admission on Sunday afternoons from 2 till 6 o'clock, without any introduction, card, or restriction.

The Marquis of Hartington opened on Wednesday the new building in connection with the Railway Servants' Orphanage, Derby. It has cost £10,000, and accommodates 300 children.

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CONVENTIONAL SPECIFICATIONS.

SPECIFICATION-WRITING, like legal draftsmanship, has rather obscured than made clear the duties of those who are entrusted to carry out the intention of the author. In both of these forms of professional prescriptions, the verbiage is by no means any gauge of the comprehensiveness or clearness of the draftsman; sometimes, indeed, the greater the verbosity the more doubtful is the meaning conveyed. Nor is curtness of phrase always a sign of clearness and intelligibility. It often is a substitute for knowledge and precision. Such a clause as "All the materials to be of the *best* quality and approved by the architect" conveys very little information. The word may mean "best" of a certain kind; it may imply best of the kind generally used by the architect, not necessarily the best quality that can be procured or best for its application. These adjectives, however, embody in any easy uncompromising sort of way what is nevertheless to be inferred, without committing the writer to any statement that would expose his ignorance of materials. We must go back to the beginning of the system of contracts to discover any reason for the present laxity of specification clauses. As the main idea of the contract system was to cheapen and expedite building operations by competition, it was not unreasonable to conclude that those who drew up specifications were anxious not to appear to be too particular or exacting in their wants, and, therefore, were induced to use general phrases that could be interpreted by the builder of an "elastic" conscience in his own way. It is not at all unlikely that some of the vague clauses found in specifications are derived from the descriptive agreements of tradesmen who have supplied materials and workmanship, and who were careful not to bind themselves to any exacting terms. To one or all those causes we must attribute the formal and ambiguous provisions of the modern specification. There are reasons, and strong ones, for not particularising too much. Definite prescription requires an extensive knowledge of materials, trade marks, and the methods of workmanship, a degree of attainment that can only be expected from knowledge and practical experience. A young architect would, for example, be safer to describe the stone to be used "to be of the best quality, free from all vents, shakes, and other imperfections," than if he were to describe a particular quarry without knowing the different beds and qualities, which would tie him to the acceptance of perhaps an inferior stone. So with regard to timber. The customary clause is that the timber is to be from the Baltic, or "to be of the best Dantzic, Riga, or Memel yellow fir," though there are few architects who obtain the best from either of these ports. A more experienced architect who knew something of the timber trade would be contented if he could be sure of getting medium quality Memel or Dantzic, from some well-known shipper. Much reliance cannot be placed upon Russian market brands in timber and deals, though it is upon these that the architect mainly rests when writing his specification for carpenters' work. Reputed brands often turn out to be misleading. A favourite clause is that "no Swedish timber is to be used," though it is worth notice that "mixed" quality Swedish red or yellow deals are often better than so-called first quality Baltic. The specification phrase—"the best timber"—means in the timber merchant's vernacular, straight-grained timber, free from knots. Probably there is more room for evading the intention of the architect in this part of the specification than in any other; so many characteristics go to make up good timber—the mode of growth, time of felling, nature of the soil—all of which are unknown to the architect. Mr. Hurst very judiciously observes, speaking of pine-wood, "Much confusion has arisen among architects and builders owing to the absurd practice of naming this timber after the ports of shipment, and also from confounding the pines (*Pinus*) with the firs (*Abies*), although they belong to distinct genera." The *P. sylvestris* is commonly known as "red" or "yellow" fir. The tree grows in Scotland, in the Baltic, and Russia. The late Mr. Thomas Laslett, a high authority on timber, places in a general way the order of quality for deals and battens as follows: First, Prussia, then Russia, Sweden, and Finland; last, Norway. It has been noted by Col. Seddon, R.E., that some of "the very best Baltic deal, both yellow and white, comes from Gefle and Soderham." By white deal, of course is meant the deals cut from the spruce (*Abies*). We hear it generally specified that all floors and joiner's work are to be of the "best Christiania deals," though it is generally known to all importers that these deals have lost the high reputation they once had, while it is incontestable that Swedish deals can be obtained that are sounder and more uniform in quality than the Russian deals. One reason for the difference is the mode of conversion. Col. Seddon, in his useful remarks on timber, observes: "A balk of Russian timber is all cut into deals of one quality; hence the numerous hearts or centres seen amongst them, which are so liable to shake and split; whereas in Swedish timber the inner and the outer wood are converted into different qualities of deal; hence the value of first-class Swedish goods." Taking, therefore, the admitted scarcity of good Christiania and Norwegian yellow deals, and the unequal qualities of those from Russian ports, it is safer for architects to specify goods which there is more chance of obtaining of good quality, such as the yellow deal from Gefle and Soderham. As we have said, "brands" are unreliable unless they are selected with knowledge: "second" quality deals of one shipper are well-known to be equal to another shipper's "first" quality. Some experience and art are required to find out the best shippers and their trade marks—a kind of special knowledge that will repay the trouble of acquiring, if one desires to avoid many of the equivocal phrases in specifications.

To avoid stereotyped phraseology, the result of copying one specification from another, the profession may do something. At present the tendency is to repeat a good general form *ad infinitum*. Specialisation is avoided as being inconvenient, and local peculiarities of material and workmanship are not favoured by the writer. On the contrary, the clauses are dictated by a knowledge of the materials of a very general and often imperfect nature. It is the information that has been picked up in the office during apprenticeship; acquired not from contact with quarrymen, brickmakers, timber importers, and workmen engaged in building, but more from office traditions. Once a general form has been adopted, it is transmitted to future generations. A special form for each new building would be exceedingly laborious and inconvenient, and to some extent certainly unnecessary. But clauses are repeated so often that they lose their original significance and force. Contractors get to look contemptuously upon an official jargon that they know has been applied to hundreds of very dissimilar cases. We may give a few illustrations. The conventional specification reads: "The mortar is to be compounded of stone lime and sharp, clean sand, mixed together in the proportions of one of lime to two of sand." The contractor takes little notice of the formula. The proportion is not attended to, there is no test specified, and the lime may be anything but fresh. Then, "sharp, clean sand"—how often we find sea sand instead of clean pit sand. The clause has been interpreted in such a manner as to disarm criticism; the germs of mischief appear on the wall, but nothing can be done to rectify the mistake. Again, as to the concrete or Portland cement, the ordinary clause is based on imperfect data. High tensile strength is generally made a condition, whereas the more practical test is the adhesive strength. It is well understood that the tensile test depends on several circumstances—the atmosphere, the mode of manipulation, temperature of water, &c., and may therefore be very misleading. Air slaking is a very important condition, but seldom insisted upon. Specifications lay down certain conditions, such as weight, fineness, strength, and time of setting. One writer on the subject refers to the marked differences, except in time, amounting in some cases to positively absurd proportions—as much as 300 per cent. in the requirement as to fineness, 18 per cent. as to weight, and over 100 per cent. as to strength. Too high a tensile strength may be purchased very dearly: the cement may be over-limed, which gives a high result at seven days, but is found to lead to expansion and cracking of the concrete mass. A tensile strength of 350lb. per square inch at seven days increasing with the age is preferable. Mr. Mann suggests the following specification for adhesive strength: "The Portland cement shall be ground so that no more than 45 per cent. shall be stopped by a No. 176 silk sieve, and its adhesive strength after 28 days' immersion shall be 95lb. per square inch; cement, as supplied for use, not less than 75lb. per square inch. Six tests being employed in each case." The No. 176 silk sieve gives 30,976 meshes per square inch.

Another stereotyped clause prescribes the drains; so many feet of stoneware pipes of a certain diameter are specified, and the mode of jointing; little is said about the bottoms of trenches, nothing about ramming them, about gradients, about avoiding curves and sudden drops, the cleaning out of the pipes as they are laid, and other precautionary measures, such as testing. We have no space to go through all the trades and suggest improvements and point out omissions. What we complain of are the uncertainties and inexact descriptions of many matters which are left to the good sense and knowledge and honesty of the contractor. To take one or two trades which appear to be very superficially dealt with. The "Founder and Smith" is one of these. A great deal is left to the founder and engineer. The iron joists that are provided are often of Belgian manufacture, and need careful specification and testing. Details like bolts and nuts and threads are left to the maker. We have seen bolts and nuts in roof trusses that do not take any strain, or very little, and have probably never been screwed up. To pass to general ironmongery, the same generalities suffice. Contractors repeatedly fix door-locks of very inferior description because the specification is inexplicit about the kind of lock intended, instead of specifying "Chubb's" or "Hill's" or "Kaye's" locks, or others of approved make. Wrought butts are often specified, but how often we find cast used. It is important also to name the grates and the manufacturers' names, to avoid the substitution of inferior make. The hot-water supply is one of the many special provisions that are left to the contractor or engineer owing to the imperfect or superficial knowledge of the writer. General directions can only be given, but these should be more intelligible than the phrase,

"To provide and fix to the architect's satisfaction a hot-water apparatus, &c., &c." At least the position of pipes, the kind of boiler, tank, or cylinder ought to be specified. The circulating pipes should be directed to be placed in positions that will avoid the inconveniences of contact with soil or waste pipes. They should be carried up in inner walls, never in outer, if possible, so that frost and cold should not affect them. The pipes should be placed in channels, the two sets of flow and return should be separated, and the hot pipes cased or packed with felt wherever necessary. A clause of no uncertain meaning should make it prohibitory to run pipes in new brickwork and to cover them up with plaster. Many disappointments arise from carelessness in arranging the pipes; long draw-off services are introduced, in which the water gets cold, and heat is wasted, the flow pipe is taken from the boiler horizontally and the circulation is retarded, "dips" in the flow pipes are made, and imperfect connection with boiler. There are a score of other technicalities which ought to be mastered before a competent or sufficient specification of a heating system is written. If our space allowed we could extend these remarks to other trades in building. Our recommendations are simply that the different tradesmen and manufacturers should, for their own protection, and to prevent incompetent men from entering into competition, join with the profession in formulating a series of general clauses that may be safely introduced in specifications for the various trades.

ALTERATIONS AND EXTRAS.

THE inattention of builders to forms is common in some parts of the country. Estimates are given for performing sundry works, and are accepted without any written form or agreement binding on both parties. The result of this kind of transaction is never satisfactory; in most cases disagreements ensue, and each party thinks he has a good case. Strange to say, a large number of works in the country are undertaken in this manner. An architect is not engaged. The building owner is desirous of building or making some alterations; he calls in a builder, who gives him an estimate for doing the work according to a roughly-drawn plan and elevation; it is accepted, and forthwith the builder, on no other agreement than a formal acceptance, commences the work. It is not long before alterations or additions suggest themselves to the owner, which would perhaps have never been required had properly prepared plans and drawings been made at the commencement, and the builder is required to send in estimates for these, or to contract for them. These alterations are frequently so mixed up with the original contract work that it becomes hard to say what was intended under the first contract, and things get into such a hopeless confusion that often the builder himself does not know what he is really entitled to. The works are at last completed, and the builder makes out his account for alterations and extras. The owner refuses to pay. Who is to be the arbitrator? One of our subscribers recounts in our Intercommunication columns a very similar transaction. The owner declines to pay on the ground, so often assumed, that the additions claimed for were understood to be included in the original tender. There is no satisfactory basis upon which any definite contract can be founded except the plan, specification, and quantities which have been prepared by the builder himself.

As most of our readers are aware, the acceptance of a tender constitutes in law a contract, and binds both parties to a performance. Unless, however, the terms of the tender are very plain, or the plans are clear and prepared with skill, it is very easy to understand how very unsatisfactory a contract of this nature becomes. The builder, if he tenders on the plans and specification, is supposed to have brought sufficient care and skill to the task; but the person who accepts the tender does not enter into any implied warranty of the correctness of the plans, even if they have been prepared by an architect. The builder is supposed to have examined them carefully, and based his tender upon them, for he will be bound by the contract. In "Thorn v. Mayor of London," a contract was entered into to take down a bridge and rebuild it. The descriptions given in the plans and specification prepared by the engineer were stated to be "believed to be correct," but were not guaranteed. The contractor claimed compensation for additional labour. It was held by the Court there was no express warranty. In like manner, if a builder or architect finds his plans imperfect, and to amend or rectify them it is necessary to add to the cost, he cannot reasonably expect the owner to pay for the extras so incurred. A builder under these circumstances often hails fresh orders as one of the means of invalidating the original contract. But a detailed account for additions and extras might be a formidable affair for the owner if he expected that any orders he had given were only those necessary to make the building fairly perfect. Owners and builders have only themselves to blame for proceeding on these uncertain data. Additions are made, and prices given and accepted in writing upon the *ipse dixit* of one of the contracting parties, without in some cases allowances being made for materials and labour under the first contract. Thus, if a room has to be made larger than the plan shows, the additional cost ought to be calculated, making a proper allowance for the end wall, which would remain as shown. The owner probably pays 50 per cent. more than the value when the detailed account is presented. On the other side, works are executed or ordered that have not been agreed for as to price; the owner refuses to pay for them, alleging that he understood they were included. They may not have been shown or described in the plans or specification. Can they be charged for? A little reflection will show that there is a reasonable implication that they are included in the contract in the absence of a written agreement or order. Any Court of law would draw such a conclusion. It is a well-known principle that if a builder undertake to do work according to a specification and deviate from it without special orders, he cannot recover; by the same reasoning, if he does extra work, he is unable to claim for it unless he can show written orders. Notwithstanding these facts and decisions of legal authorities, builders are found who daily set them at defiance by entering into contracts to perform works upon the most imperfect understanding. They prepare plans and estimates, and when the building is finished they imagine that the owner is ready to accept all that they have done for them, and to pay these accounts without the slightest hesitation. The owner is equally to blame for entering into a contract to pay a certain sum for something he does not understand, estimated by the other party on his own plans. The individuals may be perfectly honest in their intentions, yet the conclusion to be drawn from these contracts is the same—the want of assurance that the work will be performed in a satisfactory manner without the intervention of an architect. It is difficult to advise a mode of settlement between builder and owner who fall out at the end of their engagement. Probably the best plan, and the most impartial, is to call in an arbitrator in the manner suggested by one of our correspondents, who would value the several works and additions ordered, the owner paying the fees if the amount should exceed the sum claimed, or *vice versâ*. Architects have probably to thank themselves for making it possible that building owners prefer to do without them in small undertakings. There are two reasons for this avoidance of the architect's services. One is the fear that the architect will design a too costly building; the other, the saving of a commission. With regard to the first, the owner of small capital who knows exactly what he wants has, we fear, some ground for his preference; though with respect to the latter, we doubt very much whether the sum spent on "extras" to make the building perfect, and the expenses of the builder to obtain payment, do not considerably overbalance the customary fees.

THE STABILITY OF STONE SPIRES AND TOWERS.—IV.

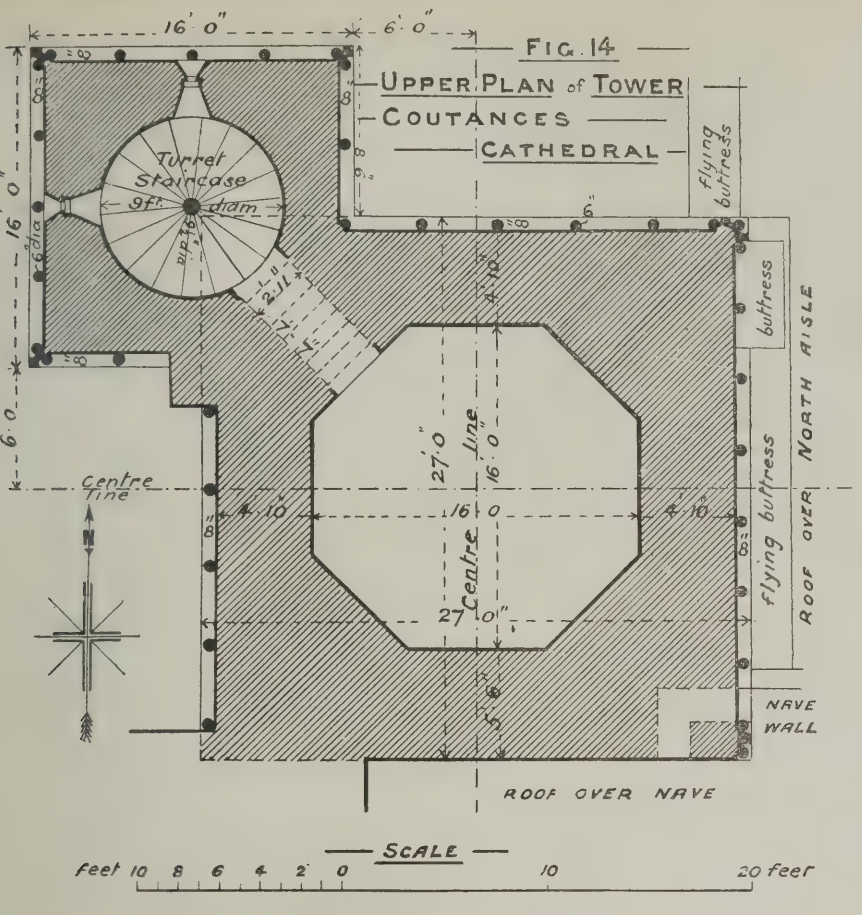
(*Continued from page* 789, *Vol. LII.*)

TOWERS.

IN many instances the stability of these structures is so far beyond all doubt as to render any calculations unnecessary, and it appears that as long as such structures are designed by architects as works of fine art, and as long as the designers endeavour to "make books of their churches," the problems will never be reduced to the same studious methods of economy by which modern engineers ascertain the least amount of material which is required to resist a definite amount of stress. For instance, the stability of a tall chimney shaft is easily determined by the simple ratio of weight *v.* wind-pressure; but many of our modern architects insist upon building many tons of solid masonry into the walls of their towers which an engineer would leave in the quarry after five minutes' consideration; and the engineer is right if these structures are merely required to resist storm and tempest in the work of raising a belfry or a clock tower above the surrounding objects. The difficulty of determining the amount of solidity which is alone sufficient to insure permanent stability under modern requirements is produced by the fanciful sentiments of art criticism or the indefinite dictation of artistic designers.

One authority (John Ruskin) writes thus:—"Your noble tower must need no help, must be sustained by no crutches, must give place to no suspicion of decrepitude. Its office must be to withstand war, look forth for tidings, or to point to heaven; but it must have in its own walls strength to do this. It is to be in itself a bulwark, not to be sustained by other bulwarks; to rise and look forth, like the tower of Lebanon that looketh towards Damascus, like a stern sentinel, not like a child held up in its nurse's arms." Bearing this in mind, and returning for a moment to the illustrations of the tower at the Cathedral of Coutances,* it will be seen that the walls are at least 5ft. thick below the belfry floor, and that the proportionate height, measured half way up the spire from the floor of the nave, is only about seven times the outside diameter of the base, the dimensions by scale being about 27ft. by 187ft. = 5,049sq.ft. area, exposed to a pressure of 50lb. per square foot, and producing an applied force of about 113 tons, with a leverage of half the height, 93ft. 6in., the result being a moment of 10,565ft.-tons. To resist this force, the total amount of stonework in the whole structure may be roughly estimated at almost 70,000 cubic feet, or a weight of about 4,375 tons, if the material is assumed to be 16 cubic feet to a ton, so that a leverage of 2ft. 5in. would produce a moment of resistance of 10,573ft.-tons. But the mean diameter of the base is about 21ft.; and the nominal limit of the deviation of the centre of pressure from the centre of the base was recommended by the late Professor Rankine to be not less than *one-third*, or about 7ft. in this case, the ground plan being a hollow square; and it is therefore evident that the principal purpose of the wind-pressure calculations is to ascertain the variation produced in the compression stresses on the base. The sectional area on the plan at the level of the nave floor is about 500sq. ft., so that the mean pressure is 8¾ tons per square foot, and the variation of the extreme pressure on the leeward edge of the base from the mean is

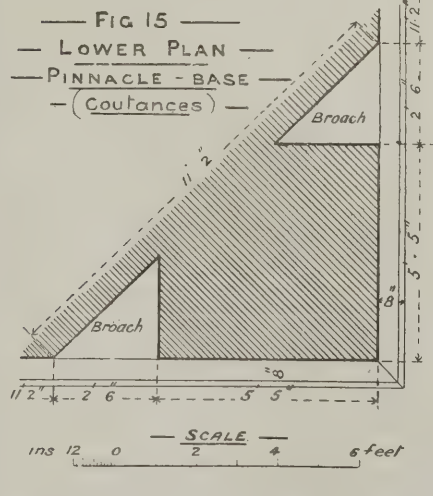
* BUILDING NEWS, 1st and 15th November, 1878.



$(8\frac{3}{4} \times 2\frac{5}{12}) \div 7 = 3{\cdot}02$ tons per square foot. The extreme pressures are therefore $11\frac{3}{4}$ and $5\frac{3}{4}$ tons per square foot; but any building stone which could be described as good enough for important work of this nature would safely bear 15 tons per foot, and the difference between these figures represents a proportionate excess of material.

There need not be any hesitation in stating that this tower contains at least *a thousand tons* of solid masonry that might have been left in the quarry, if it were merely designed to resist the forces mentioned; but before it is condemned for extravagance of material, its [illegible] reminds us that it was probably built [illegible] in turbulent times, or, as previously quoted, "to withstand war," and perhaps earthquakes as well. There is, however, no similar excuse for modern British architects, for almost all of their structures are erected outside of the area of seismic convulsions, and the task of building bomb-proof casemates or bastion flanks may well be intrusted to our military engineers.

If it is assumed that the weight of a tower similar in elevation to the Coutances model could be reduced to 3,000 tons, and erected on a base to be 27ft. square on the outside lines, the thickness of the walls at the level of the nave floor may still be 6ft., because the reduction in the weight may be obtained by gradually diminishing the thickness upwards, as an engineer would design a chimney shaft, or, as in other cases, where window openings are cut out of the sides. The mean diameter being 21ft., the area of the base is $4 \times 21\text{ft.} \times 6\text{ft.} = 504\text{sq.ft.}$, from which a deduction of about 75sq.ft. may be assumed to represent archway openings from the nave or aisle, leaving an area of 429sq.ft. for a pressure of 3,000 tons, or a mean stress of 7 tons per square foot. The moment of the applied force being, as before, 10,565ft.-tons, requires a leverage of $10{,}565 \div 3{,}000$ tons $= 3\frac{1}{2}$ft., exactly half of the nominal limit of deviation, so that the variation of the extreme pressures from the mean is only $3\frac{1}{2}$ tons per square foot, making the greater extreme $10\frac{1}{2}$ tons per square foot. This result shows a saving 1,375 tons of masonry, and a decrease in the extreme stress on the leeward side of the base, which is sufficient to explain that the mere fact of the requirement of the Ecclesiastical Commissioners or the Incorporated Church Building Society—which directs that walls more than 30ft. in height must be not less than 3ft. thick—does not involve an excessive amount of stonework; because it has been shown on page 788 that the walls of the belfry of Coutances are 5ft. thick, and still there is not one ton too much, because each of the eight sides of the tower, shown on Fig. 12, is reduced from a sectional area of about $43\frac{1}{2}$sq.ft. to about $13\frac{1}{2}$sq.ft. by cutting out eight lantern windows, shown on Fig. 10, each measuring about 30sq.ft. on the plan, and about 16ft. in height. This is



what is termed "bold and daring construction," the least quantity of material to resist a given stress, in a manner which our modern engineers would find a most difficult task to surpass with similar materials, and one other condition not yet referred to, that it is a work of fine art.

But there are more practical lessons to be derived from the same example. It should be observed that the height of the tower for stability considerations was measured from the floor of the nave and aisle, in accordance with Ruskin's theory previously quoted, that the tower should be strong enough to stand alone; although it will be seen from Fig. 14 that the south side of the tower is attached to the north wall of the nave, which is 67ft. in height, and the north side of the tower is greatly strengthened by a flanking tower containing a stone turret staircase. The second method of treating such a combination would be to neglect the wind pressure on the tower below the top of the nave wall, and take this level as the datum from which the calculations should be made, though even in this process the tower should be treated as though the base were symmetrical, because as the north side of the tower is much stronger than the south side, the result would give the stresses on the weaker side in exactly the same manner, as the fact that the strength of a chain is not only determined by its weakest link, but by the weaker side of that link.

Architectural critics have frequently denounced the deceptive use of members which should have, or profess to have, a structural duty, and have none. It is, therefore, satisfactory to find that the angles of the tower of Coutances have not been ornamented with idle buttresses, for a very slight examination is sufficient to prove that it "needs no more buttressing than a basket does," as John Ruskin wrote of the tower of St. Ouen at Rouen; although it must be admitted that the pinnacles on the angles "have no work to do whatever, but stand round the central tower like four idle servants, as they are."* They stand on solid square bases which fill up the angles of the square tower, cut off by forming the upper part as an octagon, as shown on Fig. 15, and each base being 21ft. 3in. in height, up to the cut line on Fig. 9, contains about 750c.ft. The upper portion, shown on Fig. 10, is composed of four solid shafts moulded, three of which are 290sq.in. sectional area, and one 330sq.in.; and four solid mullions, each 72sq.in., making a total of $10\frac{1}{3}$sq.ft.; the height being 45ft. 9in. to the top of the caps, it amounts to 474c.ft. Above this there is a hollow spire, 6ft. square by 18ft. high, resting on a square base, and containing about 236c.ft. The total amount of stonework is $236 + 474 + 750 = 1{,}460$c.ft., at $1\frac{1}{4}$cwt. per foot produces a weight of 92 tons at each angle of the tower. If this tower had been designed by strictly economical methods for modern purposes, an item of 368 tons of masonry would form an essential part of its stability; but in the present case, the structural utility of these pinnacles, as an addition to the stability of the tower, is not of much importance when there is such a large amount of useless material; although it should also be stated that about 280c.ft., or $17\frac{1}{2}$ tons, of the pinnacles was included in the weight of the spire, which proved to be a welcome addition when the results of the stresses on the lantern window piers were ascertained.

(To be continued.)

"BUILDING NEWS" DESIGNING CLUB.

SUBJECT P.—A VILLAGE PUBLIC-HOUSE.

SOME of the most interesting of the few unrestored old village buildings still left to us in England are to be found among the wayside taverns and country hostelries scattered here and there about the kingdom, while some of these, although now only the remnants perhaps of much larger buildings, are notable specimens of our national domestic architecture. The "Feathers" at Ludlow, "The George" at Norton St. Philip, Wilts, or the "Glastonbury Arms" at Glastonbury, for instance, may be mentioned. Everyone knows the vulgar and "gew-gaw" style of work usually adopted for the regulation modern "pub.," and many a quaint old village street has been spoiled by the obtrusive and incongruous "brewer's house" with its glare and glitter, with its characterless front, and striking want of hospitable capacity. The subject itself is eminently adapted to a picturesque treatment, and there are, as already noted, some good old models to study as examples. We have received several highly creditable designs, as might fairly be expected from such workers as the members of our Designing Club have proved themselves to be; but we cannot avoid the remark that not one really quite hits off the ideal arrangement and design of such a house. "Loidis" sends, of course, a good design, though we cannot award his this time the first

* "Seven Lamps of Architecture."

place, because his plan has one or two radical faults in it, and because his external treatment is somewhat too ambitious; otherwise there can be no doubt about the general "go" and good detail of his composition, which merits warm praise at our hands. "Norseman," with less effort, gives, as we think, a more suitable design, and thus wins the post of honour. Not that we deem his plan perfect; indeed, at a glance the difficulty of serving the tap-room is noted as a conspicuous want, and the position of the fireplace in the bar is most inconvenient. The bar itself, too, is hardly a comfortable place for refreshments irrespective of the chimney corner, and the parlour for honoured guests is not reached quite in the best way, neither is it large enough. The kitchen and private sitting-room are well isolated, and the back premises of the house are privately placed. The door to the larder next the back entrance would be an uncommonly convenient arrangement for tramps. A transposition of the scullery would have obviated this. The bedrooms are well contrived, but that over the archway should have had a fireplace, and a w.c. ought to have been placed on this floor, and without any difficulty these points could be managed. Externally the treatment is plain and suitable in general terms, and with some little revision would work out well in execution. The bar in "Loidis's" plan (which is awarded the second place) is much too small; the standing space for visitors occupies all the hall of the house, the staircase, too, being in the way of their comfort, and the bar parlour is cut off too much from the bar, the only service being by way of the standing room of the customers who prefer to remain at the bar. The wine-cellar stairs are too near the side entrance door, which must be used by the service to the tap-room on the other side of the archway. The bar-parlour in itself is a very comfortable room nicely planned, if not a trifle too large. The kitchen door should not face the front door, and the w.c. out of the hall is hardly a decent arrangement in such a building. The tap-room is a rather sumptuous apartment for country yokels, but looks very comfortable. The rest of the plan speaks for itself, and the bedrooms are convenient. The room on the first floor at the corner with the bay tower is good enough for a sitting-room. We have already remarked on the architecture of this design. Both plans are herewith illustrated. "Clair" takes the third position, and would have scored higher had his drawings been better. His perspective view is very poor, and does not do his elevation justice, which is a pity. The bar in this plan is much more suitable: it serves the bar parlour, has a good standing space in the front, and has a door for the potman to obtain the execution of the taproom orders. The house is cleverly rendered private; but the staircase hall would be dark, and the scullery should not open out of it. A side entrance for the use of the house was intended, opening out on the return road frontage. "Northumberland" has done this, and he gives a good regulation bar and little parlour adjoining. The taproom service is poorly contrived; indeed, it has been almost forgotten. His drawings show great merit; but the elevation lacks character. "Gereon" displays considerable originality and thought in his plan; the bar arrangement is excellent. Not so the taproom, which opens out of the street. The small bar, as a recess in the wall is called, would be quite useless. The offices to the house are unduly restricted, but the bedrooms look conveniently placed. The birds'-eye perspective shows an extensive group of buildings. "Oxon" has a plan which really is neither one thing nor the other. His idea of a bar is singular, and his elevations show a sad want of study, though at the same time there is an idea of the values of breadth and simplicity. "Hand-in-Hand" marks a design which fails on the score of smallness. This is to be regretted, because the scheme of the plan is not a bad one, and the exterior is quaint and pretty. The author leaves out a chimney in the perspective to get effect, and puts a w.c. on the first floor right in the centre of the house without light or ventilation to insure another result. The plan by "Toujours Prêt" is a bad one; but his elevations have a bold singularity, which, with better detail, might be thought to result from a study of old work. "Virtute et Labore" makes up a design with oddments, and the result, both in elevation and plan, is scrappy. There is, however, a distinctly marked cleverness about the design, and an amount of thought which we fully recognise. In trying again, the author should study to be more quiet; and fudging perspectives, be it remembered, does not improve the value of such exercises, the main aims of which clearly are to insure correctness both of drawing as well as design. "Eton" knows the value of balance in design, and how to vary the parts to give point to the general composition. The perspective in this case, too, does not correspond with the elevation, so the point just referred to is lost in the view, the near gables being made too tall. The plan is a poor one, but the elevations are good. "Barum" is better in his plans; but we are unable to place him higher in the list. "Dunedin" has too cramped an extrance to the publichouse proper, and a front door to the taproom is quite an objection. The details of the plan generally require revision; but need of space obliges us to omit an enumeration of the points. The elevations are pretty, but want further study. The remaining plans are marked by mottoes "En Avant," "V. R.," "Suum Cuique," "Vitruvius," "Cancer," and "Stag."

SUBJECT Q.—A STONE FONT FOR A TOWN CHURCH.

This subject has not realised our expectations, and neither of the contributors has sent us a design worthy of the occasion. "Protoplasmic Globule" is no doubt the best, and if made nicely, the font, according to his drawings, would be a good one. It is, however, not in a truly Late Gothic style; indeed, it hardly can be described under any style in particular. This, in a sense, carries the merit of an originality which we do not deny, but the design lacks interest. "Elean," with a commonplace design, comes second, and "Truth," for lack of a better competitor, registers third. These are followed by "Hand in Hand" and "Cancer."

THE PROFESSION OF A CLERK OF WORKS.—II.*

By Thomas Potter,

Author of "Concrete: its Use in Building," "The Construction of Silos," &c.

(*Continued from p.* 129.)

WHO SHOULD BE CLERK OF WORKS?—SALARY—PLEA FOR EXAMINATION AND DIPLOMA—CIVIL SERVICE CLERK OF WORKS.

WHO should be a clerk of works, and what his salary, are questions the former of which is easily answered, for it has been already explained that the first and main qualification should be as great a practical knowledge of all the building trades and processes as is possible to acquire, an opinion which the majority of architects confirm by employing only those who have had large experience in constructional matters. For all who intend following the profession of a clerk of works, actual work at the bench, the banker, and on the works is the initiatory object which should invariably follow a sound and practical education; physical acquaintance with building materials is the stepping-stone to proficiency in construction. Telford, the eminent engineer, said: "I ever congratulate myself upon the circumstances which compelled me to begin by working with my own hands," and many others have echoed the same words. Classical learning, however valuable otherwise, will be found of little use on a scaffold and in the workshop; far better to first acquire a thorough insight into building details and all the surroundings which have been previously described, if a man is dependent upon his own exertions and intends to obtain his livelihood by acting as clerk of works. There are some strange notions, however, on this point. An eminent architect once said: "A pupil of good education and office experience possessed qualities which compensated for practical knowledge," an opinion by no means general; and if an individual society is debating as to the proper and best means of teaching students the practice of architecture, one of the speakers is pretty well sure to recommend the pupil, after he has passed the greater part of his four years, more or less, as the case may be, in the office of his employer, with now and then a glance at some building in progress, to act for a considerable period as clerk of works. In such a case nothing is said about the employer's interests, or how they are to be protected; but it is quite certain that if an enterprising contractor, bent on making money—no matter how—obtained a fairly remunerative contract in some out-of-the-way place where the architect's visits must of necessity be few and far between, a clerk of works of the description indicated would, according to the opinion of the builder and his men, be an inestimable blessing. It is a unique occurrence, however, to find a suggestion to this effect made at the expense of clerks of works in general; but at one of the meetings of the Architectural Association a few years ago a member made the following curious remarks: "The selection of a clerk of works was a difficult matter; he might drink or connive at builders' dishonesty, or if honest and sober he might prove to be unreliable in many ways, and the architect's pupil even might make a very good clerk of works," &c. The only crumb of comfort to be picked out of these equivocal assertions is that they are very undefined; it is not positively said that the clerk of works does as a rule drink or connive at builders' dishonesty, or is unreliable, or that the architect's pupil would make a good clerk of works; but in a roundabout way such things are hinted at as extremely probable. After all, possibly these expressions were only intended to excite the susceptibilities of the large number of pupils and assistants who were present, and at the expense of clerks of works, who were absent. Architects' pupils are, no doubt, usually drawn from a better educated grade of society; but it does not follow because having received a liberal scholastic education they are thereby rendered more capable, or more honest, or more painstaking, in so far as concerns the superintending of building works. The years of training and patient observation men have to undergo previous to becoming competent clerks of works is *primâ facie* evidence of not having wasted a great deal of time in intemperance and profligacy; admitted, as with architects and architects' assistants and every other calling, so with clerks of works, there are good, bad, and indifferent in their ranks, both morally and otherwise; but that the bad are in excess of any other class is untrue, although so far as qualifications are concerned, and from causes previously described, the indifferent form far too large a proportion. The majority, however, serve their employers, according to their lights, to the best of their abilities and ofttimes with considerable personal risk and discomfort. If we trace their antecedents we find that a small minority belong to the very class who "might make very good clerks of works"—architects' assistants, who, with no hopes of an independent practice, and possessing a taste for construction in preference to the ordinary routine of an architects' office, throw in their lot with, and become in course of time, *bonâ fide* clerks of works. Of necessity, they have acquired, by hook or by crook, a certain amount of practical knowledge; but the want of a thorough technical training in early life is found to be a difficulty which is never thoroughly surmounted. The great majority have, however, been what is called "practical men," or men who, having as boys left school when fit for work or of an age to be apprenticed, have learned and for a time followed for an honest livelihood one or other of the building trades, and in four cases out of five either as carpenters or masons. Some may perhaps be the sons of well-to-do tradesmen, who, with too large a family to give each the means of starting on his own account, have had the commonsense to see that a greater prospect of success in life is obtainable by learning some handicraft than by serving behind a draper's counter, or joining that legion of underpaid humanity—general clerks. However lowly he commences life after learning a trade, the building mechanic, if he proves himself a competent workman, has a reputation for sobriety and perseverance, is energetic, and exhibits a capacity for directing others, is bound before a great while to be selected to take charge of works of minor importance on

* All rights reserved.

behalf of a builder. As his knowledge increases, and as he is found to possess tact and common sense, his advancement is simply a matter of time, more especially if he has received a fair education. From the direction of small and unimportant works to those of a more extensive character is only a natural sequence, and sooner or later he is selected by the architect, whose buildings he may at some time or other have been foreman of on behalf of the builder, and who may be in need of a clerk of works, to fill that position. If he is temperate in his habits, persevering in his duties, and possesses more or less those good qualities and attainments which are so essential, he will probably from that time forward, and to the end of the chapter, remain a clerk of works. These may not be, and in point of fact are not, the only stepping-stones to the "*Ultima Thule*," the highest position on a building next the architect, but they constitute as a rule the chain of events that lead thereto, and they are substantial evidence that sobriety and perseverance must have prevailed up to that point in his history, or promotion would not have ensued, and which certainly could not otherwise have landed him in a supreme position of trust and responsibility. The clerk of works of one or two generations since had, in common with others, every excuse for leading an irregular life; the majority of people, even in the highest ranks, considered it no disgrace to indulge in intemperance and vice, and no wonder the population, clerks of works included, were therefore tainted; but times have changed, a better order of things prevails, and the latter are, as far as regards sobriety and temperate habits, neither better nor worse than their fellows; where undeniably worse it will be found they are not in the first rank of their calling. The majority of clerks of works half a century ago were, in the matter of attainments, anything but what they should have been; but the reason was apparent, for it was not so much a question at that time of qualifications as of salary. A moderate knowledge of one or two trades connected with building was about all required, the equivalent for which was a few shillings more weekly than the earnings of a working bricklayer or carpenter, and the natural result, according to a correspondent of the *Builder* in the year 1847, is described as follows:—"I am sorry to say that too often the clerk of works is a debased and drunken mechanic, truckling to the builder, shutting his eyes for a consideration to all the dishonesty and injustice practised towards his employer, in allowing unsound and improper materials to be used, and weights, measures, and qualities under the specified value, and in many things in a clerk of works' responsible care selling himself to a dishonest and truckling builder." This is a "plain, unvarnished" character for builder as well as clerk of works, but the writer deals with the remedy: "I will prove that architects and employers are the causes of their clerk of works' dereliction of duty. They have yet to learn the fact that in all situations of trust the holder should be well and handsomely salaried. Ask the bankers, merchants, railway contractors, and even builders; they will all answer that where they put confidence and trust they give an adequate salary; it is not only necessary, but it is imperative. Look at your clerks of works holding situations of great trust, temptation, and responsibility: what do you give them? Not sufficient to keep themselves and families in respectability, much less from peccability. Some architects, standing high in the profession, grind their clerks of works' salary down to the wages of a building mechanic. I have shown the result to be the degradation and abasement of the clerk of works, and I think it requires very little foresight to see that in the end nothing is gained, but a vast deal is lost, not only in the moral, but in the monetary point of view. And now let me ask you why should such a state of things exist? I call upon architects and employers to do their duties to their clerks of works, and to improve their moral condition; but first to improve their salaries, and the natural consequence will be that they will be above want, and, consequently, more above temptation. The fact is, architects treat them as common mechanics, and expect them to be immaculate and honest all the while. Where want oppresses, and temptation offers, it is not in the power of poor human nature to resist."

The position of a clerk of works less than forty years ago, assuming this description to be a fair one, apparently left a good deal to be desired, and it must be admitted has very much improved during the interval. Architects do not at the present time treat them as common mechanics, nor grind their salaries down to the level of the mechanics' wages, and the improvement in their moral character and general capabilities is clearly, in a great measure, the result thereof. But it is difficult to see how the increase in salary could have been avoided, even if architects and employers had been so inclined; the building mechanics' wages, in towns at least, are from 25 to 35 per cent. higher now than forty years ago, while competent and efficient foremen and overlookers, instead of being valued at 6d. or 1s. a day more than ordinary mechanics, as was the case then, are considered to be worth at least nearly double the latter. The clerk of works' position in any building would be a very undignified one if it were the practice to pay him less than the builder paid his foreman. This is sometimes the case, however, even now, for a contractor usually finds it answers his purpose to keep exceptionally good men and pay them substantial salaries, more, indeed, than that which the clerk of works receives, while the architect, even if the employer consented, could not raise the salary of the former to the same level in certain cases and not in others where the duties were equally as important. Indeed, it may be taken for granted that it is to the liberality of large employers of labour in dealing with those whom they intrust to carry out their contracts that the average salary of the clerk of works is considerably higher at the present time than was the case formerly; but is it sufficiently remunerative all points considered? Three, three and a half, or at most four guineas a week appears a substantial equivalent when compared with some other occupations, but there are many points to be considered. The clerk of works is essentially a bird of passage. He may be actively engaged in the South of England at the present time, and a few months hence he may be just as busily employed in the North of Scotland. The cost and inconvenience if constantly moving from one part of the country to another, and having no settled home or habitation, are well known.

(*To be continued.*)

NEW THEATRE IN THE STRAND.

ON the site of the old "Coal Hole" in the Strand, a new theatre is in course of construction for Mr. Edward Terry, from the designs and under the superintendence of Mr. Walter Emden, M.S.A., Southampton-street, and will be visited by the Society of Architects to-morrow (Saturday) afternoon. We illustrated the building in our issue of Aug. 27 last year. A considerable clearance of the site was necessary; the old adjoining houses in the Strand had to be demolished, and the Adelphi arches were dug out and the foundations taken down to the original level of ground. The chief feature of the new theatre is the fire-resisting construction that has been adopted throughout, and in this respect the new structure will be unique among the theatres of the metropolis. Special arrangements have been made in order to guard against the spread of fire. Each portion of the house has two exits, the walls of the auditorium are of brick, the dress-circle, first-tier, gallery, and the floors and staircases of iron and concrete. The auditorium, which is at the Strand end of the site, is constructed entirely with wrought-iron trusses and risers forming the galleries. These are circular in plan and rise in tiers; the risers are of angle iron flanges filled in with lattices, the soffits of each tier and gallery having wire netting plastered below. The upper surfaces or floors will be of ironwork, filled in with concrete. Beyond the iron pillars supporting the dress-circle and two upper tiers are shaped-iron cantilevers with curved uprights, upon which the fronts of each gallery will be secured. Woodwork has been very sparsely employed, and only in the doors and windows. That used before and behind the curtain will be coated with Sir Seymour Blane's fireproof paint. In connection with the fireproof qualities of this theatre, we may draw attention to the experiments made before Captain Shaw and other gentlemen the other day to prove the efficiency of the fire-extinguishing arrangements to be carried out by Messrs. Rose, of Manchester. These consist of a complete system of hydrants placed in desirable positions before and behind the scenes, the whole of the stage and "flies" being commanded by a system of overhead sprinklers controlled by valves at the stage door. These sprinklers are connected with the water mains, and are supplied by a 5in. pipe, the pressure being at about 90lb. A large bonfire composed of wood and shavings was lighted on the middle of the stage, the flames rose 25ft. to 30ft., when the signal was given to open the valves and admit water through the sprinklers. From these a deluge of rain poured down from the roof, and the fire was subdued in a very few seconds, and one jet finished the work of extinction. The sprinklers are set at an angle commanding stage and flies. The body of the theatre is quite distinct from the stage, each portion being independently ventilated, and each tier has two exits. The auditorium is planned to accommodate about a thousand spectators; the angles next the stage are slightly canted, and a wide and well-arranged entrance gives access from the Strand, the pit entrance being in Occidental-court. The elevation towards the Strand has two ornamental gables; the facing is to be of red brick and stone, with Burmantofts faïence introduced in the balustrading of first-floor windows, and in other parts. Elliptical arches with stone voussoirs are proposed on the ground story and entrance. The contractors for the work are Messrs. Holliday and Greenwood, Loughborough Park Works; the superintendent of the works is Mr. H. F. Sheppard, Mr. Egan acting as clerk of works under the architect. The works are being proceeded with night and day.

THE CITY OF LONDON SURVEYORSHIP.

THE City Court of Common Council had an animated discussion at their last meeting on a report from the Officers and Clerks' Committee as to the nature, duties, and emoluments of the office of City Architect, rendered vacant by the death of Sir Horace Jones. The committee, by a casting vote, had decided to recommend that the office of City Architect should be abolished and the appointment in lieu thereof of a "City surveyor and clerk of works" at a salary of £800. In moving the adoption of the report, Mr. Sly said the Court required a surveyor every week in connection with the City lands and estates, but would not want an architect four or five times in twenty years, when they could easily put the work out "to tender." Mr. Edmeston strongly urged that the office of City Architect be continued, and argued that even if there were no new buildings wanted, questions were constantly arising as to buildings, and architectural competitions, on which they proposed to rely, were wrong in principle and led to abuses. Mr. Beck, on the same side, argued that there was not a single building which had been competed for that did the Corporation credit. Major Joseph contended that it would be economical to continue the office of City Architect, for during the last twenty-three years £1,531,800 had been expended on buildings under the charge of that official, and the commission of 5 per cent. on this would have been £76,590, equal to a salary of £2,890 a year, whereas they had paid Sir H. Jones £53,128 in salary and gratuities. Mr. J. C. Bell corrected this statement, saying Major Bell had omitted £8,996 paid for plans, and said the Court had expended personally on the late City Architect £62,331, equivalent to £2,833 a year. The proposed change would effect a saving of £2,800 on the chief officer and his staff. Mr. Malthouse said, with all this expenditure, the major part of the architect's business had been "put out." In the case of Holborn Viaduct they employed Colonel Haywood, and paid him the enormous sum of £17,000 to do the work the architect ought to have done. When they built a bridge over the Thames they employed an outside man, and paid him something like £30,000. He believed the humblest surveyor in the City would have laid out the Central Meat Market much better. The Fish Market, again, was like some old country workhouse. Let them go to St. Pan-

cras, and see the building there designed by a young surveyor. Deptford Market was one hundred years behind. He referred to a work long delayed, which could not be done by the "superior intelligence" of an official, and which was done in a very short time by the working bee—Mr. Murray. On a division upon an amendment that the appointment of City Architect should be continued, the numbers were equal, when, according to custom, the Lord Mayor voted in the negative, but the report was subsequently referred back for reconsideration and for fuller information.

THE MAPPIN ART GALLERY AT SHEFFIELD.

THE Mappin Art Gallery, originated by a bequest from the late Mr. J. Newton Mappin, was opened on Wednesday. It was Mr. Mappin's intention originally to bequeath his pictures to South Kensington; but shortly before his death, in October, 1883, he left the whole of his collection, valued at from £50,000 to £70,000, to the town of Sheffield, and also a sum of £15,000 for the erection of a suitable building in which the pictures might be hung for exhibition. The gallery has been erected in Weston Park, and is in the Ionic style, having a central hall, in which the late Mr. Mappin's pictures are placed, and six other galleries. One of the latter is filled with pictures presented to the town by Sir Frederick Mappin, Bart., M.P., nephew of the late Mr. Mappin, while the remainder are occupied by a collection of paintings lent by distinguished artists, and by private owners in various parts of the country. The collection bequeathed by the late Mr. Newton Mappin includes a series of the finest works of J. Pettie, R.A., amongst them being his "Conspirators," "The Flag of Truce," "The Sally," "War to the Death," "The Drumhead Court-martial," &c. Several of these passed into the possession of Mr. Mappin direct from Pettie's studio. There are also several important works by J. Philip, R.A., and two unfinished pictures which exhibit the dark background on which this great colourist was accustomed to work. Two or three pictures by Sidney Cooper, R.A., are likewise included, and the collection is rich in the works of John Linnell, including "The Haymakers," and a smaller work—a landscape, with sheep that are being hurriedly driven to shelter from a coming storm—for which Mr. Mappin paid the artist 1,500 guineas. There are two works by Sir Edward Landseer, of which one is "The Stray Shot," left unfinished, and purchased by Mr. Mappin for 2,000 guineas. It was subsequently completed by Rosa Bonheur. Mr. E. M. Ward, R.A., is represented by his "Fall of Clarendon," and there are several works by Fredk. Goodall, R.A., B. W. Leader, A.R.A., T. Creswick, R.A., Marcus Stone, R.A., Clarkson Stanfield, R.A., T. Faed, R.A., and W. P. Firth, R.A. The collection given by Sir Frederick Mappin includes a large example of Sidney Cooper, two by Goodall; a finished sketch by Maclise of his fresco in the House of Lords—"The Spirit of Chivalry"; and other works by H. W. B. Davis, Muller, &c. In the loan collection Sir Frederic Leighton, P.R.A., is represented by "Weaving a Wreath," lent by Mr. George Holt, of Liverpool; and among other works are Mr. E. J. Poynter's "Diadumene," Mr. Edwin Long's "Pharaoh's Daughter," Mr. E. A. Waterlow's "Sunny Hours," and Mr. A. C. Gow's "Absolution for the Lost at Sea."

BUILDERS' BENEVOLENT INSTITUTION.

THE 40th annual meeting of this institution took place on the 21st inst. at Willis's Rooms, St. James's, Mr. Basil E. Peto, President, in the chair.

Major Britton, the secretary, read the annual report, which stated that during the past year ten deaths had occurred among the pensioners, and nine who were waiting for the benefits of the charity had been elected. The total number of pensioners was 32 men and 33 women, who necessitated a large annual expenditure, and caused deep concern in the minds of the committee to obtain new subscribers, the more so as many who had for years given regularly to the institution had been removed by death. The income of the institution for the past year had not been sufficient to meet the expenditure, and it had, therefore, been necessary to withdraw the balance of the reserved fund. The committee were under great obligations to Mr. Basil E. Peto for his valuable aid during the past year, and were pleased to announce that Mr. H. H. Bartlett would be the president for the ensuing year. The annual dinner would take place at Carpenters' Hall on 3rd Nov. next. The report and accounts were unanimously adopted. Votes of thanks were passed to the president for the past year, to the vice-presidents, the trustees, and to the treasurer, Mr. George Plucknett, J.P., who was re-elected. Votes of thanks were also accorded to the committee, the retiring members being re-elected, and Messrs. Basil E. Peto and A. Moore added to their number, and a similar compliment was paid to Messrs. Ward, Bolding, and Duffield, the auditors. Mr. Plucknett proposed Mr. H. H. Bartlett as president for the ensuing year, which was seconded by Mr. T. Stirling, and agreed to. A vote of thanks to the chairman closed the proceedings.

BOOKS RECEIVED.

Designing Wrought and Cast-Iron Structures (Part IV.) Notes and Calculations for a Trussed Fir Beam with a Rolling Load; a Cast-Iron Stanchion and Riveted Joints. By HENRY ADAMS, M.Inst.C.E., M.S.A., &c., Professor of Engineering at the City of London College (London: 60, Queen Victoria-street).—This is another useful guide to designing ironwork. Part IV. treats of the mode of designing a trussed fir beam 20ft. span supported at ends, and carrying a rolling load of 4½ tons. Architects have often to make drawings for such beams, such as a trussed purlin. The trussing shown in the example is external, the ends of tie-rod being secured to plates and screws at the ends of beam, and having a strut below it. Mr. Adams enters into the reasons why the type he selects should be chosen; the compressive strength of the timber, the depth of trussing, and the stresses borne between the strut and end of beam. The notes, calculations, tables, and stress diagrams are important helps, and are arranged as in the author's previous publication, each step of the process being worked out in figures. Thus the scantling necessary to support the load between strut, and one end being obtained, namely, 13·1sq.in., the size is increased for the compressive strength in the longitudinal direction the addition of 17·14sq.in. being made, which gives 13·75in. square for the beam. The truss is then drawn, and the loads apportioned so as to find the stresses in compression, which are found to be 9·644 tons. Then, 9·644 tons at $\frac{3}{10}$ ton per square inch = 32·15sq.in., while 13⅜in. square gives over 180sq.in., proving that the sectional area is ample. The stress in each tie-rod is 9·94 tons, and at 5 tons per square inch safe load $\frac{9\,94}{5}$ = 1·99sq.in. net area = 1⅝in. diameter. Two rods are used instead of one, so that $\frac{1·99}{2}$ = 1sq.in. is given to each, say, 1 3/16in. diameter. Other details are found by the same analytical method, and after they are all proportioned, the design is drawn out to a scale of 1½in. to a foot. Mr. Adams shows how the stresses can be obtained by measurement from the diagram or by calculation, so that the student can readily adopt the easier of the two processes. The second section deals with a cast-iron stanchion or story post 10ft. high to carry a dead load of 36 tons, and the question is solved after a similar fashion. A section of stanchion 8in. by 8in. by 1in. is found sufficient to carry the load with safety, and the details are drawn out to scale. The series of parts are invaluable to all students and engineers.—*Walks in the Ardennes*: With Fishing and Shooting Notes. Edited by Percy Lindley (London: 125, Fleet-street), is a tourist's guide-book, describing in an agreeable, chatty style a cheap holiday tour, and is a welcome companion to the other holiday handbooks in the same series of Great Eastern Railway Company's handbooks. Besides a sketch map of the Ardennes, the guide is artistically illustrated by Julian F. Weedon, and is varied with boating, cycling, and fishing notes. The Ardennes district is one of the cheapest, and embraces many places of interest. Antwerp is within a few hours of London, and the green-shored Scheldt is a pleasant way to it; Brussels, Waterloo, Dinant on the Meuse, Namur, Liege, Louvain, are all within short distances. Mr. Lindley's readable little guide is very timely.—*A Guide to the Choice of a Site for Residential Purposes*, by a Member of the Geologists' Association (Redhill).—The author of this little brochure has collected a number of authorities in therapeutics and climatology, showing the advantages of high-lying dry sites as remedial and preventive of disease. The author favours high-lying sites on the chalk as being drier. He has, consciously or not, we do not know which, made a serious indictment against a large portion of the area included in Greater London, which is of clay soil. The author says a great many people in London "do not know what a clay soil is, especially as regards its evil influence on climate, although many do know. Carefully avoid the clay districts comprised within the area of Greater London, which not only show themselves to be clay by the predominance of the oak and by their general flatness, but also by still remaining in pasture unoccupied by houses although only six or seven miles from the Bank." This appears to be a very strong indictment against South London as a residential locality. The compilation will help many to form an opinion as to the desirability of certain districts for residence, and help them to avoid flat, low-lying clay soils. Opinions culled from eminent physicians are classified, the names appended. It is well known that and rheumatism, catarrhal affections, heart diseases, and consumption are induced in damp soil, and that greater extremes of heat and cold can be borne in a dry climate than in a damp one. As Dr. Lee and Dr. West say, in their works on climate, dry air favours excretion of moisture from the lungs and from the skin by means of insensible perspiration, while in moist air the perspiration accumulates on the surface of the body. From these facts, it is not hard to see why Southport, which is on clay, is less healthy than New Brighton, which is on a sandy soil. Elevated sites are drier and warmer than low ones; sheltered and timbered districts are less healthy than exposed and treeless places like Brighton. These are propositions in which there is some truth; but cannot the climate cure be carried too far, and are not wooded countries more endurable for the invalid than "sunny and treeless" Brighton?—*Transactions of the American Society of Civil Engineers* is to hand, and contains a few interesting papers—one on the "Formulas for Weights of Bridges," by A. J. Du Bois, and the discussion thereon.

MOSAIC DECORATION AT EATON HALL CHAPEL.

WE have seen an interesting series of 26 cartoons at Messrs. Burke and Co., Newman-street, designed and drawn by Mr. Shields, to be translated into mosaic for the internal decoration of the chapel at Eaton Hall for the Duke of Westminster. These mosaic pictures are intended to be placed along the north wall of the chapel in two series of figures, the upper one representing the "Goodly Fellowship of the Prophets," and the lower series the "Holy Church Throughout all the World." The chapel has the apse at the west end, and a large east window of painted glass at the other. The artists, in the treatment and colour of these figure designs, have endeavoured to avoid the extremes of the crudeness of outline found in ancient examples and the later pictorial treatment, and we think they have succeeded in ridding the design of the conventional rendering and accompaniments so often found in the art of this class. The prophets are arranged in Scriptural order, the cartoons representing figures of Enoch and Noah, Jacob, Moses, David, Elias, the series concluding with Malachi, who is shown pointing to the fulfilment of the prophecy, and of the coming of Christ. John the Baptist, and the disciples SS. James, John, and Peter, occupy positions in the east window. Throughout this series Mr. Shields has broken away from the conventional accompaniments of the prophets: he has rather presented the spectator with a series of conceptions of spiritual visions, in which there is an obvious connection. In the figure

of Ezekiel, *e.g.*, the artist has, by a thorough study of the prophet and his commission from God, represented the signs which accompanied the revelation. Thus, God's hand is shown on the head of the prophet with a roll of the prophecy. He is depicted with a shaven head, in pursuance of the description we find in the fifth chapter of Ezekiel, where under the type of hair is shown the judgment of Jerusalem. He is directed to take a razor and to pass it upon his head and beard and to weigh and divide the hair; to burn a third, to "smite" another portion," and to scatter to the wind the other third part. The figure represents also strength: a cross is set on the forehead, and he stands amongst briars and thorns and scorpions. The figures of Enoch and Noah are equally characteristic and typical. In the former is typified the wickedness of the world; the serpent of the latter represents the flood, Noah pointing to fire above and the bow in the cloud as the token of a covenant. In each of the figures the artist has embodied the leading incidents and attributes very skilfully; the drawing is remarkably free from archaicism, and the colouring subdued and soft. The main consideration of mosaic has been kept in view, the figures being handled with sufficient freedom to tell the story, yet not with such obtrusive individuality as to lose sight of the relation to the architecture.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A GENERAL meeting of the donors and subscribers took place on Tuesday evening, the 26th inst., at the offices, 21, New Bridge-street, E.C., the president, Mr. W. R. Freeman (Messrs. John Mowlem and Co.), occupying the chair. The president was supported by Mr. E. Brooks (treasurer), Messrs. C. K. Turpin, J. Robson, H. W. Parker, W. D. Gilbert, F. Burchell, E. C. Roe, and other gentlemen. The meeting was convened for the election of pensioners and amendment of rules, the election taking place first, when Louisa Hadrill, Maria Bowtle, and Eliza Holding were returned by show of hands to the widow's pension of £20 per annum, a ballot not being necessary, as the numbers of candidates and of vacancies were the same. There were but two vacancies in the first instance; but a third was specially announced in honour of the Queen's Jubilee, and thus the three cases were elected without the candidates being put to the harass and expense of a contest.

The following "amendments" of the rules were then submitted and adopted, viz.—

Rule II. Sec. 3, add, "For the purposes of this Section, it shall be lawful for the trustees to purchase presentations for periods of 21 years in such institutions as a general meeting may from time to time sanction in the names of the trustees of the Builders' Clerks Benevolent Institution."

Rule XIX., add new Section: "That the holders of each presentation purchased in pursuance of Rule II. Sec. 3, shall bind themselves to use such presentation only in favour of such candidates as shall be elected by this institution, and to conform in all points to the rules thereof, and to the rules of the Institution into which the child is to be presented."

At the close of the business a cordial vote of thanks was presented to the president, not only for his services that evening, but for the active personal interest taken by him in all that pertained to the welfare of the institution.

WEIGHTS OF BRIDGES.

PROFESSOR A. J. DU BOIS, of the American Society of Civil Engineers, has introduced a method of dividing bridge weights into those for floor system, lateral system, and trusses. He presents a series of rational formulæ which accommodate any specifications and design, and give the weight of iron for any given style, and enable the best depth and length of panel to be adopted. Taking the floor system first, Prof. Du Bois shows that the weight of rails, ties, planking, &c., is tolerably constant for all railroad bridges. These elements of the floor are estimated at 400lb. per lineal foot for a single track. The stringers and cross girders are next considered. For weight of a plate girder Prof. Du Bois gives the following formula:—

$$\text{Weight of a plate girder in pounds,} \quad \left\{ \frac{12\ W\ l^2 + 2\ R\ l\ d^2}{1{\cdot}2\ R\ d - 12\ l^2} \right.$$

where l = span in feet, d = depth in inches, R = average flange stress in pounds per square inch, W = total external load in pounds, including allowance for impact. This formula has been tested by actual weights, a table of which is appended, and the formula gives results very close to the actual weights. From this formula the author shows how the best economic depth can be found. The formulæ we cannot give here, but the author gives tables constructed from them assuming the live-load system. By the tables furnished for iron plate stringers of uniform depth and cross girders of uniform depth, any engineer can calculate his weights without recourse to the formulæ. The weight of stringer for any panel length in accordance with the live-load system can be found. The weight of iron in floor system having been estimated, the best depth of any plate girder bridge can be determined. The author shows the application of the tables by an example and the saving of calculation effected. Bridge trusses are then considered, the author entering into an analytical demonstration of the formulas. These we must say are more complicated than the author is willing to admit. Thus the formula for economic depth in feet is far too intricate for engineering purposes. The tables, however, supply all that the practical engineer asks for. The data which enter into the problem of weight are introduced, and the formulæ can be applied under any specifications and loading. Prof. Du Bois's system is a rational one: the weight of floor depends upon panel length and the amount of distributed weight on engine wheels, the lateral system depends also on panel length and wind pressure, that of trusses upon panel length and combined live and dead loads; all these factors have been dealt with. The only uncertain factors are those derived from the specification requirements.

WOOD MOULDINGS.

WE have had sent us a box of specimens of hardwood mouldings manufactured by John Eede, Butt, and Sons, timber and slate merchants, Gloucester-road, Brighton, and Littlehampton. These contain oak, walnut, and other hardwood mouldings, plain and enriched by ornaments suitable for architectural purposes, such as architrave mouldings, cornices, transoms, strings, picture frames, and other uses. The specimens we have are rebated for frames, but the process of manufacture is, we are informed, capable of producing a great variety of patterns. Nothing in the way of wood enrichment can look cleaner or sharper; the ornament is judiciously introduced in the angles of moulding in the shape of dentil, billet, dog-tooth, and other architectural ornamentation. Very effective combinations are made. One moulding very suitable for a picture frame consists of an outer frame moulded at the edge and reeded with a plain inner face rebated for the glass, and with a small hollow moulding round "sight line." One of these is made of walnut, with an oak (polished) inner frame, and is very effective, and suitable for drawings and engravings. Another narrower moulding has a "quarter-round" worked on each edge with fillets, the centre enrichment being the dog-tooth. The larger specimens embrace some built-up mouldings, suitable for architraves, with outer moulding, angle enrichment, and two inner faciæ. The ornament is introduced separately in the angles and glued in, but is so neatly and accurately executed that it would be difficult to distinguish it from carving out of the solid. Greater accuracy is insured by this mode of insertion. Messrs. John Eede, Butt, and Sons have succeeded in producing a class of hardwood mouldings that cannot fail to meet with appreciation from architects and decorators. For superior internal woodwork and joinery the enriched mouldings are admirably adapted, and the mouldings are of an artistic character, which is more than can be said of the ordinary machine-made mouldings in the market.

OUR COMPETITORS' COLUMN.

WE are altogether disappointed with the response to our ninth competition, inviting a short essay naming the architect who, during the past thirty years, had most decidedly influenced ecclesiastical architecture in England. Only three papers have reached us, and none is worth printing. Two of the authors name Sir Gilbert Scott, and the third appears to be uncertain, and rambles at some length through the list of the principal ecclesiastical architects of the past generation. All three competitors fail to reach publication mark, and we have no alternative but to withhold the prize.

We now offer another prize of One Guinea for the best paper giving

THE EXPERIENCES OF AN ARTICLED PUPIL,

comprising such hints for self-improvement and the best utilisation of time and resources as may benefit others. Papers giving actual personal experience will be preferred. To be sent in by July 29. This will conclude the series for a few weeks, when the column will be revived, together with a new series of the Designing Club.

CHIPS.

Mr. W. J. Jennings, for many years assistant to the late Mr. J. G. Hall, architect, of Canterbury, has arranged to carry on the private practice of his late employer in conjunction with Mrs. Hall, and has been appointed to succeed Mr. Hall as engineer of the Edenbridge drainage works.

Dr. Moorhouse, Bishop of Manchester, consecrated on Friday the new church of St. Anne's, Shevington, near Standish. The cost of the new structure has been £2,000, and it will find accommodation for 260 persons; it has been erected by Mr. Ward, Upper Brook-street, Manchester, from plans prepared by Mr. Charlewood, architect, Manchester.

At the last meeting of the Royal Irish Academy Mr. Hugh Robinson, President of the Belfast Naturalists' Field Club, and secretary of the Government School of Art at Belfast, was elected a member.

Memorial stones of a new Wesleyan chapel at the corner of Southbank-road and Ash street, Southport, were laid on the 22nd inst. The new building will furnish sitting room for about 600 persons; the cost of the structure is estimated at £5,000. The architects are Messrs. Waddington and Son, and the contractors Messrs. Fairbridge and Hatch, of Birkdale.

The tower of the village church of Warslow, near Leek, Staffs, was destroyed by fire on Wednesday week, together with its bells and clock.

The partnership between Messrs. Filliter and Rofe, of Leeds, and Victoria-street, Westminster, civil engineers, has been dissolved.

The last section of the Barking and Pitsea line of the London, Tilbury, and Southend Railway Company, that between Horndon and Pitsea, is approaching completion, and the extension, by which the route between London and Southend will be considerably shortened, is to be opened in the autumn.

The new buildings of the Railway Servants' Orphanage at Derby, opened by Lord Hartington on Wednesday week, have been built at a cost of £10,000, from designs by Mr. A. A. Langley, the engineer of the Midland Railway, who gave his services as architect without charge, and the contract has been carried out by Mr. Edward Wood, of Derby. The buildings are of brick, with stone dressings, and accommodation is provided for 300 children.

The Horncastle Local Board, in consequence of the hard times, have reduced the salary of the surveyor, Mr. Boulton, from £76 to £70 a year.

Two statues have been placed in St. Austin's R. C. Church, Stafford, in honour of the English Martyrs in the reign of Henry VIII. lately beatified. They were carved in Caen stone by Mr. Wall, of Cheltenham, and represent the Blessed John Fisher and the Blessed Thomas More.

Two colossal female figures representing "Manufacture" and "Navigation" have just been erected in the parapet of the new front of the Devon and Cornwall Bank in Bedford-street, Plymouth. They are wrought in Portland stone, and were executed by Mr. Harry Hems, of Exeter.

The Buxton local board have accepted the tender of the Arlesey Lime and Portland Cement Company for the supply of 1,000 tons of their Eddystone Portland cement for the construction of the Hogshaw reservoir.

A new organ, by Messrs. Foster and Andrews, at Hull, has been erected in Ayr Cathcart-street United Presbyterian Church.

WAYSIDE NOTES.

A SUM total of seventy-five farms, within sight of a certain standpoint in the county of Essex, all of which are without tenants and many actually out of cultivation, is a "terrible list" indeed, and forms a good index to the present state of the farming interest in England. Mr. Arthur Pryor's letter to the *Standard* gave the details of this sad condition of rural landlords and farmers, and sets forth the names of the farms, the parishes wherein they are situate, and their acreage.

Twenty-one thousand four hundred and seventy-two (21,472) is the total number of acres in these seventy-five Essex farms, two of which comprise one thousand each. Happy Essex! Real estate in our country is practically unsaleable; houses are a drug in the market; they will neither let nor sell; and farm lands are often not worth cultivating at present prices. Merrie olde England!

What a contrast to this stagnation of all our industries is the state of the land, house, and labour markets in the Far West of America—new England! In the June number of *The West Shore*, published at Portland, Oregon, U.S.A., the writer of an article on the cities of British Columbia says:—"Another city of more than local fame, already the second in size in the province, is Vancouver, the terminus of the Canadian Pacific Railway. One year ago the town site was a dense forest, and now a large portion of it is covered with buildings, some of them of brick, and many streets are laid out and planned, while the sound of the saw and hammer, the ring of the mason's trowel, and the loud reports of blasts constantly salute the ear, impressing one with a sense of restless energy."

An engraving represents this Wild West of a year ago, with a King of the Cowboys, or other pioneer, riding therethrough; while another picture shows a street with houses, stores, and telegraph wires of to-day. The writer further says that "the present improvements have risen on the ashes of their predecessors, for on the 13th of June, 1886, the city was almost destroyed by fire, only two or three small buildings being saved. Since then upwards of a million dollars have been expended in improvements, and a city of 5,000 people has sprung into being, and is growing daily in population and structures. The greater number are for business purposes, but many cottages and a number of excellent residences have been erected. Several brick blocks have been completed, or are under way, one of which is being fitted up for two banks—the Bank of British Columbia and the Bank of Montreal. The improvements under way and projected, including the street improvements, gasworks, waterworks, and railroad buildings, approximate 2,000,000 dollars in value."

Even discounting liberally for the enthusiasm of the writer, and the fact of the place being on American soil, this certainly looks like sharp, go-ahead work. And it is well, in passing, to note the difference between a rapid and healthy growth and the "run-up" productions of our jerry-building. One is the outcome of necessity, and the other of excessive greed of worldly gain. The new city is full of wholesome vigour, and its life-blood pure and unalloyed; but on the bloated carcases of old cities bad building flourishes like a fungus—rank, poisonous, and thriving upon the attributes of death and decay: a hydra-headed monster, its veins full of a venous fluid, carrying the germs of many national and individual, physical and moral, diseases.

Of current competitions the latest (barring any that may appear in this issue) is the one advertised by the Swinton and Pendlebury Local Board for public baths. The board's advertisement, doubtless, has been followed by applications from all parts to know whether a professional assessor will be engaged to assist them in their decision, as also many other questions on points where the conditions seem vague; whereupon, it is to be expected, the Swinton people will reply, as per usual, that an assessor will or will not be appointed, and also add more or less matter about perspective, levels of drains, &c. It is very curious that so few particulars are ever issued at all complete, and self-explanatory on all points. When the above correspondence has ceased it will be time to send in the plans (?), for it seems to me that competitors have only been allowed about ten clear days to perfect their designs.

A competent assessor will be very necessary in the Swinton competition, as in the matter of of baths practical and good planning is of infinitely more importance than the appearance of the building; and, in fact, the designing of such utilitarian edifices is almost a speciality. Arrangement is everything. Nothing is more unpleasant than a dark, dirty, damp, and unventilated bathroom, be it small or large. Yet, unfortunately, one often finds baths that are scarcely fit for cattle. Without a doubt, the cleanest, most orderly, and best swimming-bath I have ever seen is one at Brussels, where the arrangement of everything, down to the neat nautical costume of the attendants, is excellent.

The inaugurators of the Douglas, Isle of Man, competition seem determined not to have a failure through want of sufficient advertising. Have not seen the conditions, so cannot say anything about it, excepting that, as things go, the premiums appear to be liberal. So does the £25 for a public hall at Helston, wherever that worthy city, town, or village may be. There is a small parochial building required at East Grimstead, but, if I remember rightly, the premium does not exceed a £5 note. There is a good deal of work just now for the wholesale competitor, but the retailers should "keep their powder dry" for a season. We sadly want another Imperial Institute or other large competition, but when it comes let us hope it will be open to all.

"One Anxious to Know" asks for the names of a few reliable works on composition and design in architecture. There are none—or, rather, there are no books that are entirely devoted to general first principles as distinct from principles of style, although many may profess to do so. But to explain this it is necessary that these notes should be temporarily extended by the space of one column, if Mr. Editor can spare it. As the subject is so little discussed, and yet is above all others in importance to the true architect, I offer no apology for making the innovation.

It is possible that the reason we have so little literature upon first principles of design and beauty in architecture, is that the difficulty of abstracting these principles and deducing rules therefrom is so great. Differences of taste, style, the influence of association, and many other circumstances, all tend to render our present architectural storehouse a mere promiscuous heap of forms, more or less beautiful, but whose adoption by the designer is seldom governed by a more durable principle than the ever-varying demands of fashion. But, in spite by this seemingly hopeless chaos, order may be established and a sheet-anchor welded for his use by each earnest seeker after truth if he will but patiently study all styles of design, and endeavour to abstract therefrom their first principles of beauty. These principles will be found to be the same in all true architecture: they are the unalterable laws of beauty and fitness that must remain unchanged for all time.

In order to get an insight into this method of abstraction and generalisation, it is necessary to read, mark, learn, and inwardly digest very many works on art and architecture—more than can possibly be named here, because good hints and suggestions are scattered about the pages of a vast number of books treating on these subjects. But of those it is possible to mention, first and foremost I place, without hesitation, the noble work of Mr. John Ruskin, "The Seven Lamps, or Spirits, of Architecture." This book, however, must be studied with the utmost attention and thought. Much of the matter contained in it is useless to the superficial reader; but to the thoughtful student (we are all but students) it is eminently suggestive and valuable on this account. The artistic diffusion of light and shade is Mr. Ruskin's chief principle, and rules the whole of his works. "The sun was risen upon the earth when Lot entered into Zoar."

Providing that one is able to read with a resolve to think out problems for oneself from suggestions obtained whilst reading, *all* Mr. Ruskin's works on art and architecture will be found of the greatest value. The "Modern Painters," read with a view to abstracting first principles of beauty, is a storehouse of valuable information. There is so much in the laws of good architectural composition that also applies to that of other arts, that a treatise on painting, sculpture, or even musical and literary composition, may be read with benefit. The principles of gradation and contrast are universal.

For the elementary laws of architectural massing Garbett's "Principles of Design" should be read. Pugin's "True Principles" should be studied, but it is well to remember the distinction between principles of *style* and those generalised principles that apply to all true architecture. Style is the rock upon which so many who would treat of first principles are wrecked. It is astonishing that Gwilt, in his thousand odd pages, devotes but a page and a bit to "General Principles of Composition"! But the chapter on "Beauty in Architecture" in this work is worth attention. Read, too, Alison's "Essay on Taste," and study carefully Hogarth's "Analysis of Beauty." Fergusson is suggestive for outline. Study in the manner indicated above *all* writers on architecture, abstracting therefrom their hints on composition, and deduce your own rules. Viollet-le-Duc's many books should be carefully studied in this way.

After all that may be said and written about composition and design, the one eternal rule of fitness is worth every other as a test of a work of architecture, both as to use and appearance. And simplicity goes hand in hand with fitness. Longfellow might almost have been writing a treatise on architectural design when he said: "Simplicity in character, in manners, in style; in all things, the supreme excellence is simplicity." A noble thought; one that is directly suggested by Nature in her grandest moods. Where is the complication in what we can realise of the design of the universe, or the mass and motion of its rolling orbs? There is more intricacy in the form and movements of the worm that grovels in the dust of the earth. Let us, then, in imitation of Nature, be simple and unaffected in our composition, and if we must have complication, let it be in the merest and most insignificant detail.

As I take it, it is a sure test of a perfect architectural composition that it should be pleasing in the distance as well as near at hand, that, like a true friend, it is worthy in our presence and faithful in our absence. That when we set out, at the dawn of day, on a pilgrimage to a noble work of architecture, its shadowy outline will break the distant horizon in a beautiful manner against the cool-tinted background of sunrise; that as we advance the disposition of its mass may be equally pleasing; that on our nearer approach the grouping of its features should be a thing of beauty, and its colour and texture appear harmonious; that when we have toiled across the intervening plain, and stand beneath its portals, we may read a lesson in its minutest carvings, and marvel at the beauty of every detail; and that, lastly, when we pass from the heat of the day to the cool shadows of its aisles and cloisters, we may yet find greater glories than were before revealed to us.

GOTH.

Memorial stones of a new Baptist chapel now in course of erection in Aglionby-street, Carlisle, were laid on Thursday, the 21st inst. The building will be Gothic in style, and will be faced with stone; the internal fittings, including open-timbered roof, will be of pitch-pine, and provision is made for the addition of galleries at a future date. Without these the chapel will seat 490 persons, and will cost £2,300. Mr. M. C. Williams is the architect, and the contractors are—builder, Mr. Gordon, English-street; joiner, Mr. Edward Wilkinson; plumber, Mr. Sowerby; painter and glazier, Mr. D. Canning; plasterers, Messrs. R. M. Ormerod and Son; slater, Mr. Smith.

Building Intelligence.

Bombay.—The keystone of the large central dome of the G.I.P.R. Terminus and Administrative Offices, now in course of completion at Bombay, has been placed in position. The cupola is the first of its dimensions to be constructed in solid blocks of stone, without an additional covering given to European domes. It is octagonal in form, and eight ribs converge to the apex, which will support a colossal figure of Progress. The vaulting between the ribs is cut on the outer face into the shape of tiles, so as to prevent rain from penetrating the joints of the masonry. Each ring or course has radiating joints horizontally towards the centre and to the centres of the curves of the dome. The upper outer belt of each course is perfectly horizontal for about three inches, and weathers the next course below it by a slight projection or lap similar to that of the tile. The stones of the rings of the vaulting are keyed or dovetailed into the sides of the large ribs, and between the joints of the voussoirs, on the upper side, strong metal keys are inserted, and the whole set in Portland cement. In its construction no course was commenced until the one below it had properly set and was complete. Each ring or course of masonry was made the support of the next above it, and thus the usual centring was dispensed with, and the contractor saved a considerable sum of money. The construction of the interior of the dome will be open and exposed to view. The carvings throughout the structure have been executed by students of the Bombay School of Art under the direction of Mr. Griffiths, the principal; but the figures to crown the dome and gables are supplied by Messrs. Earp and Son, of Lambeth, S.E. The entrance hall is paved with Maw's encaustic tiles. The clocks, the largest of which has two dials each 10ft. 6in. in diameter, 116ft. apart, and driven by one movement, and another 8ft. 1in. diameter, are supplied by Messrs. Lunn and Blockley, of London. Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., of Bombay, is the architect, and Mr. S. Khanderao his chief assistant. We illustrated the interior of the terminus in the Building News for Oct. 22, 1886.

Bristol.—Mr. J. L. Pearson, R.A., has just reported to the city council on the condition of the Mayor's Chapel on College Green. He remarks that the many beautiful features of the church are now sadly obscured by injudicious alterations and additions. The interior, when opened out, will, from its lofty proportions, have a very imposing effect, while the east end externally possesses a dignity rarely met with in buildings of much greater importance, and the little sacristy on the south side of the chancel is one of the most beautiful examples of 15th century work. As originally erected in the 13th century, it appears to have been a cross church, to which, early in the following century, a south aisle was added, and which was, no doubt, used as a chapel. The next alteration was a remodelling, or rebuilding, of the chancel. Later still, the tower was erected, taking the place of the south transept, and last of all a monumental chapel was added, filling up the space between the tower and the south aisle to the nave, and with an entrance to it from the south aisle only, an arrangement almost, if not quite, unique. Mr. Pearson regards the modern arrangement of steps and entrance at the west end and the nave seating as inconvenient and unsightly, while he points out that other disfigurements have been made which should be removed. He proposes to open out the archway on the north side of chancel, to rebuild the transept with a low vestry attached to it on the eastern side, and to provide a covered way or cloister for access to this transept and to the vestry. He would also remove the western porch, and insert an entrance of appropriate character and on the street level, and with a flight of steps inside down to the level of the nave floor, to remove the gallery, and repair the west gable. He should like to open out the east end by the removal of some at least of the buildings which crowd round it, to open out the walled-up windows, and to provide new floors, pulpit, oak chancel screen, and seats. The total cost is estimated at £3,510. The city council has been recommended by a committee to adopt the report, and to carry out the works from Mr. Pearson's plans, and under his directions. The College Green front of the chapel was illustrated from a drawing by Mr. Louis Knapp in the Building News for March 18, 1881.

Clevedon, Somerset.—A Franciscan church at Clevedon was consecrated on Friday. It has been built from designs by Father A. J. Scoles, of Bridgwater, and is in the Early English style. The walls are of local stone with freestone dressings. It consists of nave and a sanctuary, and side aisles terminating at their eastern ends in chapels, that on the north dedicated to St. Francis, and the southern one to St. Anthony of Padua. The sanctuary is approached by five steps and the altar by three others. The building is heated by hot-water apparatus. It is 120ft. long and 50ft. broad inside, reckoning the nave and aisles, and a congregation of 700 persons will be accommodated on open benches. The roof is covered with Major's patent weather-proof tiles. Mr. Kitch, of Bridgwater, was contractor, and Mr. Bradfield, of Bridgwater, executed the masons' work, local labour being employed. The building cost £3,000, and is dedicated to the Immaculate Conception.

Denstone, Staffs.—The opening and dedication by the Bishop of Lichfield (Dr. Maclagan) of the new chapel in connection with Chad's College, Denstone, took place on Wednesday. The plan of the chapel consists of an oblong 114ft. 6in. by 38ft. (inside measurement), with a double-storied ante-chapel 15ft. by 38ft. Beyond this oblong chapel proper is the apsidal sanctuary, 37ft. by 22ft. 6in., flanked on either side by towers opening into it and into the body of the chapel. This plan is adopted so as to provide for the boys seated choirwise, with a broad central passage, and at the same time to get a sanctuary of sufficient depth and width and of dignified proportions. The sanctuary is groined in stone, with its vault concentric with the great central arch. The towers are at present only carried up to the ridge of the roof, and are temporarily roofed in. The height of the sanctuary from the apex of the vault inside is 44ft., and the height to the apex of the roof outside is 66ft. The height of the body of the chapel is 35ft. to the cornice outside and inside, and the apex of its roof is the same as that of the sanctuary. The length is divided into five bays by buttresses, and in each bay is a three-light window with geometrical tracery. The roof is of fir and pitch-pine, strongly tied to resist the thrust of the timbers over the single span. The timbers are neither stained nor varnished. An organ gallery opens by three arches into the west end of the chapel, with arches under them between the ante-chapel and the chapel. The whole building is, like the College, faced with carved Alton and Hollington stone, and the inside walls are also faced with this stone. The pavement is of tiles increasing in richness towards the east, and is the gift of Mr. Campbell, of the Campbell Tile Company's Works, in memory of his late father, a former Fellow of the College. The foot-pace steps are of polished Hopton Wood marble; the others are of stone. In the west gallery is the beginning of a large organ by Hill and Son, of London. In the central bay of the apse is the reredos, of which the architectural portion is alone finished. The panel, in which will be inserted a bronze representation of the Crucifixion, by Messrs. Singer, of Frome, is not completed. The framework is of Steetly stone, the super-altar is of alabaster, and above it are panels inlaid with ancient Roman marbles. All this part of the work has been executed by Mr. Earp, of London. The chapel has been erected from the designs of Messrs. R. Herbert Carpenter and B. Inglelow, of London.

Liverpool.—A series of technical laboratories and schools are about to be added to the Liverpool University on Brownlow-hill, by the liberality of Sir A. B. Walker, who has given £17,000 for the purpose. The objects of the school are very wide, including not only civil engineering and mechanical engineering, which are now taught in classes for mechanics, physics, geometry, and designing, but the college will ultimately contain chairs of architecture, mining, surveying, and electricity. For the new schools Mr. Alfred Waterhouse, R.A., who designed the University buildings, is the architect, and, like the existing buildings, the premises will be Gothic in character, and of grey brick and terracotta.

Monkton Wyld Church, Dorset.—The church of St. Andrew has been again enriched by the addition of a sacristy, built on the north side of the old choir vestry. It has a stone altar, after the example of old English sacristies, and will be further enriched with a lavatorium carved in stone, and chests carved in oak to contain the altar frontals, dossals, &c. The whole of the structure is in the Early Decorated period of architecture, harmonising with the church. The sole cost of the sacristy has been borne by the vicar, and presented to the parish as a memorial to commemorate the Jubilee. In addition to this a pulpit has been placed in the church. The base, hexagonal in plan, is of red Mansfield stone, with polished Devonshire marble columns at the angles, from which spring the groined and sculptured Mansfield stone canopy, which supports the superstructure. The pulpit, from the floor over the stone canopy to the top, is in oak, with buttresses, columns, pinnacles, and niches, and projecting crocketed canopies. In the niches stand the figures of four saints sculptured in sycamore wood. The saints are St. Andrew, the patron of the church; St. Cecilia, crowned with roses, bearing the organ, and listening in rapture to the songs of the angelic hosts; St. Mary Magdalene, bearing her costly gift of spikenard; and St. Elizabeth, of Hungary, with a nun's veil and a crown on her head—a fold of her dress holds a cluster of roses, and a beggar boy kneels at her feet, to whom St. Elizabeth is in the act of giving bread. The steps to the pulpit are in red Mansfield stone, and the balustrading and handrail in polished brass. The whole of this work has been executed by Messrs. Luscombe and Son, of Exeter, from the designs of Messrs. Hayward and Son.

Sutton Coldfield.—The new buildings for the Sutton Coldfield Grammar School will be opened to-day (Friday). The buildings, which have been erected by Messrs. Barnsley and Sons, from designs prepared by Mr. J. A. Cossins, consist of a schoolroom, nearly 60ft. long, with three classrooms in close proximity; whilst underneath are a chemical laboratory, with accommodation for sixteen students, dining hall for sixty boys, a lecture room, lavatory, hat and coat room, &c. In the upper floors are several bedrooms, bathrooms, and an infirmary. The buildings face the main street, and are connected on each floor with the headmaster's house. The main part of the building is heated with hot water. There is a recently-prepared cricket field in the rear, and playground and covered shed adjoining the school.

Wimbledon.—The High School for Girls, Mansell-road, Wimbledon, was opened on July 20. The architect is Mr. J. Osborne Smith, A.R.I.B.A., 34, Southampton-street, Strand, W.C., the builders Messrs. Howell and Son, London and Bristol, and the clerk of works Mr. R. Old, of Wimbledon. The building will accommodate 250 pupils. The accommodation consists of ten class-rooms, a laboratory, a studio, a large central hall, rooms for head and assistant mistresses, cloak rooms, dining-room, covered playground, housekeeper's apartments, lavatories, &c.

The streets committee of the Edinburgh Town Council passed on Friday plans and sections of new roads proposed to be made on the Braid estate. The area dealt with extends to 133 acres, and on this it is proposed to build in all some 300 villas and self-contained houses. The roads will join with proposed new streets on Colonel Trotter's estate at Blackford on the east, and with those already formed on Plewlands and Greenbank estates on the west. When completed, they will form new avenues of connection between the Grange and Morningside districts.

Mr. George Waterman, of the firm of G. and J. Waterman, who have for many years carried on business as builders in Watford, died on the 19th inst. at the age of 51.

St. Michael's Church, Mytholmroyd, is about to be restored, enlarged, and reseated, from plans by Messrs. T. H. and F. Healey, of Bradford, Yorks.

On Sunday, the Summer Exhibition of the Royal Institute of Painters in Water Colours, Piccadilly, was open to the members of the Sunday Society from 5 to 7, when the number of visitors was 248.

CONTENTS.

Conventional Specifications 157
Alterations and Extras... 158
The Stability of Stone Spires and Towers.—IV.... ... 158
BUILDING NEWS Designing Club 159
The Profession of a Clerk of Works.—II. 160
New Theatre in the Strand... 161
The City of London Surveyorship 161
The Mappin Art Gallery at Sheffield 162
Builders' Benevolent Institution 162
Books Received 162
Mosaic Decoration of Eaton Hall Chapel 162
Builders' Clerks' Benevolent Institution 163
Weights of Bridges 163
Wood Mouldings 163
Our Competitors' Column 163
Wayside Notes 164
Building Intelligence 165
Our Lithographic Illustrations 166
At the Sale Rooms... 166
Louis XVI. Fire-Dogs 189
Notes on Concrete... 189
Engineering Notes... 191
Architectural and Archæological Societies 191
Competitions 192
Correspondence 192
Intercommunication 194
Statues, Memorials, &c. 194
Water Supply and Sanitary Matters 195
Legal Intelligence... 195
Our Office Table 195
Meetings for the Ensuing Week 196
Tenders 196

ILLUSTRATIONS.

SELECTIONS FROM THE GROSVENOR AND ROYAL ACADEMY GALLERIES. — SECTIONS OF SELECTED DESIGN FOR THE IMPERIAL INSTITUTE.—CHURCH AT ROGERSTONE, MON.—SCIENCE AND ART INSTITUTE, WALSALL.—SIMONSTONE HALL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SELECTIONS FROM THE GROSVENOR GALLERY.

ROSSETTI'S conception of "'Lilith,' Adam's First Wife," has been chosen by the Hon. John Collier for his picture which we are enabled to-day to illustrate from the artist's own sketch. The painter's endeavour to realise the poet's idea—"But she was made like a soft sweet woman"—has no doubt been eminently successful. The background of the picture is intended to represent a sort of ideal landscape set in tropical climes, embracing, as it were, in one the elements of heat, light, and moisture. The plants from the tropics were studied at Kew, and the snake was painted from a gigantic boa constrictor at Liverpool, which was lent the artist by Mr. Cross, the naturalist, whose foreman held the reptile during the "sittings." This was a necessary help, as the snake was 10ft. long and "very lively." Mr. Hugh de T. Glazebrook's scene, "In the Cloister" of a marbled Italian monastery, rich in mosaics and frescoes by Giotto—a souvenir of Assisi—is in striking contrast to the last-named picture. The contemplative monk looking into the peaceful convent gardens, where a cardinal walks book in hand, stands in a fitting posture of repose, which chimes in gracefully with the silence of the garth inclosed by the cloister. The buildings are based upon those of the Campo Santo of St. Francis at Assisi. "A Morning Hymn," by Mr. Reginald Hallward, represents one of the larger designs in illustration of a poem included in a volume of music, verse, and design. "Flowers of Paradise" is to be the title of the work, which will be published in the course of 1888. It may thus be seen from this design that the book aims at a far more elaborate character than previous works by the same artist, and it will likewise be produced on a larger scale. Though chiefly addressed to children, its purpose really will be much wider. The composition of the design is marked by considerable originality of treatment in a decorative style. Mr. A. B. Donaldson's view of Lüneburg is taken from the Kalkberg, an anciently fortified mound of great height overlooking the town. The church in the foreground is dedicated to St. Michael, and contains the burial vault of the Guelf family. Beyond are the interesting churches of St. John and St. Nicholas. The Rathhaus is also shown in the picture. This building is notable on account of its chambers having been decorated by Albert Dürer and other artists. The town of Lüneburg is rich in specimens of quaint Domestic architecture, chiefly in brick, and the trees grouping with the churches combine in furnishing a charming picture. "On the Bure, Norfolk," brings us home again, and we thank Mr. Edward H. Fahey, R.I., for his delightful rendering of so well-known a piece of water. The scene is on the Salhouse Broad, and in the distance is seen behind the wherry the Hospital farm on Wroxham Broad, the headquarters of the artist when he painted his celebrated series of watery pieces from Norfolk. This picture, which is in the Royal Academy Exhibition, graphically illustrates Matthew Arnold's lines—

". . . . Eve lets down her veil,
The white fog creeps from bush to bush about."

THE IMPERIAL INSTITUTE.

WE complete our series of illustrations of this competition this week with three sections of the selected design by Mr. T. E. Colcutt. We are obliged by the remarks of several correspondents about the manner in which our illustrations have been produced. There was really no difficulty about it. The authorities placed all facilities at our disposal, and the competitors as well. We had to photograph the designs *in situ;* but that does not matter where the light is good, as it was at South Kensington. It is only when the light is bad, and it is impossible to reproduce designs properly, that we insist, as usual, on removing competition drawings to our own office.

ROGERSTONE CHURCH, MONMOUTHSHIRE.

THIS country church, from the designs of Mr. T. M. Lockwood, architect, of Chester, is herewith illustrated from drawings now on view at the Royal Academy. The plan of the building is very simple—a nave with one aisle, a chancel and square built tower on the south side, capped by a dwarf spire. The walls are of local stone in random courses, with dressed quoins. The porch is of timber, and the roofs are covered with tiles.

WALSALL SCIENCE AND ART INSTITUTE.

THIS building, illustrated to-day, is being erected on a site fronting to Bridgman-street, Bradford-place, Walsall. The design was selected from drawings submitted in competition by architects from Birmingham, Wolverhampton, and Walsall, after careful consideration by a committee appointed for the purpose of carrying out the buildings, and assisted by an officer from South Kensington. Accommodation will be provided for the art department on the ground floor, with ample cloak rooms, lavatories, &c.; and for the science department, consisting of class and lecture rooms, and chemical laboratory, &c., on the mezzanine and first floors. Accommodation is also made on the first floor for a caretaker, and ample cellarage is provided in the basement, with a room for metallurgical research. The exterior of the buildings will be in best red brickwork with warm buff-coloured terracotta dressings. The interior will be faced principally with picked common bricks relieved with moulded brick strings, cornices, &c.; the woodwork will be stained and varnished. The halls and corridors will be fireproof, and laid in simple patterns of tiles. The staircase will be Hawksley's patent. The cost of the buildings, including fittings, will be about £4,000. The architects are Messrs. J. G. Dunn, A.R.I.B.A., and F. W. Hipkiss, of 44, Waterloo-street, Birmingham; and the builders are Messrs. Barker and Son, of Villa-road, Handsworth, Birmingham.

SIMONSTONE HALL.

THIS country residence is a nobleman's shooting-box, and the architects are Messrs. Carpenter and Ingelow, of Regent-street. The present new work has been built on to the walls of an old house which is incorporated with the enlarged hall. The hatched sectional plan shows the old, and the blacked-in parts the new buildings.

A new steam laundry at the County Hotel, Carlisle, was opened last week. It has been built from designs by Mr. T. Taylor Scott, of Carlisle, by Messrs. Johnstone Bros., of the same city, and has been fitted up by Messrs. Bradford and Co., Manchester and London.

The restoration of the 15th-century screen in Plymstock Church, Devon, is approaching completion. Mr. Harry Hems, of Exeter, is carrying out the work from drawings by, and under the superintendence of, Mr. R. Medley Fulford, of the same city.

AT THE SALE ROOMS.

THE sheet of sketches we illustrate to-day was taken from various objects in the sale that lately took place at Messrs. Wright and Mansfield's premises, New Bond-street. The charming old Breton Bedstead, shown at the top of sheet, is a quaint example from a country where nearly everything is done in a sleepy, Mediæval sort of way—a circumstance which induced the late lamented Randolph Caldecott to visit and chronicle in one of his last works the doings of the Bretons. The bedstead is fitted across one end of a room, and is entered by means of the two doors shown. It is not, we should imagine, a very healthy or sanitary piece of furniture; but it quite precludes the possibility of any violent fall or ejectment from within. The little turned balusters almost remind one of Cairene work. The date is shown on the side—viz., 1729—and there is no doubt that every portion of the bedstead was genuine. The little Chippendale Wine-Cooler was a good specimen of that artist's work, well carved, but slightly too roccoco. The Cassone was a good piece of Italian workmanship, elaborately carved, and was originally at Holyrood Palace. The cassone, as most people know, was often used to contain a bride's dowry and attire when she left her father. This example dated from the middle of the 16th century, and was in good condition.

CHIPS.

The energetic Dean of Winchester, Dr. Kitchin, has just carried out a great improvement in the north transept of the Cathedral by removing the lath-and-plaster imitation of stone which blocked up the arches of its triforium, and visitors can now see the Norman work in all its massive simplicity. The restoration of the stonework of the reredos on its southern wing is about to commence; Messrs. Traske will carry out the work under Mr. John D. Sedding.

The Crown Princess of Germany will lay on Tuesday week, the 9th prox., the first stone of the new parish-church for Portsea, which is about to be built from designs by Mr. A. W. Blomfield, M.A.

Several memorials have been discovered at Dewsbury parish church in the course of the removal of some of the earth in the old chancel, which is being rebuilt from plans by Mr. A. E. Street. The discoveries include a stone with three brasses—two to former vicars; a fourth brass, a memorial of the Rooke family; and, most important of all, a portion of a Saxon cross (possibly a monument to Paulinus, the Roman missionary), on which is sculptured the Virgin and Child, beneath a canopy.

The organ in Christ Church, Tunbridge Wells, was reopened on Wednesday week, after rebuilding on an enlarged scale by Messrs. Bryceson, of London.

The foundation-stone of a new church in Union-place, Aberdeen, for the St. James Episcopal congregation was laid on Friday. The church will accommodate 400 persons, and the cost is about £2,700.

The council of the Sheffield School of Art have elected Mr. Frank Tory to the mastership of the wood-carving class. Mr. Tory has executed among other works in Sheffield the carving at Messrs. Pawson and Brailsford's, the Mappin Art Gallery, the memorial to the late Mr. M. E. Hatfield, and alabaster statuary for the church of St. Ignatius, at Preston, and St. Joseph's, Wath. The examiners at South Kensington have awarded him two silver medals for figures modelled from the antique.

Westhall Hill Manor House, Oxfordshire, is undergoing restoration by Mr. R. Norman Shaw. Mr. Alfred Groves, of Milton-under-Wychwood, is the builder.

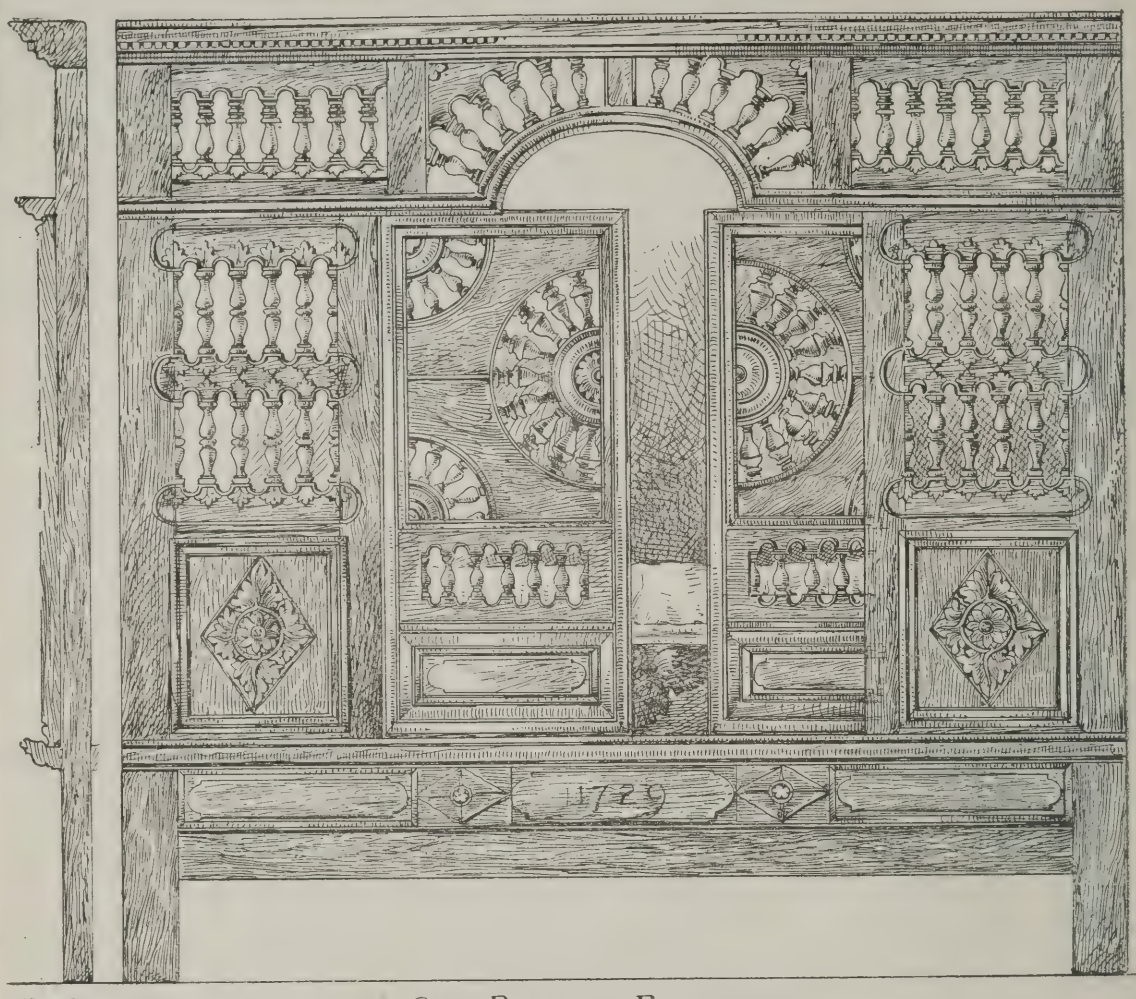
The Edinburgh town council have had under consideration the alterations of the selected plans for the proposed building at George IV. Bridge, and made by their architect, Mr. G. Washington Browne, after consultation with Mr. Waterhouse, R.A., and have finally approved of the plans as revised.

The Hampstead Vestry have voted a contribution of £20,000, and St. Pancras Vestry one of £30,000, towards the purchase of lands for the extension of Hampstead Heath, under the provisions of the local Act of last year.

The Local Government Board have, upon the report of Major Hector Tulloch, given their sanction to the Eccles Local Board borrowing the sum of £8,396 for works of public sewering and paving and private street improvements in Eccles, Patricroft, and Winton.

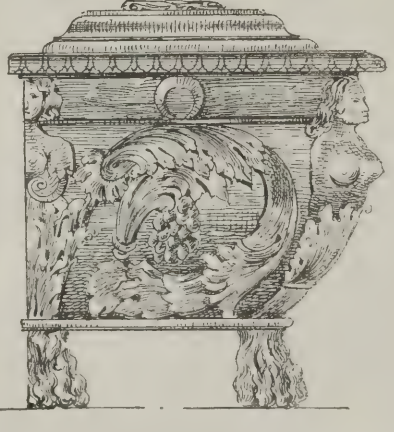
UNIVERSITY OF ILLINOIS

SKETCHES AT MESSRS WRIGHT & MANSFIELD'S SALE

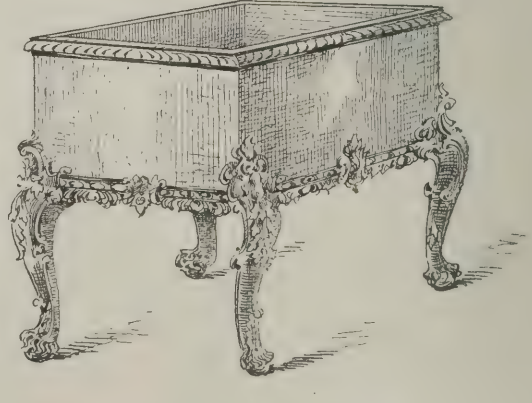


OLD BRETON BEDSTEAD

END VIEW



END VIEW OF CASSONE



CHIPPENDALE WINE COOLER



ITALIAN CASSONE

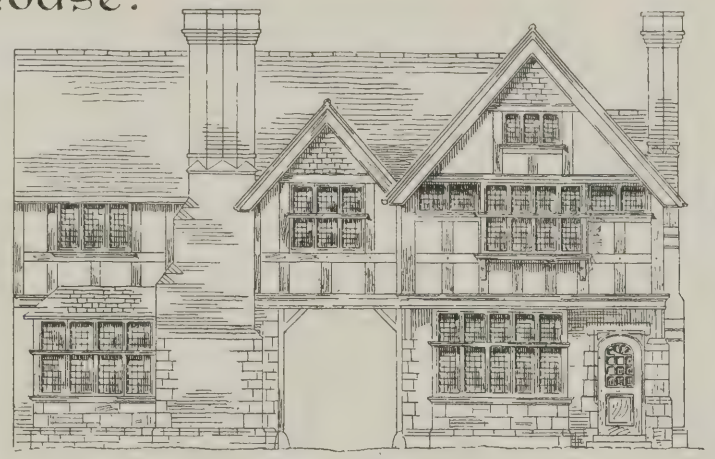




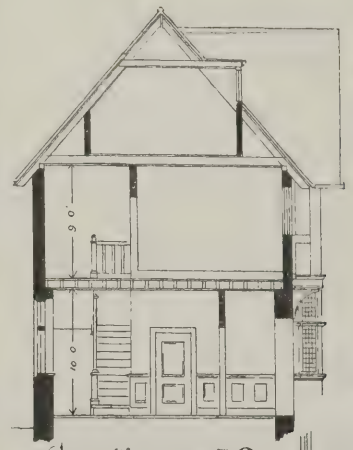
"PHOTO-TINT" by James Akerman, 6, Queen Square, London, W.C

B·N·D·C· DESIGN·PLACED·FIRST

A Village Public-house:



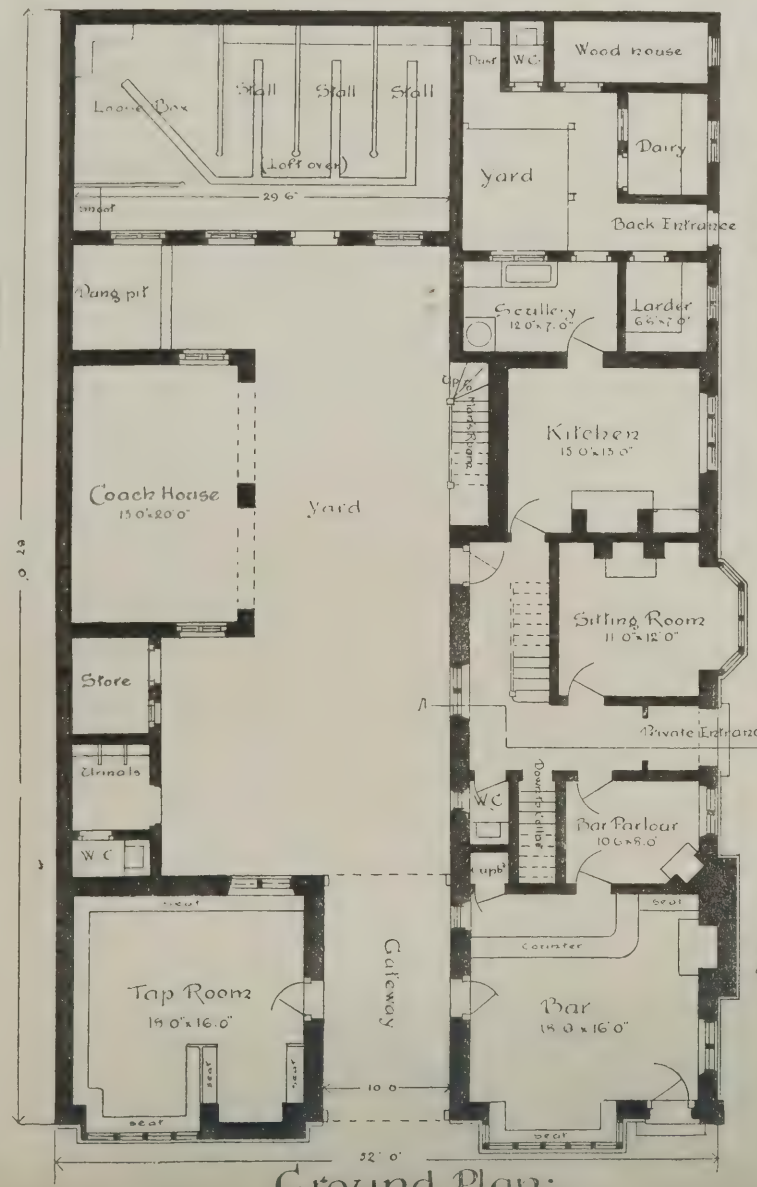
Elevation:

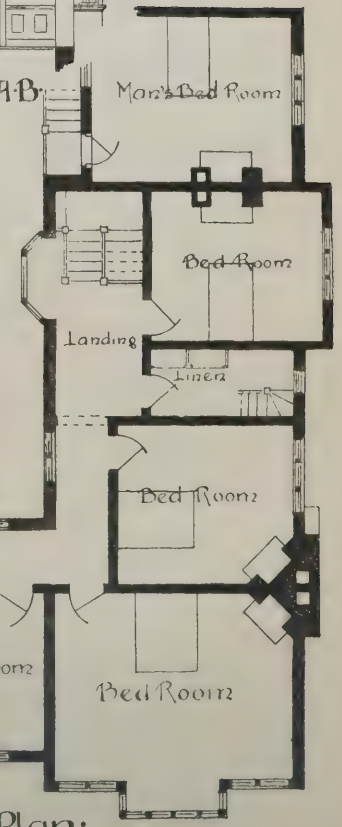


Section on A B

"Norseman"







Scale of Feet:



"IN THE CLOISTER," HUGH DE T. GLAZEBROOK.



"LILITH," HON BLE



A. MORNING HYMN, REGINALD HALLWARD.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



N COLLIER."





"ON THE BURE NORFOLK," EDWARD H. FAHEY R.I.



LÜNEBURG, A.B. DONALDSON.



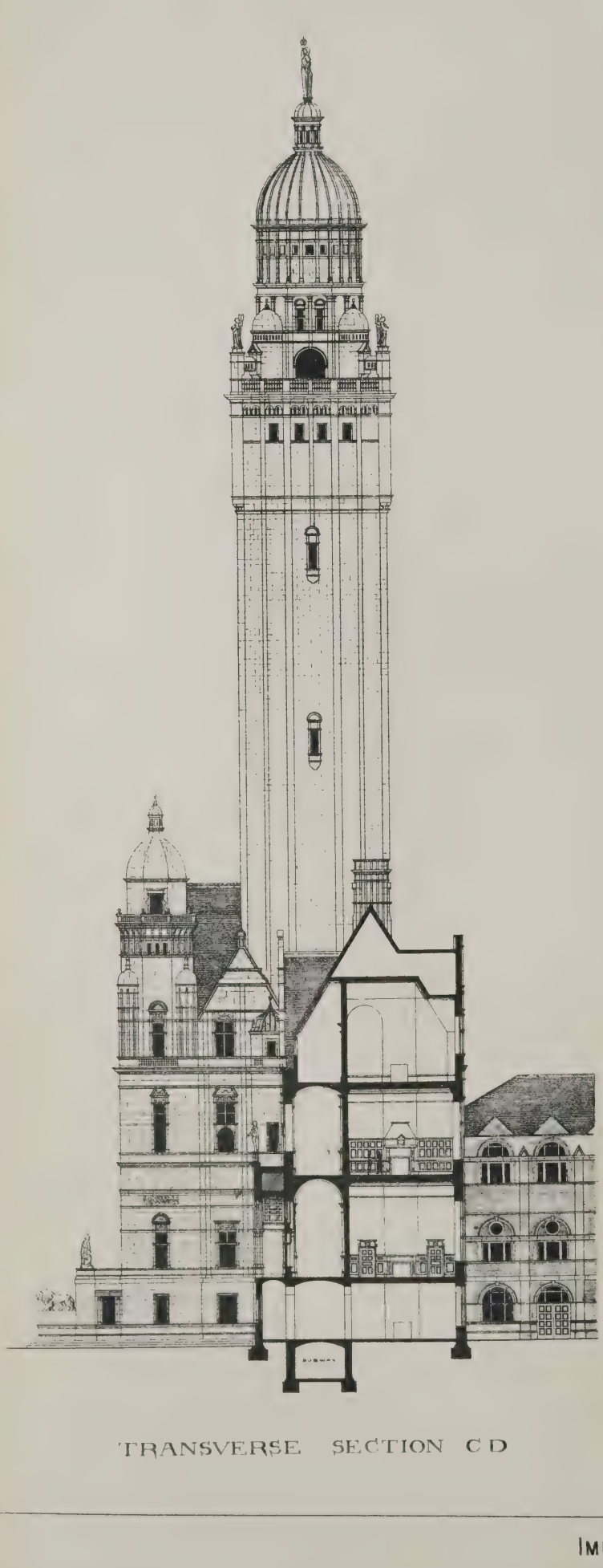
"PHOTO-TINT" by James Akerman, 6 Queen Square, London W.C.

SIMONSTONE HALL,

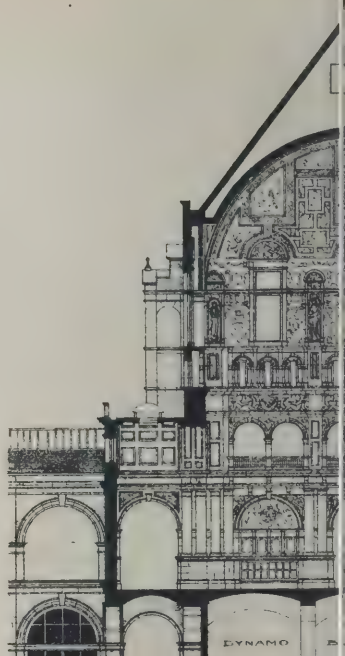
R. H. CARPENTER
B. INGELOW } ARCHITECTS.



"PHOTO-TINT," by James Akerman, 6 Queen Square, London W.

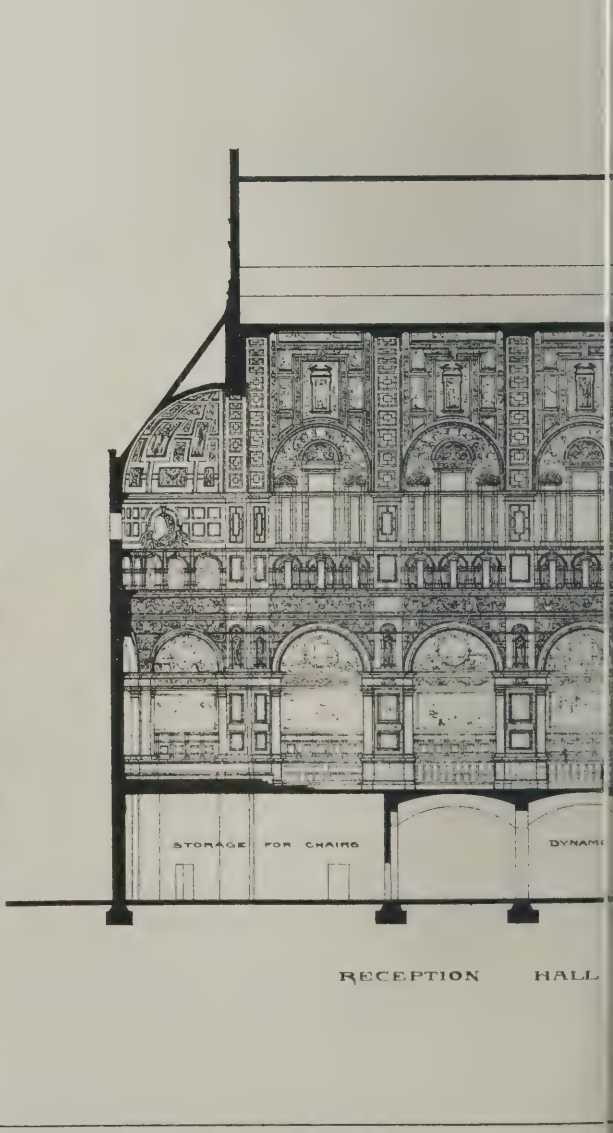


TRANSVERSE SECTION C D

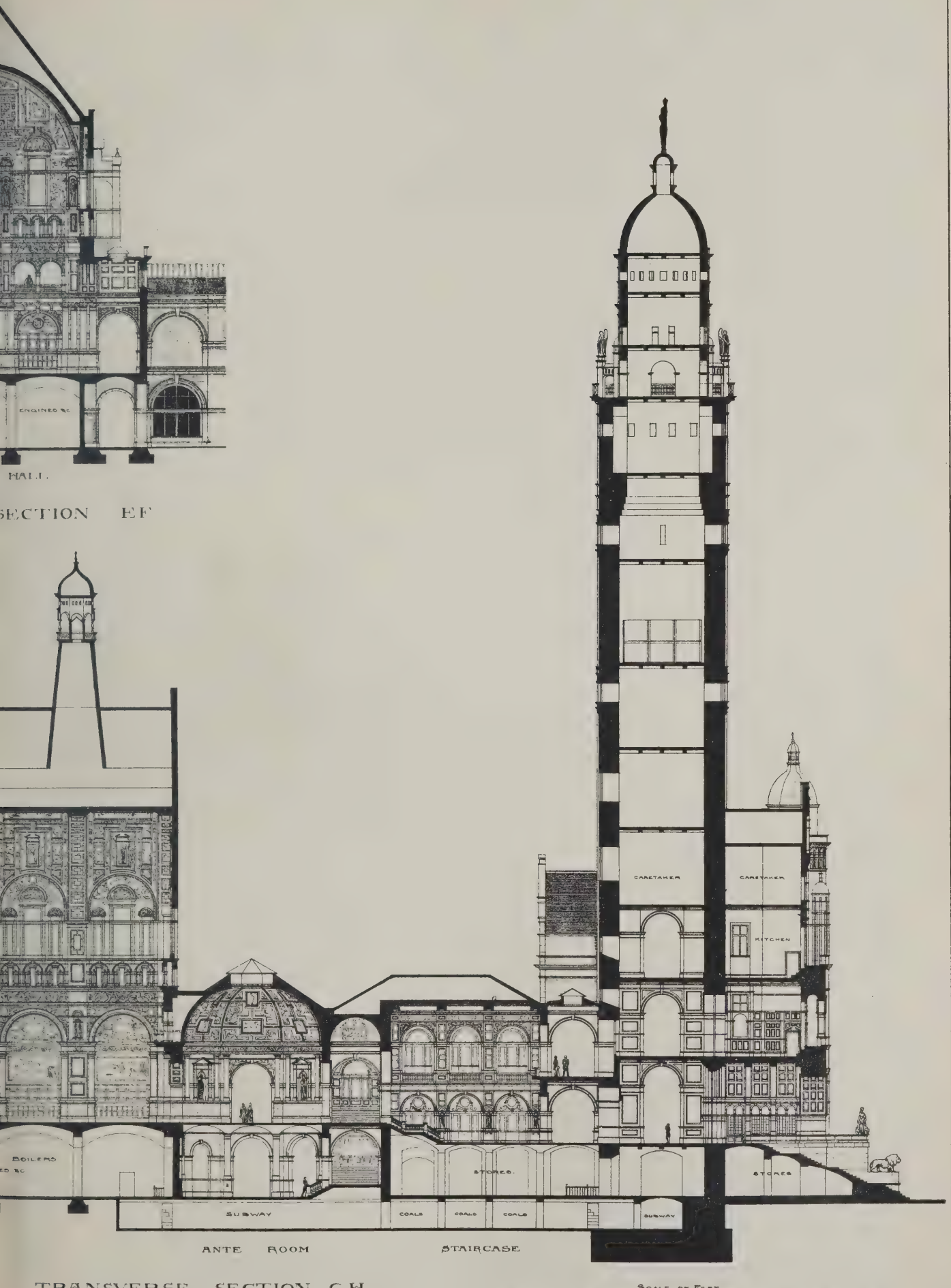


RECEPTI

TRANSVERSE



RECEPTION HALL



SECTION EF

TRANSVERSE SECTION GH

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

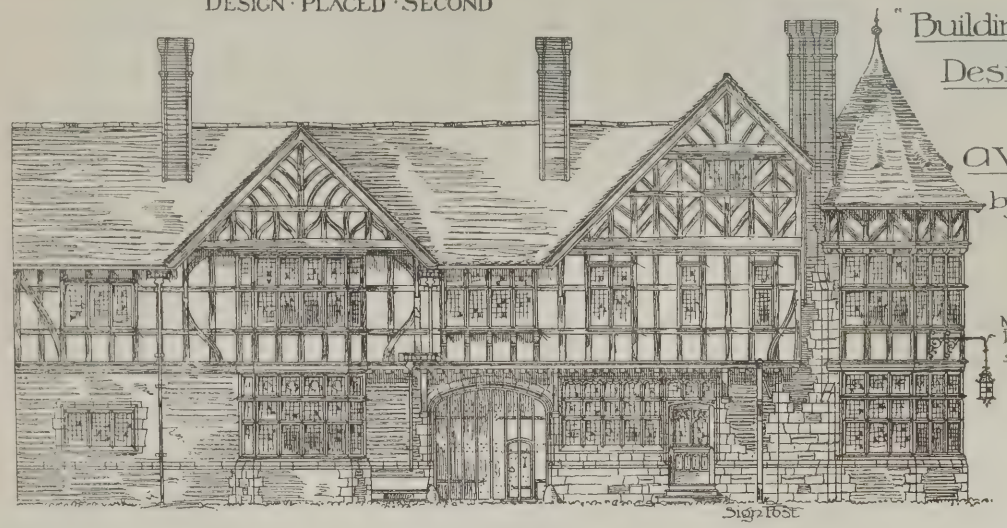
TON, SELECTED DESIGN, T. E. COLLCUTT, ARCHITECT.

DESIGN · PLACED · SECOND

"Building News" Designing Club.

A Village Public House

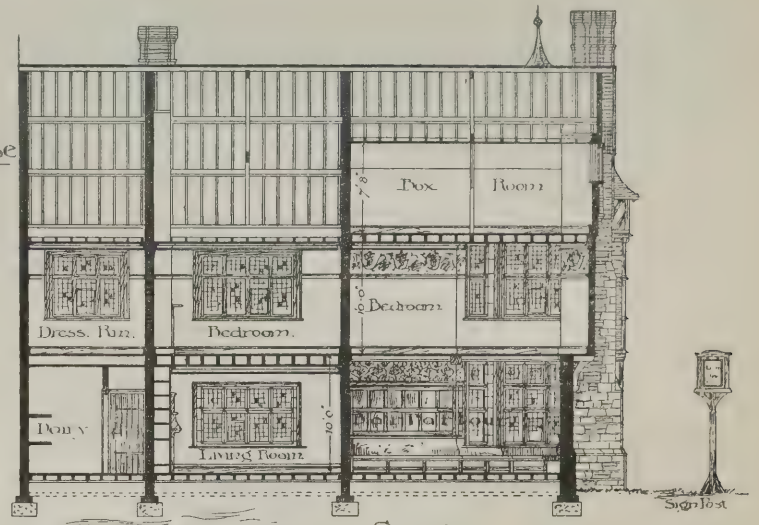
by "Loidis" June. 1887.



Materials. Bricks Stone in lower portion, tarred oak upper stages, red tiles on roof

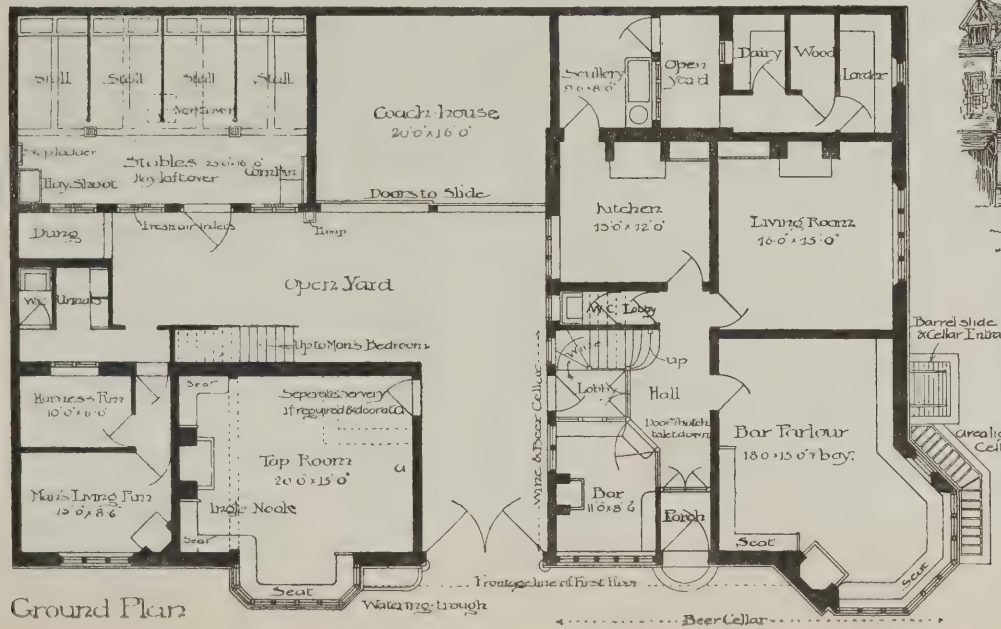
Elevation.

Scale.



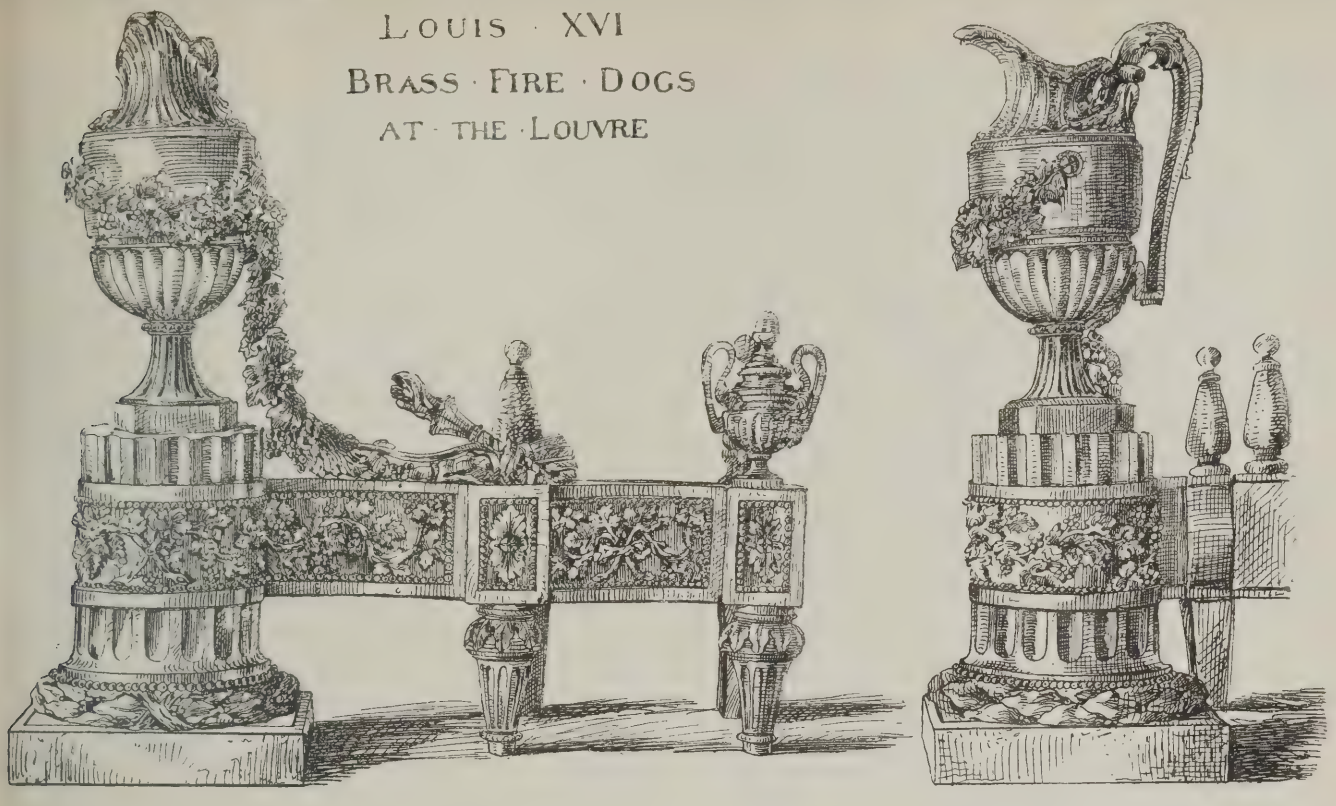
Section.





Ground Plan

First Floor Plan.



LOUIS XVI. FIRE-DOGS.

THE Brass Fire-Dogs illustrated are of chased brass and gilt, and are at the Louvre. The French name is *chenet*. We were assisted in our drawing by a photograph kindly lent us by Mr. Boucneau, of Warren-street, Fitzroy-square.

NOTES ON CONCRETE.*

THE author of this little book on concrete, who has taken the Miller prize of the Institution of Civil Engineers, for an essay on iron cylinder bridge piers, is practically acquainted with the subject, and endeavours to impart his own experience in the constructional use of concrete. Mr. John Newman does not write for the manufacturer or professor, but for the practical engineer, and the sixteen chapters of his book are chiefly devoted to the use of concrete in submerged structures. The composition and chemical properties of Portland cement are therefore scarcely touched upon; but the engineer will find what more directly concerns him—methods of testing, the proportions of sand, gravel, and stone; mixing, damping the aggregates, depositing concrete, expansion and contraction, and precautions against their ill effects; the use of concrete in facing, in arches, lowering plastic concrete and blocks, and the bag system of deposit. Something may be gleaned from the chapters on air-slaking, storing, and testing Portland cement. Testing is of little value, as we have often insisted, unless the conditions are observed closely, the tensile strength depending on so many circumstances. These have been enumerated; a variety of small details is necessary to make the test of value. Even the form of clip for holding the briquette, whether the mould was filled at one operation, whether the briquette is made under the same conditions, amount and quality of water used in mixing, its temperature, and that of the testing-room are matters affecting the test. Mr. Newman prefers, as many do, a moderate tensile strength of about 350lb. per square inch at seven days, and increasing with age to a high tensile strength not afterwards increased. Mr. Mann's experiments are quoted as being the most complete, and those referring to the adhesive strength are most important. "The average cohesive strength of the neat Portland cement tested was after seven days 425lb. per square inch. The average adhesive strength of the same neat Portland cement being 611b. per square inch, and 841b. per square inch after seven and twenty-eight days' immersion respectively. The test pieces to which the Portland cement was attached were sawn, close-grained limestone." These experiments further show that there is no general ratio between the adhesive and cohesive strength; while the cohesive strength remained nearly stationary, the adhesive strength increased. But neat cement tests are not conclusive; the tests should be made after mixture with sand. These show whether the cement is finely ground or not, for "coarsely-ground cement when mixed neat gives a higher tensile strength than fine cement; but when mixed with sand the reverse is the case." Many valuable hints are furnished, to which we cannot refer. Mr. Newman has sifted a great many authorities, and has given us the *résumé* of their suggestions. Referring to depositing concrete in work, the author does not agree with the "tipping" system. He says the concrete should be gently shovelled into position on the level, if possible. Throwing in from a height separates the particles, and induces air holes or bubbles, a conclusion which all must have come to, though the system is a favourite one among contractors, as it saves time and labour. The layers should be gently rammed, which increases the density, and the panning should be done directly the concrete is deposited, and not be long-continued. With regard to expansion and contraction, the author cautions against the use of over-limed or freshly manufactured cement; that which has been air-slaked and stored some time being the best to use. Mr. Harrison Hayter recommends that Portland cement should not be used if it contains more than one per cent. of magnesia, and considers there should be no carbonate of lime in it. To avoid expansion this rule is obvious; the cement also should be ground very fine. The author does not appear to have given any attention to the question of the deleterious effect of sea-water on submerged concrete—a point to which we referred last week, nor to Mr. Harrison Hayter's and M. Lechartier's remarks on the subject, though he points to the great importance of avoiding or stopping up any open joints, cracks, and fissures in submerged concrete works to prevent the penetration of water and air and the consequent compression within the mass of concrete and its destructive action. The importance of an impervious facing is discussed in a separate chapter. Quay and harbour works ought to have a facing of hard concrete. Mr. Bernays, at the Chatham Dockyard extension, faced the dock and retaining walls with 9 to 10in. of such concrete, the proportions being 4 to 1, consisting of 4 parts of broken slag or flint, 2 parts of sharp sand, and 1 part of Portland cement, which is so hard as to resist cutting into. But we must take leave of Mr. Newman's useful guide, which ought to be read by every engineer and architect.

* Notes on Concrete and Works in Concrete. By JOHN NEWMAN, Assoc.Inst.C.E. London: E. and F. N. Spon.

CHIPS.

In our issue of the 15th inst., mentioning the opening of some wards at the hospital in Queen-square, it would have been more correct, we are informed by Mr. Manning, to have said "erected from the designs, and under the superintendence of, Messrs. Manning and Simpson," Mr. Simpson having been in partnership with Mr. Manning during the greater part of the time the building was in progress.

Mr. Hadfield has prepared plans for the new abattoirs which the Duke of Norfolk contemplates erecting in Cricket-road, Sheffield. Preliminary plans have been laid before the health committee of the town council, and met with the general approval of the committee.

New Wesleyan Sunday schools are being built at Wimpson, near Southampson, Mr. Morris being the architect, and Mr. George Inder, jun., the builder. Memorial stones were laid last week.

A granite monument has been erected to the late Principal Tulloch in the new cemetery of St. Andrews, N.B. It is of Aberdeen granite, and, standing about 20ft. high, consists of pedestal and column surmounted by a Maltese cross. The sculptors were Messrs. Macdonald and Co., Aberdeen.

Extensive additions are being made to the paper works of Messrs. Dickinson, at Croxley-green, near Watford, including the erection of a chimney shaft 208ft. in height, which has just been carried to its full altitude. Messrs. Clifford and Gough, of Watford, are the builders.

The board schools at Sholing, near Netley, have just been reopened after enlargement, carried out by Mr. Carden, from plans by Mr. W. H. Mitchell, of Southampton.

Railway construction in the United States still makes rapid progress. In the first six months of the present year 3,750 miles of new main-line track were laid down. This is a larger addition than any other corresponding half-year has witnessed, excepting in 1882, when out of 11,568 miles for the whole year, 5,000 miles were laid down in the first half of the year. The average annual addition for the last twenty years is 5,005 miles; for the last ten years, 6,016; and for the last five years, 6,767 miles. The rate of increase is, therefore, progressive.

UNIVERSITY OF ILLINOIS

Engineering Notes.

BOMBAY.—The extensions of the Prince's Dock are rapidly approaching completion. The water area is a little over twenty-four acres. In shape it is rectangular, and its main dimensions are 1,866ft. by 1,000ft. From the west side three jetties are thrown out, measuring 400 by 230ft., and the quayage measures 9,000ft. A passage connects the old and new docks, measuring 202ft. in length by 64ft. wide and 35ft. deep. The separation will be made by an iron ship-shape caisson, built by Messrs. J. and G. Rennie, of London. The entrance to the new works is 80ft. wide, the depth being 32ft. The walls are constructed of local basalt, but the sill stones and coigns are of granite, and have been imported ready dressed from Cornwall. Two of these, the heel pieces for the gates, are each not less than 14 tons in weight. It is expected that Messrs. Kirby and Co., the contractors, will have finished in another six months. The sheds are to be constructed of iron columns composed of old rails, with iron roofs. The hydraulic engines, the cranes, gates, bridges, caisson, pipes, and all iron work are being supplied from Sir W. Armstrong, Mitchell and Co.'s works at Elswick-on-Tyne. The dock was designed by Mr. G. E. Ormiston, Chief Engineer to the Port Trust, his chief assistant, Mr. G.R. Lynn, who had gained experience at the Hull and Barnsley Dock, being resident engineer.

DIEPPE.—The inauguration of the new docks took place on the 17th inst. in the presence of MM. de Hérédier and Dautresne, the Ministers of Public Works and Commerce. The new basin is 1,600ft. long by 300ft. wide, and is entered at present through the Duquesne Dock by a lock. A new entrance is also being made from the outer port, through a tidal basin 490ft. long and 325ft. wide, with locks 69ft. wide, in which the depth of water on the sill will be 32ft. at spring tides. This will enable ships and steamers of heavy draught to enter at all times of the tide. It will take three years before all the works are completed and the warehouses erected on the quays. They are being pushed forward, under the superintendence of the Chief Engineer, M. Alexandre, and his assistant, M. Gerardin.

The Bishop of Ripon re-consecrated St. Stephen's Church, West Bowling, Bradford, which, built in 1860, has just been enlarged by the addition of north and south transepts, an organ-chamber and vestry, and lengthening at the east end by 21ft. One hundred additional seats have been provided. A new memorial reredos is in Caen stone, and is divided by red marble pillars into five panels, which are filled in with devices in alabaster, there being a cross in the centre panel. A stained-glass window of two lights has been inserted in the chancel wall, and contains a representation of the Crucifixion and the Ascension. The work is by Messrs. Powell, of Leeds. Mr. M. Brayshawe was the architect for the work, which has cost £1,400.

The City Court of Common Council considered at a recent meeting alternative designs in Gothic and Italian styles respectively for a new City of London Court, prepared by Mr. Andrew Murray, their acting architect. By a majority of votes it was decided to adopt the Gothic plan, it being in harmony with the Guildhall library and council chamber. The court will be erected on the site of No. 84, Basinghall-street, and will cost as a whole about £202,000; but the first section, with which it is proposed to proceed at once, is estimated to involve an expense of £22,000. At the same meeting a report was received from a committee recommending that in place of a City architect a City surveyor and clerk of works should be appointed at a salary of £800 a-year.

The foundation stone was laid last week of a campanile, which is being added to St. Augustine's R.C. Church, Tunbridge Wells. The tower is of local stone, and will rise to a height of 65ft. Under the church class-rooms for 270 children are being formed in the basement, hitherto unutilised. Mr. Brett A. Elphicke, of Tunbridge Wells, is the architect, and Mr. Jarvis the contractor for both works.

The building of the French cathedral at Pekin has been begun, and the carpenters and masons are now at work. Several objects of antiquarian interest were found in digging the foundations, including war instruments, porcelain, and varnish of the Ming period. The relics have been handed over to the authorities for preservation.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM AND MIDLAND INSTITUTE.—The members of the archæological section of this institute, who, it will be remembered, visited London last summer, took part this week in an excursion to York, Ripon, and Fountains Abbey. The party were to leave Birmingham yesterday (Thursday) afternoon for York, where they will take up their quarters at the Royal Station Hotel in that city. This (Friday) morning the train will be taken to Ripon, where the cathedral will occupy the visitors till luncheon. The afternoon will be spent (by permission of the Marquis of Ripon) in the charming pleasure grounds of Studley Royal, in which are situated the ruins of Fountains Abbey. Returning to York for the night, the whole of to-morrow will probably be found none too long for an inspection of the Minster and St. Mary's ruins, the churches, walls, and other antiquities. A saloon carriage will be provided by the Midland Railway Company, and the return train is due at Birmingham shortly after ten o'clock on Saturday night. The excursion promises to be one of the most enjoyable and useful of those planned by the committee.

KENT ARCHÆOLOGICAL SOCIETY. — The thirtieth annual meeting of this society was held on Tuesday and Wednesday last, Tonbridge being selected as the headquarters. At the business meeting held on Tuesday Canon Scott Robertson, the hon. secretary, read the report, which stated that 63 new members had been elected during the year, and that the financial condition of the society was satisfactory. The members then visited Tonbridge Castle, under the conduct of Mr. J. A. Wadmore, and afterwards proceeded to Penshurst Place, all the private apartments in which had been thrown open for inspection by Lord de L'Isle and Dudley. About a hundred members and visitors dined together in the Public Hall, Tonbridge, the chair being occupied by Mr. R. Furly, F.S.A., of Ashford, and an evening meeting was held in the new Science and Art Schools, when Mr. J. F. Wadmore read a paper on "The Smythes of Westenhanger." Mr. G. Payne, F.S.A., described some "Recent Archæological Discoveries in Kent," saying that the site at Plaxton, near Ightham, was about to be opened in continuation of the excavations made in 1859 by Major Luard; and Canon Scott Robertson gave an address on "Tonbridge and its Connection with English History." On Thursday an excursion was made to Brenchley, where the 13th-century church, restored by Mr. Joseph Clarke, the parsonage house, and the Elizabethan houses in the village were seen, and also to Horsmonden Church, Scotney Castle, and the ruins and modern house at Bayham Abbey.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—A special business meeting of this body was held on Friday to consider the recent communications made by Messrs. Kelly and Birchall with respect to the Higher Grade and other schools. It was decided to ask Mr. Edward Birchall, F.R.I.B.A., to resign his membership of the society, on the ground that his firm's proposals were detrimental to the interests of the profession.

LINCOLN AND NOTTS ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY. — This society, which covers the same ground as the old Lincolnshire Diocesan Architectural Society, held its annual meeting on Tuesday and Wednesday week at Nottingham. After a special service at St. Mary's Church, the Bishop of Nottingham (Dr. Trollope) delivered an address on the many architectural and historical facts connected with the building. The members were afterwards received at the Castle Museum and Art Gallery by the curator (Mr. G. H. Wallis, F.S.A.), a descriptive lecture being given by Mr. F. C. Hine, F.S.A. Subsequently, parts of the castle were inspected, and in the afternoon an excursion took place to Wollaton Hall, a description of this fine specimen of Elizabethan architecture being given by the Bishop Suffragan of Nottingham. The annual public dinner of the society was held in the evening at the George Hotel, and at night, under the presidency of Dr. Trollope, a public meeting was held at the Exchange Hall, when papers were read by Mr. G. H. Wallis, F.S.A., and Mr. W. H. Stevenson, the former giving an account of the discovery of the Temple of Diana Nemorensis by Sir J. Savile Lumley, and the latter a history of ancient Nottingham. On the following day the society visited Bakewell Church and Haddon Hall, and in the evening the Mayor of Nottingham entertained the members to a soirée at the castle.

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.—The annual meeting of this society was held on Tuesday and Wednesday in Bristol, a district north of the Avon being visited during the excursions. The opening meeting was held on Tuesday in University College, the Mayor of Bristol in the chair. The annual report showed that the society had increased in numbers from 520 to 525, and that the state of the finances was sounder. The society had succeeded in preserving the old Grammar School at Taunton, which had been acquired by the corporation of that town to be reserved for municipal purposes, with a guarantee that the ancient features of the building shall be preserved. The Mayor having given an address on the progress of Bristol, the members inspected the civic plate and records at the Council House, and afterwards visited St. Mary Redcliff Church, Mr. W. E. Jones, assistant city architect, acting as guide. Canyng's House, the Temple Church, and the crypt of St. Nicholas' Church were afterwards visited. In the evening, Professor Lloyd Morgan read a paper on "The Stones of Stanton Drew," and Prebendary Scarth another on "Recent Discoveries in Bath." On Wednesday, the members of the society made an extended excursion through Bristol, and they also inspected the lines of fortifications at Brandon Hall (under the guidance of Colonel Bramble), the Mayor's Chapel, the Cathedral, the Law Library, St. Peter's Church, Norton's House, the Dominican Friary, and St. James's Church.

CHIPS.

A new set of stable buildings is in course of erection at Bruem Abbey for Mr. Cecil Samuda. Mr. Alfred Groves, of Milton-under-Wychwood, is the contractor.

The town council of Wolverhampton have decided to adopt the scheme of the borough surveyor, Mr. Berrington, for the sewerage works and the separation of rainfall from sewage, subject to the approval of Sir Joseph W. Bazalgette. The estimated cost of the works is £8,000 for the separation scheme, and £17,000 for new outfall sewers.

The trustees of Lord Conyers have decided to spend about £500 in the better preservation of the ruins of Conisborough Castle, including the repair of the approach to the summit of the keep and the erection of a lodge on the castle grounds. Mr. Johnson, of Doncaster, is the architect for the works.

Barnstaple is an exception to the rule that a prophet hath honour save in his own country, for the town council have adopted a contrivance for excluding the tidal water from the sewers, patented by a fellow-townsman, Mr. Giles Carter, of Joy-street, Barnstaple.

A mission church is about to be erected at Lower Caversham, Reading. The walls are to be of flint rubble, with freestone quoins and dressings, and faced internally with brick. The contract has been let to Messrs. Wheeler Brothers, of Reading. The architects are Messrs. G. Fitzwilliam and E. P. Warren, of 5, Staple Inn.

A new grammar school is about to be built at Abergavenny, Mon., as a Jubilee memorial. The buildings will be erected in sections, the first of which will cost nearly £4,000. Mr. E. A. Johnson, of Abergavenny and Newport, Mon., is the architect.

Mr. Alfred Groves, builder, of Milton-under-Wychwood, has just completed the restoration of the north and south transepts and Burgess aisle of Burford Church, Oxon, under the superintendence of Mr. J. D. Sedding, architect, London.

A new residence, with stables and lodge, has been completed at Ramsden, Oxon, for Captain Wynter. Mr. H. J. Tollit, Oxford, is the architect; and Mr. Alfred Groves, Milton-under-Wychwood, the builder.

Acting under the advice and upon the recommendations of their architect, Mr. Arthur Loader, of Brighton, the trustees of the Catholic Apostolic Church have decided to have their building re-roofed, restored, and a system of ventilation introduced (Boyles' large extractors being one of the methods). The builder selected is Mr. G. R. Lockyer, of Brighton.

COMPETITIONS.

FORESTRY.—The following awards have been made by the Scottish Arboricultural Society for competitive essays on various departments of Forestry :—Silver medal to George Cadel, for essay on Forest Administration in the Canton Vaud, Switzerland; on the Natural Reproduction by Self-Sowing of Forest Trees—John Smith, surveyor, Romsey, Hampshire, bronze medal; Forestry in Hungary—Major Bailey, Simla, gold medal; Plantations on —— Estate—A. D. Webster, Penrhyn, No. 2 silver medal; Town Planting—A. D. Webster, Penrhyn, bronze medal; Trees and Shrubs suitable for Seaside Planting—A. D. Webster, No. 2 silver medal; Foresters' Cottage, with plan —John Smith, No. 2 silver medal; The Effects of the Great Gales of last 25 Years on Woods and Forests of Britain—John Smith, bronze medal; Report on Woods and Plantations upon the Estate of —— —George Dodds, Wentworth, No. 2 silver medal; Watkin's patent girthing tape—bronze medal to Rider and Son, London; best kind of dead fences for plantations—D. A. Glen, Gartshore, bronze medal. No awards were made for an essay on the abnormal growth of forest trees—the beech knot—or on the hygienic effect of trees and plants. It was reported that on the whole the essays were of more than usual ability.

GREENLAW CHURCH, PAISLEY.—The competitive plans for the Greenlaw Established Church, proposed to be built by the Abbey congregation, were on exhibition last week. The committee received nine sets of plans from Glasgow and Paisley architects. Mr. Sellars, of Messrs. Campbell, Douglas, and Sellars, Glasgow, adjudicated on the merits of the plans, and his award placed the plan by Mr. T. Graham Abercrombie, of High-street, Paisley, with whom is associated Mr. R. S. Symington, head draughtsman in the office of Messrs. John Burnet and Sons, Glasgow, first; that of Mr. Caldwell, of Paisley, second; and that of Mr. Donald, of the same town, third. The committee unanimously agreed to Mr. Sellar's report.

CHIPS.

The number of visitors to the British Museum has sensibly decreased since 1882, when the numbers were 767,402, the number of visitors during last year being 504,891. The visitors to the Natural History department at South Kensington in 1886 numbered 382,742, as opposed to 421,350 in 1885, and 231,284 in 1881, the date of opening.

A portion of Lewis's Building, Ranelagh-street, Liverpool, destroyed by fire on the 24th December last, has now been restored, and was opened on Saturday. The restored premises necessitated the preparation of fresh plans, as the building is now erected on new lines, being as much fireproof as it is possible to secure. Each floor is 1ft. thick, solid concrete, built on firebrick columns, and the iron beams are covered with 3in. of concrete, there being no exposed iron anywhere. The floors are covered in some places with mosaic, some with cement, and others with wood-block flooring. The old buildings have been fitted with automatic sprinklers. The new building measures 140ft. by 65ft. The architect was Mr. W. W. Thomas, of Lord-street, Liverpool; and the builders were Messrs. William Tomkinson and Sons, of Dansic-street, in the same city.

A fatal accident occurred on Friday in the Grand Depot Barracks, Woolwich. The harness-rooms are roofed with asphalte about 6in. in thickness, and a party of workmen in the employ of Messrs. Claridge, Victoria Embankment, have been for some time employed on the repair of the roofs. On Friday they were at work on No. 4 Harness-room, under the direction of a foreman named John Cooper, a man nearly seventy years of age, when, without any warning, the roof fell in. Cooper was killed, and four other men, named Stovell, Hughes, Jefferies, and Harvey, were injured.

The east window of St. Mark's Church, Deptford, is being filled with stained-glass, representing "Christ Disputing with the Doctors." Mr. A. Taylor, of Berner's-street, W., is the artist.

On Saturday, at the invitation of Mr. G. G. Hoskins, of Darlington, President of the Northern Architectural Association, and architect of the new Town Hall and Municipal Buildings at Middlesborough, the members of the association and their friends inspected that group of buildings, which will cost about £100,000. After viewing the town hall and offices the company were entertained by Mr. Hoskins to tea at the Corporation Hotel.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

RECEIVED.—J. W. and Co.—C. and Co.—J. H. J.—F. T.—F. B. and Co.—H. Bros. and Co.—T. and Co.—F. A. Co.—B. of N.—A. B. of G.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Lawton," "Vitruvius," "Aspirant," "En Avant," "Stag," "Omega," "Alley N.," "Try Again."

Correspondence.

HINTS TO CONTRIBUTORS OF ILLUSTRATIONS.

To the Editor of the BUILDING NEWS.

SIR,—A word to your contributors. Is it not possible to give in the case of each illustration of modern work the cost of erection? Also, a ground plan at least of the building? Might I also suggest that in the case of a building which relies more for its effect upon a general arrangement and massing than upon minute and delicate detail, the idea of your "B. N." Designing Club illustrations should be carried out, and a couple of plans, a couple of elevations (or, in case of good internal work, a section and an elevation), and a perspective sketch given?

I throw out these suggestions with all deference; for, of course, every man ought to know how best to "bring his own pigs to market."—I am, &c.,

NORTH COUNTREE.

NEW POST OFFICE, KNUTSFORD.

SIR,—May I call your readers' attention to your illustration of the above, in connection with your illustration, published September 3, 1873, of Mr. Norman Shaw's design for the New Zealand Chambers in Leadenhall-street.

I am the last man to complain of plagiarism from living or dead, and I consider that anyone is fair game who gives his designs and plans to the world, as I may fairly term your readers; but, I also think, as a man uses these advantages, so will he be judged.—I am, &c.,

HALSEY RICARDO.

13, Bedford-square, Bloomsbury, July 27.

ORDNANCE SURVEY.

SIR,—I am pleased that my last letter to you should have received support from "Triangle" and "A Sufferer." I do not suppose that anyone of an unbiased turn of mind would seriously attempt to defend the principle of the Ordnance Survey. If there are any such I should like to hear them "chirp."

But although there be an undoubted wrong, the remedy is rather difficult to find. In my opinion isolated effort is useless: the thing is too deep rooted to be eradicated by a single hand. Were we only combined we might do much; my only fear is that we are not. One must remember that it is only those who enjoy, or have enjoyed, a fair income from land surveying alone who feel where the Ordnance Survey pinches. To appeal to an architect pure and simple, or a civil engineer, I have found to be useless; they either cannot or will not see the injustice. Let the same principle be applied to *their* especial branch, and then—hey, presto!—that would be a horse of an entirely different colour. Nothing like an *argumentum ad pecuniam*, Mr. Editor, for rousing folks sympathies.

We cannot hope, I suppose, to get the present plates which are in use broken up, and the sale of copies stopped; but we might arrest the further progress of the plundering scheme. "Triangle's" petitioning scheme is all very well, but unless it is most strongly backed up it will be useless. I doubt very much whether some of our M.P.'s would present petitions: we have been contented to sit down so quietly and so long under this flagrant injustice, and to have our daily bread stolen out of our mouths so meekly, that doubts of our sanity will be raised in the minds of most folk, I am afraid.

Will some of our Bill-promoting friends not give us a lift?—I am, &c.,

SURVEYOR.

A NATIONAL INSTITUTE OF BRITISH BUILDERS.

SIR,—Would you kindly allow me very briefly to suggest the inauguration of the National Institute of British Builders as an appropriate memorial of the Jubilee year?—I am, &c.,

AUGUSTUS J. HARVEY.

12, Landridge-road, Fulham, July 26.

THE EFFECT OF SEA WATER ON CONCRETE.

SIR,—The account of the changes produced upon cement concrete in the graving dock of Aberdeen Harbour is another link in the chain of evidence which ought to tend to force the truth upon the minds of those engineers and architects who, in spite of the evidence of chemists, will persist in maintaining that Portland cement is an enduring substance under all circumstances of exposure to the action of either fresh or sea water.

The truth is, Portland cement is a material highly susceptible of pseudo-morphic changes, which may either be for the worse or the better.

For instance, take the silicate of lime crystals for examination, commonly called the insoluble silicate of lime, of which Portland cement is largely composed. Alkaline carbonates decompose insoluble silicate of lime. Now, in sea water it is computed there is in every 10,000 parts 0·165 parts of carbonate of magnesia. Hence if sea water be passed through the pores of concrete or sand, held together with Portland cement, the silicate of lime is decomposed, carbonate of lime is formed and also silicate of magnesia. The unfortunate part of this change is that the volumes of silicate of magnesia and silicate of lime are unequal, so that this pseudo-morphic change, instead of turning out to be beneficial, disintegrates the concrete into stucco. What has taken place at Aberdeen must inevitably be in progress in all those cases where percolation of sea water is acting on Portland cement; but the amount of disruption must be contingent upon the rate and quantity of material acted upon.—I am, &c.,

Parkstone, Dorset, July 22. A. C. P.

THE DOME.

SIR,—I do not want to go into matters of architectural taste, as I profess only to be a practical man, but kindly allow me to say that in your leader of the 8th inst. on the rival features of architecture I look in vain for anything about that most noble feature the dome, and the larger the more grand; if only a cupola it is worthy of being included in the features.

I hope that the subject is to be continued, as

there is next to nothing said about the tower, nor in the "B. N." of the 15th inst.

I do not recollect seeing domes treated upon in any of your excellent journals, and just now it would be a welcome subject, especially if favoured by the experienced architect who urged it for the Imperial Institute instead of a tower.

I read in a contemporary there should not be a dome because it would compete with the Albert Hall, and said to be a good reason for the rejection of Messrs. Deane and Sons', or, I suppose, any other, dome.

I consider the Albert Hall to be a roof; that being so, it would only compete with St. Paul's, there being no other in London worth writing about; and, oh! what a pity it seems to—

Yours, &c.,

Broxbourne, July 25. JAS. PULHAM.

THE NUISANCE FROM SEWER VENTILATORS.

SIR,—Mr. W. P. Buchan, in his reply to my letter on the above subject, completely ignores the most vital part of the question—viz., that it was impossible to get any ventilation through a shaft when the air in that portion of the shaft underground was of a colder and heavier gravity to that of the inlet or outlet. The statement was a simple one; but before giving additional proof that this is correct when applied to any shaft, I will briefly answer Mr. Buchan's questions.

1. I did not refer to an "offensive" street grating which had a "brick ventilating pipe" running under the road. In my letter (p. 52, BUILDING NEWS) the word "brick" is not even mentioned. How could a brick channel be termed a pipe?

2. Mr. Buchan's reference to a street sewer grating having a trap is to me unintelligible. When a person speaks of a sewer grating in connection with the ventilation of sewers, he generally means one in the centre of the road. That was my meaning; and it is not customary to place a water-trap between such grating and the sewer.

3. The horizotal portion of the pipe running under the centre of the road was constructed of 6in. stoneware glazed pipes, and the vertical portion of 4in. iron pipe with a cowl on the top. Had the pipe been choked with iron rust, as suggested, it could not have been clear as I stated. The question as to whether iron pipes are coated is not one which seriously affects ventilation, providing they are clear. It is one of friction, and I would advise Mr. Buchan before mentioning it again to test to what extent a column of air is affected by passing through a rusty pipe; but let the two pipes used for testing be of the same dimensions, on the same level, and both columns of air of equal temperature and pressure.

4. It was desired that this ventilating shaft should effectually ventilate the sewer; but it did not do so, not through the faulty construction, but it proved useless for the reasons mentioned.

5. Whether "stack pipes" are to be used more in the future than at present "in sewer ventilation," is a question for your readers to decide; but in discussing it in the future I would beg Mr. Buchan to stick to the points at issue, and not wander into problematical ideas. If shafts give a certain motive power for the ventilation of sewers, let Mr. Buchan prove it by the laws which govern atmospheric pressure, and by the same I will give you other proofs of their uselessness.

The particulars of the shaft mentioned at Tottenham can be better described by Fig. 1. A is the inlet grating, B the outlet, C the horizontal pipe running under the road to shaft of sewer. The temperature at B being 106°, A 110°, and C 63°, it will be seen that the motive power for ventilation would be at B, forcing air down the shaft; but this is prevented by heavier air in pipe C, consequently the power at A and B had not power to move that at C, and no air could pass up or down the pipe.

If we have a steam boiler and make a fire under it, making steam sufficient to give 10lb. pressure to the square inch, we know exactly what motive power can be applied. In the same manner, if we calculate the weight of atmospheric pressure at inlets and outlets, we have a force as certain as that of the steam boiler. Now, in the above instance, the greater force being in pipe C, and exceeding that of B or A, how can shafts be otherwise than useless for ventilation under such conditions?

Fig 2 shows that of a shaft unattached to a sewer, and used for calculating the current introduced from it, and this under the most favourable circumstances. A is the inlet at

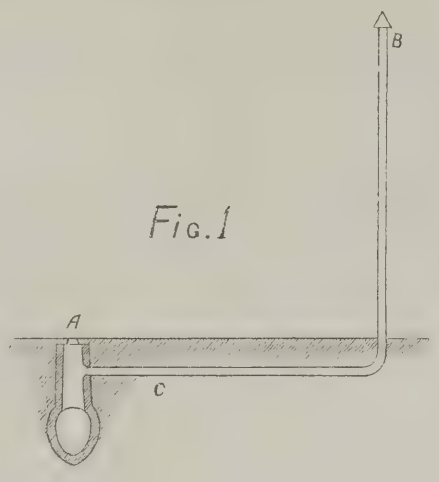


Fig. 1

the level of ground, B the outlet 50ft. high. It is used in this instance to calculate the difference in pressure between points A and B, to arrive at what point is gained by the upcast shaft for ventilation. In this case, 50ft. of

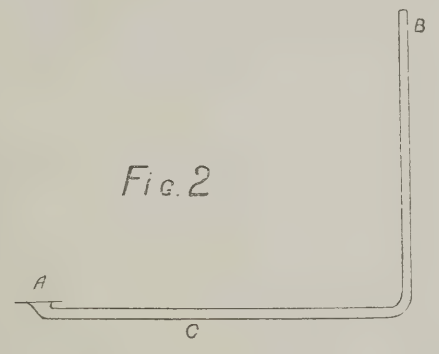


Fig. 2

upcast shaft gives one-twentieth of an inch barometrical pressure on inlet A, or equal to a wind current (deducting friction in bend and tube) of at least ten miles an hour, providing that portion of tube C was not buried in the

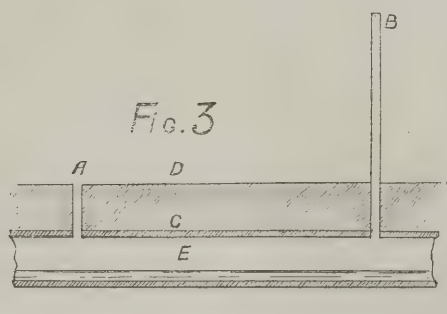


Fig. 3

ground, and the outlet and inlet protected from the influences of eddy winds. Now, at this time of the year, the greater heat being at A, the barometrical pressure is neutralised at this point, for if the air at A be only 4° warmer than at B, the barometrical pressure is lost as a motive power, and the air at B being the heaviest in gravity, it flows down the pipe to mix with air at inlet A in velocity according to the increased heat at A as compared to B, or in the same manner to that of air rushing into a room on the opening of a window.

The air at B, being the heaviest in gravity, becomes the greatest motive power, producing a current down the pipe and out of the inlet A. Consequently in practice, when shafts are erected and the horizontal pipe not plugged with foul air, we have not only the whole of the sewer gas given off at the grating, but an additional current brought down from point B and rendered more or less foul by contact with pipe in its passage, and delivered in the street to increase the nuisance. Thus it will be seen at a glance that as long as the temperature at B is the lowest, the shaft only increases the evil.

Many persons attach great weight to the power (?) of ventilators fixed to the top of pipes with a view of averting the evil. This is an error. Supposing a ventilator were constructed capable of producing a current of 15 miles an hour, and fixed on the top of pipe B. This would add to the pressure at A 1·107lb. per square foot. Add this to the barometrical pressure, and compare it to the power given by the difference of temperature, and it will show the uselessness of either shafts or ventilators when applied to the ventilation of sewers. But the above case only refers to shafts attached to pipes having no water flowing through them; consequently their power is here calculated under the most favourable circumstances.

Fig. 3 will show the working of a shaft when attached to a sewer. In this case the inlet A is still at the ground level, and the outlet B 50ft. high, giving as before 1-20th of an inch barometrical pressure; but that part of the tube C is now formed by the sewer, which is, say, 10ft. below the surface of the ground. At whatever depth the sewer is from the street level, there is always a difference in the weight of air in the sewer to that of the street; therefore the air in sewer forms a mass of heavy gas. The rapidity with which this is removed depends upon the decreased heat at A and B. Thus, when the temperature of A is, say, 50°, B 50°, and E 61°, you have a rush of air up and down the ventilating shaft from A to B, and note that during the months when this is the case sickness is most prevalent. It will be thus seen that the rapidity with which the air is changed in the sewer depends not on the shaft, but on temperature. Thus, if shafts were removed you would have less sewer gas, less friction, and the sewer would be better ventilated. In addition to the above, there are other powers which many times outweigh the difference of temperature or pressure of atmosphere; but with these and the ventilation of house drains I will deal in another letter.—I am, &c.,

R. H. REEVES.

Cedardale, Putney, 18th July.

CHIPS.

The hospital at Beccles, Suffolk, is being renovated, and a new ward added, from plans prepared by Mr. C. Thwaites.

The new church at Ribbleton, Preston, which has been designed by Mr. R. Knill Freeman, of Manchester and Bolton, is about to be commenced. It will, when completed, contain about 350 sittings, and cost about £5,000.

The Corporation of Canterbury elected on Thursday Mr. Baker as city surveyor, in succession to the late Mr. J. G. Hall. Mr. Baker has been for nearly three years assistant borough surveyor of Leicester, and was formerly chief assistant engineer at Sheffield Waterworks.

A new organ, built by Messrs. Peter Conacher and Co., of Huddersfield, was opened on Wednesday week at the Congregational Church, Folkestone.

The new graving dock which has been for some time under consideration at Esquimalt, Victoria, British Columbia, was successfully opened on Saturday. The dock is of sufficient dimensions to dock most of the ships of H.M.'s navy. The caisson at the entrance is one of Mr. Kinipple's patented travelling and folding bridge caissons, which dispenses with the usual swing bridges, dock gates, and machinery for dock entrances. The works were designed and have been carried out by Mr. W. R. Kinipple, of Westminster, as chief engineer, Mr. W. Bennett acting as resident engineer.

The memorial stone of the parish schools of St. Michael and All Angels, Howe Bridge, Atherton, was laid on Saturday. The accommodation is for 450 children. The schools have been designed by Mr. Medland Taylor, of Manchester, and the work is being carried out under his superintendence by Mr. Holmes, of Wigan.

Memorial stones of a new Wesleyan chapel were laid at Horbury Junction, near Leeds, on Saturday. The chapel will be Early Decorated in style, will be built of stone with pitch-pine fittings, and will seat 260 persons.

Intercommunication.

QUESTIONS.

[9352.]—**Rainproof Colour Wash.**—Can Mr. William A. Gross, who replied to this question in the "B. N." of the 13th May last, or any of your readers, inform me where to get Morse's calcarium?—L.

[9353.]—**Land Surveying.**—Owing to a disputed charge, I should be glad of a reply to the following. What is a fair charge for surveying 3½ acres of land which, on account of its nature, took nine hours to measure, being obstructed and in long strips, and also calculating contents, making plan and two tracings?—JUVENIS.

[9354.]—**Gothic.**—I am desirous of studying Gothic architecture. Will any reader of the "B. N." kindly state from experience, in studying the same subject, what are the best books for learning same? For mouldings, is Paley's "Gothic Mouldings" to be relied upon?—STUDENT.

[9355.]—**Vanishing Point.**—Will some kind reader oblige me with the information as to whether there is any way of obtaining the inclination of lines that give the vanishing point in perspective views without having to draw every line to the V.P. itself? And if there is a way of obtaining such inclined lines, how will they (the vanishing lines) be measured for intermediate distances? Accept thanks in anticipation of reply.—S. E. C.

[9356.]—**Wood Staining.**—Which is the best way to stain and varnish deal church seats an oak colour? Considering both durability and appearance, would oil or water stain be best? What would be the requisite number of coats, and the order of their application in each case? I have specified some work (church seats) to be stained first with water-stain, and then twice sized, and afterwards twice varnished; but contractor proposes to size work first, then to stain with oil-stain, then size again, and afterwards twice varnish, which he says would be a better way.—YOUNG ARCHITECT.

[9357.]—**St. Paul's Cloisters.**—I shall feel obliged if some correspondent will give me the measurements—length and breadth in feet—of the cloisters at St. Paul's Cathedral, rediscovered by Mr. F. C. Penrose in 1878. I can find no particulars in Mr. Penrose's interesting paper on the cathedral, read before the R.I.B.A. in that year, nor in any of the late Rev. Mackenzie Walcott's papers, contributed to the BUILDING NEWS or separately published.—EAST ANGLIAN.

REPLIES.

[9310.]—**Half-Timbered Walls.**—I do not think this question has been correctly answered yet. The replies of Mr. Rumble and Mr. Thorneloe have thrown very little light on the subject. My experience teaches me, and I have been building half-timbered houses for the past 20 years, that brickwork is the best material for filling in, whether intended to show as brick panels, or plastered or tile hung. A brick wall is the same, whether it rises from a concrete foundation or whether it is built in the panels of a half-timbered house, and the damp is as likely to penetrate one as the other. If the panels are to be plastered, rake the joints of the brickwork and render with good Portland cement and sharp sand, and if you like the effect, "pebble dash" it. If on the other hand it is intended to "tile-hang" the panels (rather an unusual thing for panels), build in fixing pieces about 2ft apart, about 2in thick, 4½in wide, and about a foot or 15in. long. These "fixing pieces" may be placed upright in the brick panels and flush with them. On to these pieces nail the tile laths, and on these latter nail the tiles As regards the part of the question referring to thickness of timbers, I must confess I do not like Mr. Rumble's mode of doing it: it certainly is not "construction." My conception of a half-timbered building is one in which the timbers are framed together in so substantial and "workmanlike" a way that the whole fabric would stand, and the roof could be put on without the aid of any kind of filling-in. To effect this the timbers should be of scantlings somewhat as follows:—Heads, 11in by 6in.; sills, 11in. by 9in.; angle uprights, 9in. by 9in.; other uprights, braces, &c., 7in. by 6in. Of course, these sizes are meant simply to illustrate my idea of half-timbered construction, and the sizes would in execution vary to suit architectural requirements. With "half-timbering" put together with "stuff" as above, the filling-in of the panels is usually of brickwork 4½in. thick, set back 1½in. from face of timbers; or, in other words, the inside face of the filling-in is flush with back of timbers. A 2in. cavity is then formed, and another 4½in. wall (or, if expense is a secondary object, a 9in. wall) is built on the inside of house, the 4½in. filling-in, and the 4½in. inside really forming, with the 2in. cavity, an 11in. hollow wall. I have built several large houses on these principles, and have never heard any complaint about wet striking through.—JACK MORTISE.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—It is disappointing to find no further replies in to-day's issue (July 22) upon this subject. The explanations by "Rex" on p. 117, in addition to what he said on p. 40, do not alter my opinion (on p. 74) that the outlet ventilation of the church should be properly rectified as soon as convenient, whatever is done regarding inlet ventilation or heating. If "Rex" is correct that the openings in the false roof are really tightly closed up, the question as to what is the cause of the "down-draughts" is somewhat interesting. Before accepting the explanation given by "Rex" on p. 74, that the cold draughts are caused by the warm air from below rising up and displacing the cold at ceiling, I would like to be quite certain first that there are no other openings in or near ceiling or elsewhere by which cold air can blow in. If it is not cold air blowing in from somewhere, then we seem to be shut up to some such explanation as that given by "Rex," or that cold air in contact with a cold ceiling and windows produces the bad effect complained of.—W. P. BUCHAN.

[9346.]—**Green Timber.**—Timber of all kinds varies considerably in weight, and this is accounted for in a measure by the nature of the soil upon which it is grown. It is estimated that the average weights of English oak, ash, beech, and elm, after drying in the air from ten to twelve months, during which time they have lost 25 to 35 per cent. of their original weight, are, respectively, 45, 45 to 50, 43 to 53, and 35 to 50 pounds per cubic foot.—THOMAS POTTER.

[9349.]—**Concrete Floors.**—Lieut.-Col. Seddon, some years since, made a large number of tests of the strength of concrete floors, and with extraordinary results. A description of these and other experiments, with diagrams, may be found in the *Building World* for 1884.—THOMAS POTTER.

[9350.]—**Cheap Iron Roofs.**—"Examples of Iron Roofs," by Thomas Timmens, to be had of Batsford, 52, High Holborn, price 12s. 6d., will give the information "Perry" requires.—THOMAS POTTER.

CHIPS.

Messrs. Singer and Sons, of Frome, have designed and executed a mural brass monument for the chancel of St. Matthew's Church, Kingsdown, Bristol, as a memorial to the late J. B. Clifford, M.A. It is in bronze, the emblems of the Four Evangelists being at the corners, and the background being blue enamel. The border of the brass is of 15th-century design, with texts introduced as a part of the ornament.

The Duchess of Albany was present on Monday at Marlborough College, at the dedication of windows in the new chapel as memorials of the Duke of Albany, Dean Stanley, the third Marquess of Ailesbury, Bishop Hamilton of Salisbury, Mr. Robert Few, and Mr. F. Alleyn M'Geachy.

All Saints' Church, Leek, Staffordshire, which has been built from plans by Mr. R. Norman Shaw, R.A., was consecrated on Monday by the Bishop of Lichfield. The church seats 750 persons, and cost £9,000.

In 1872 there were only 2,069 works of art exhibited at the Salon, of which 1,530 were pictures proper, and 334 sculptures and medals, whereas this year of a total of 5,318, 3,563 were pictures, and 1,092 sculptures and medals. The highest numbers of works exhibited in the Champs Elysées of recent years were in 1880, when the total was 7,259, comprising 5,042 pictures and 731 sculptures and medals. The grand total of works of all kinds exhibited in the Salons since 1872 is 74,408, including 54,147 pictures. It is calculated that they would cover 150,000 *mètres carrés*.

An oak pulpit, designed and carved by Mr. Kendall, of Warwick, at a cost of over £120, has been added to the chapel of Malvern College, and was used for the first time on Sunday.

New public brine and fresh-water baths at Winsford, designed by Mr. Phipps, and erected at the cost of Messrs. Verdin, were opened by Lord Cross on Wednesday week.

Among the receiving orders in bankruptcy announced in Tuesday's *London Gazette* is that of Charles James Chirney Pawley, Moorgate-street and Sydenham, architect and surveyor.

The Sheriff of Newcastle-on-Tyne formally opened on Monday a new Victoria Jubilee Board School, which is situated in Urwin-road, Byker, Newcastle. The building is in the Tudor style, and has been built from designs by Mr. Robert J. Thompson, the contractor for the work being Mr. Taylor, of Benfieldside. On the ground floor there are infant school, two classrooms, a committee room, hat and cloak room, and offices. On the first floor there are a mixed schoolroom and six classrooms. There is accommodation for 1,000 children. The total cost is estimated at £7,760.

Thursday, November 3, has been fixed for the consecration of Truro Cathedral. The Prince of Wales, who laid the foundation stone of the cathedral, will be present at the ceremony, which will, it is expected, be performed by the Archbishop of Canterbury.

The British exhibitors at the Adelaide Jubilee Exhibition presented to Sir Herbert Sandford on Monday the oil painting, "The Old, Old Story," by Frith, in token of their appreciation of his services in their behalf.

New board schools for 350 children are about to be built at the new steam-packet station at Parkeston, in Harwich Harbour. Mr. H. A. Worste Reeves, of London, is the architect.

For the erection of the new Hartley Memorial wing at the Sunderland infirmary, of which Mr. J. Eltringham, of that town, is the architect, the tender of Messrs. G. and H. Hildrey, Grange Yard Works, Sunderland, has been accepted at £9,999.

On Saturday last the chancel of St. Philip's Church, Camberwell, was reopened, after restoration and decoration, from the designs, and under the superintendence, of Mr. H. P. Burke-Downing, architect. The figure subjects have all been painted by hand, and the general tone of colour adopted is most satisfactory. Under the north chancel arch some interesting 13th-century work has been introduced, copied in *fac-simile* by the architect from a now desecrated portion of a church of this period.

STATUES, MEMORIALS, &c.

BATH.—A Jubilee bust of her Majesty has been placed in a niche at the new Pump-room, with the inscription beneath, "Victoria D.G. Brit: Reg: Imp: F.D. MDCCCLXXXVII.," the gift of Major Davis, city architect. It has been executed by Mr. R. L. Boulton, sculptor, of Cheltenham. The carvings on the same building were also executed under the care of the same sculptor, by orders of the architect, and amongst them are the restoration of the bronze head of Minerva (preserved in the institution), with the addition of a laurel wreath which it is believed crowned the head. Near this is the head of Hygeia, and another of Minerva as ordinarily represented. The carved consoles represent emblematically the winds as they were idealised by the Greeks, heads emblematical of the Creation, Divisions of the Earth, and Seasons. These consoles are thus intended to represent allegorically the universal benefit of the waters to mankind.

KINGHORN, N.B.—The memorial of King Alexander III. was unveiled, and the new public park opened, by the Earl of Elgin on Tuesday week. The memorial, which has been erected at a cost of £300, takes the form of a shaft over 11ft. in height, slightly tapered square on plan, each face being about 21in. broad. Upon each angle is a roll moulding, treated as minor attached shafts, with moulded capitals and bases, while midway in the height is a moulded band. The shaft is set upon two tiers of pedestals, the lower of which is 4ft. 6in. square on plan, the whole rising from a moulded and splayed base course. The main front of the pedestal is relieved with a slightly recessed panel, on which is the following inscription:—"To the illustrious Alexander III., the last of Scotland's Celtic Kings, who was accidentally killed near this spot, March 19, 1286. Erected on the sexcentenary of his death." A deeply-splayed and moulded intake course divides the lower from the upper pedestal, the latter being also panelled with roll moulding on sides and top, rising from a splayed sill. The front panel is enriched with a bas-relief in bronze by Mr. John Rhind, sculptor, of Edinburgh, representing King Alexander surrounded by his courtiers, hearing the pleadings of some of the peasantry during one of the Circuit Court assemblies. The upper moulding of the panel is stepped in the centre, forming a minor panel above on each side of the pedestal. In each of these minor panels are shields. The top of the shaft is finished with a cornice moulding, and a foliated cross terminates the whole at an altitude of 28ft. above the rock base upon which the memorial is founded. The entire structure is of Peterhead granite, from designs by Mr. Hippolyte J. Blanc, architect, Edinburgh.

CHIPS.

A shocking accident occurred on Tuesday at the works of Messrs. Land and Nettleton, joiners and builders, Dewsbury-road, Ossett. One of the partners, Mr. Joseph Clegg Land, was using a steam boring-machine to bore a number of holes in a 3in. plank, intended for the false bottom of a dye vat. When the bit of the machine pierced the wood, Mr. Land slipped, and he fell forward. The bit instantly entered his body, inflicting fatal injuries before he could be extricated. Mr. Land, who was about 35 years of age, was well known in many of the neighbouring towns, where his firm does an extensive business.

Mr. A. C. Carlyle (late of the Archæological Survey of India) is exhibiting at the Albert Hall a comprehensive collection made by himself, of antiquities, mostly archaic, illustrating the earliest arts of man in the pre-historic Stone age, with other objects pertaining to a later period.

Mr. Broadhurst is asking for a return intended to show that the danger to human life has greatly increased with the increased use of machinery in the joinery trade, and that better methods are needed for protecting workmen in that trade from injury.

Extensive additions are about to be made to the Bethnal-green Workhouse schools at Leytonstone, including large dining-hall, kitchen, and sculleries, baths, stores, workshops, and clothing stores. Messrs. A. and C. Harston are the architects.

The Elephant and Castle horse repository in New Kent-road, S.E., close to Newington Butts, is about to be rebuilt. Messrs. Inkpen and Stallard, of Southsea, Chichester, and Havant, are the architects; and the contract for the first section of the works has been taken at £4,423, by Messrs. W. and F. Croaker, of Hackney.

The local board of Fenton, Staffs, decided on Tuesday to pay the surveyor, Mr. S. A. Goodall, a gratuity of £100 in acknowledgment of extra services in preparing plans and laying out the cemetery, and in carrying out the sewerage of the district.

WATER SUPPLY AND SANITARY MATTERS.

ABBOT'S LANGLEY.—A new system of water supply has just been carried out in this village under the superintendence of Mr. A. F. Phillips, C.E. of St. Albans. A boring was made at Hunton Bridge to a depth of 150ft., with 120ft. of steel tubing, 6in. in diameter, and 30ft. below that depth in the chalk without tubing. Two "Otto" gas-engines were erected, of six horse power each, with two sets of two-throw pumps, capable of delivering 4,000 gals. per hour each. The main water pipe is 5in. in diameter, and about 3,730yds. long. The reservoir is situated near Cecil Lodge, is of brick-work, arched, and covered in. It will contain 7,005 gals. of water, and stands 215ft. above the pumps. For the high service the water is raised 50ft. above the reservoir. At present, one engine is sufficient to do the work, pumping above 15,000 gals. of water per day.

AYR.—The first inspection of Ayr new water-works was made last week by the magistrates and town council of Ayr. Loch Finlas, the source of the new supply, is a mountain tarn, about 800ft. above the level of the sea. It is surrounded by pastoral land. The outlet of the loch is into the Doon, and the council must give compensation to the Doon millowners by sending down the burn daily 250,000 gallons of water. The old water-works, which are still to be maintained, gave a supply daily of about 800,000 gallons of water. By the new scheme, the supply will be from one and a half to two million gallons daily. The water limits embrace a population of 26,000, but the supply is adequate for 10,000 more. From the loch the party drove to Knockjarder, where the filters are placed. These overlook the village of Dalrymple, at a height of 200ft. above sea level. From the filters the water flows into two wells, of 100ft. diameter and 17ft. deep each, and from these into the valve well through pipes of 18in. From Knockjarder to Ayr is a distance of about eight miles; the new pipes are joined to the old ones at Barrhill. The cost of the scheme, which has been carried out under the direction of Mr. Mercer, surveyor to the town council, is about £50,000.

CODNOR AND LOSCOE SEWERAGE.—The Basford guardians proposed to carry out a system of sewerage and sewage disposal for this parish, which is in their union; but the scheme has met with opposition from the parishioners, who considered it too expensive, and objected that it did not deal with the whole district. The guardians have therefore, with the consent of the Local Government Board, agreed to delay further proceedings until the parishioners have time to present an alternative scheme for their consideration. The parishioners have requested Mr. W. H. Radford, C.E., of Nottingham, to report whether a more economical plan can be devised, and, if so, to prepare an alternative scheme.

CRAIL WATER WORKS.—This scheme consists in abstracting a portion of the Lochton Burn above Toldrie, and conveying it, by a fireclay pipe 10 inches in diameter and 1,920 yards in length, to filters and a service reservoir to be constructed on the town's land near Ribbonfield. The water of a spring entering the burn about 680 yards from the filters is also to be intercepted and taken into the reservoir. The filters will be two in number, 15 feet by 14 feet, each in area, and capable of passing a supply of 21,000 gallons per day. The service reservoir is to be 30 feet by 14 feet and 10 feet deep, holding 25,425 gallons. It will be covered with a galvanised wrought-iron roof. The medium of filtration is sand, which is laid on in layers—commencing at the top, 18 inches of fine sand, 3 inches of gravel about the size of peas, 3 inches of gravel about the size of hazel nuts, and, finally, ending with 15 inches of broken metal, in which the drain pipes leading away the filtered water to the service reservoir are laid. The main pipe to the town is 4 inches in diameter and 2,100 yards long. There are 1,800 yards of distributing pipes, and a number of street wells will be erected throughout the town. The engineers are Messrs. J. and A. Leslie and Reid, C.E.'s, and the contractor is Mr. R. B. Steuart. The works will be commenced immediately.

LIMPSFIELD AND OXTED WATER COMPANY.—The works of the above company will be opened to-day (Friday). Although the works are small, they are interesting from the fact that the pumping machinery is worked by water power, and is the first of the kind erected in this country. Mr. W. Barns Kinsey, M.Inst.C.E., F.G.S., is the engineer.

THE VYRNWY SCHEME FOR LIVERPOOL.—The town clerk of Liverpool has been authorised by the Water Committee of that city to retain counsel to appear before the arbitrator in the claim of Mr. Hawksley against the Corporation with regard to his services in connection with the Vyrnwy scheme. The appointment of Sir J. W Bazalgette "as the one hydraulic engineer to determine the plans of the works and apparatus for measuring the Vyrnwy compensation water, about which the engineers of the Corporation and the Severn Commissioners have failed to agree," has also been approved by the committee.

LEGAL INTELLIGENCE.

A BOGUS SANITARY PROTECTION ASSOCIATION.—At the Manchester assizes, on Friday, before Mr. Justice Smith, Thomas Smith Bright was charged with having obtained money by false pretences at Preston. In April last the prisoner established himself at Preston. He called on Mr. Wilding, plumber, of Lune-street, and stated that he was engaged in forming a sanitary protection association, and that he was supported by various medical men in the town. The association would have a good deal of plumbers' work to dispose of, and if Mr. Wilding would pay a life subscription of five guineas that work would be given to him. Similar representations were made to another plumber, named Jolly, and in each instance the five guineas were paid. No such association was formed, and the plumbers got no work in return for their five guineas.—Dr. Pilkington, medical officer for Preston, said he consented to join the proposed association, but did not, as was represented, refer the prisoner to any plumbers. It was stated that the prisoner had carried on similar operations at Barrow, Lytham, Warrington, Blackburn, Wigan, and Swansea, and that he had received in the latter towns at least £600, for which no consideration was given. He was found guilty, and the judge, describing him as a pernicious and dangerous member of society, sent him to prison for 15 months with hard labour.

IN RE CHARLES GRIBBLE.—The bankrupt applied to pass his examination before Mr. Registrar Brougham on Friday. He was described as of Vauxhall-cross, importer of doors, mouldings, and trellis-work, lately trading with Arthur W. Peaty, and his unsecured liabilities were returned at £5,153, with assets £3,502. The bankrupt was formerly manager to Messrs. Esdaile and Co., to whom the business formerly belonged, and in February, 1882, having no capital of his own, he agreed to purchase the stock-in-trade for £2,811, Esdaile and Co. continuing to supply goods. Mr. Peaty (Esdaile and Co.) joined him in the business, bringing in £1,000, upon which he was to receive interest and also two-thirds of the profits, but Mr. Peaty stated that he was not a partner. The bankrupt passed his examination without opposition.

IN RE W. LANGLEY AND SON.—The debtors, trading as brick merchants at Plaistow, have filed their petition, and upon the application of Messrs. Thomson and Ward, the usual receiving order was made by Mr. Registrar Hazlitt on Monday. The liabilities are believed to be considerable.

CHIPS.

The old colours of the 38th Regiment, now the 1st Battalion South Staffordshire Regiment, which were carried through the Crimea, Indian Mutiny, and Egypt (1882-5), were on Tuesday deposited in Lichfield Cathedral. The flags were much dilapidated, having been in use for 48 years.

A new public hall is about to be built at Isleworth, from plans by Mr. S. Woodbridge, jun., of Brentford.

A new hotel, to be known as the Creg Malin, has just been opened at Peel, Isle of Man. The external elevations are a departure from the stereotyped stucco met with everywhere in the island. They are faced with Ruabon bricks and cream-coloured bricks, and a new artificial stone similar in colour to the Ruabon bricks is employed for dressings. The oriel windows at each angle of the front portion of the building are carried up above the main roof to form turrets, and have battlemented parapets. Messrs. Mangnall and Littlewoods, of Manchester, were the architects, and the Executors of the late William Gradwell, of Barrow-in-Furness, the contractors.

The Select Committee of the House of Commons on Forestry will report next week. It is understood that the committee are in favour of the establishment of a board of forestry, which should consider how best to utilise existing facilities for instruction in forestry. It is believed also that the committee will recommend that parts of the west coast of Ireland and the highlands of Scotland be extensively planted with trees.

Larbert parish church was reopened on Sunday. An organ has been built by Messrs. Wilkinson and Sons, of Kendal. The whole church has been re-seated and panelled in solid oak by the Bennet Furnishing Co., of London and Glasgow, who have also furnished a carved pulpit and screen for the organ, both in oak, from the designs of Mr. John M'Laren, Larbert. The congregation have expended upwards of £1,700 in carrying out this work.

Our Office Table.

ON Friday last a number of gentlemen assembled at the invitation of Mr. Edward Terry and Mr. Walter Emden, M.S.A., the architect of Mr. Edward Terry's new theatre, fully described on page 161, to witness the special precautions made to prevent the chance of a damaging and dangerous outbreak of fire in the building. A thorough system of hydrants in the best available position will be placed both before and behind the scenes, while the whole of the stage and flies both above and below are dominated also with a system of sprinklers, which are commanded by valves at the stage door. The proceedings on Friday consisted of the extinction of a fire, which was built up on the stage, and allowed to attain considerable proportions before the water arrangements were brought into requisition.

ACCORDING to a writer in *Le Figaro*, the French Government has always been more liberal in the distribution of the Legion of Honour towards painters and architects than to musicians. At the present time the number of members of the several professions in France entitled to wear the riband of the Legion is: Painters, 202; architects, 105; sculptors, 83; musicians, 60; and engravers, 29. Although such "honours" are not worth much, it is noteworthy that art in all its branches is thus far more lavishly recognised by distinction of this kind in France than by our own Government, which even on the occasion of a Jubilee does not find a single architect or other artist whom it delights to honour—possibly because our professional men do not dabble sufficiently often in politics to stir the memories of the wire-pullers who control these distributions.

MR. WILLIAM WOODWARD, in a letter to the *Times*, vigorously attacks Mr. Butterfield's proposal to reduce the width of the portico of St. Martin's-in-the-Fields Church, as a solution of the difficulty of widening the bottle-neck of Charing Cross-road. He says that the lessening of the projection of the portico would destroy the very element of its success, as the eye would thereby be the more easily led to the weighty tower and steeple, which appear to spring directly from the porch roof. He asserts that the ever-increasing traffic at this corner necessitates some setting back of the pavement, and proposes to do away with the church steps altogether, and to erect a podium or continuous plinth under the portico. Mr. E. J. Tarver suggests that a simple remedy would be to narrow the platform midway up the flight of steps to the average width of a step, and so provide an additional line of wheel traffic at the cost of taking up and relaying half a dozen steps. Mr. Butterfield protests against the strong language used by Mr. Woodward, and especially against the charge of "barbarism," adding, with an assumption of ignorance which is amusing if genuine, "I do not know whether Mr. Woodward is an architect. His readiness to leave 'the public to decide' such a question makes me hope that he is not." Having been directly challenged by Mr. Woodward, the Secretary of the Society for the Protection of Ancient Buildings comes forward with a tardy and somewhat tame deprecation of the proposed alterations, proposing instead that the National Gallery railings and steps should be set back.

BY the death on Wednesday week, at the age of 84 years, of Miss Margaret Gillies, A.R.W.S., the oldest of British lady artists has passed away. At the age of 20 Miss Gillies removed from Edinburgh to London, having determined to take the courageous step of becoming a professional artist. Learning her art, and working at the same time, she began to maintain herself by painting portraits in miniature, and for many years contributed to the annual exhibition of the Academy. Among her portraits were those of Wordsworth, Charles Dickens, and Mrs. Marsh. For nearly five-and-thirty years she has been an Associate of the "Old," now the Royal Society of Painters in Water Colours, and in the present exhibition is to be seen the drawing which she intended to be her last work—"Christiana by the River of Life."

THE summer exhibition of the Royal Scottish Academy, just open, is, like the display of last

year, restricted to water-colours, drawings in black and white, etchings, and a few pieces of sculpture. The total number of subjects in the present exhibition is 852, of which the great majority are by Scottish artists. The president, Sir W. Fettes Douglas, exhibits seven drawings in water-colour, and among other artists who exhibit may be mentioned W. E. Lockhart, Sir Noel Paton, Waller Paton, R. Herdman, Gourlay Steell, and John Smart. The best etchings are those by W. B. Hole and Otto Leyde, the latter also showing several full-lengths of children. The works by deceased artists include three English landscapes by Turner, and other drawings by David Cox, Robert Thorburn, G. P. Chalmers, Sam Bough, and E. F. Crawford.

THE electric light has, so far, failed to fulfil its early promise. Meanwhile gas has fairly held its own, and the Welsbach Incandescent Gas-Light comes upon the scene as a powerful auxiliary of the old and familiar illuminant. Many successful installations have been made by the Incandescent Gas-Light Company, amongst which some of the most conspicuous in public places are those at Willis's Rooms, Madame Tussaud's, the Gaiety, Lyceum, and Covent Garden Theatres, the Café Royal, and the Hôtel Continental. Amongst leading West-end clubs, where it is in contemplation to adopt the system, the preliminary installations having given the greatest satisfaction, may be mentioned the Travellers, the United Service, the East India United Service, the Whitehall, the Junior Athenæum, and the Junior Army and Navy. The Welsbach Incandescent Gas-Light has attracted a great deal of attention from the medical profession, not only on account of the beauty and steadiness of the light emitted, equal, with a very small consumption of gas, to a 20-candle incandescent electric lamp, but also on account of the entire absence of the deleterious products of combustion; and by invitation of the Council of the Royal College of Physicians, the light was exhibited at the hall of the college on the occasion of a conversazione held on 29th ult., where it attracted universal admiration. In the *Revue d'Hygiène* of 20th June, Dr. Galezowski, the eminent Parisian oculist, has written an article on various systems of illumination, in which he assigns the highest place to the Welsbach incandescent system of gas-lighting.

MR. JOHN DAWSON, an architect and journalist, makes the practical suggestion, based on personal experiences, that the surface of the walls, floors, and even the ceilings of police and prison cells should be composed of glazed tiles or glazed bricks, set in the best cement. This would allow of little or no lodgment of dust and vermin, and render the daily mopping out of the cells a perfectly easy and effectual process. He further suggests that it would be better if the benches of the cells were not fixtures, so that they could be daily carried into the yard and thoroughly cleansed.

THE Corporation of Liverpool have arranged for the delivery of a course of at least eight lectures on health in the Picton Lecture Hall in that city during the coming autumn, under the auspices of the Corporation. Eight professors of University College, Liverpool, have promised to give a lecture in this course, which will deal with houses, sanitation, drainage, and food. Like all the lectures given by the Corporation in the same hall, they will be free to the public, and are specially intended for the working classes. A good feature of the scheme is that it is intended to publish a *résumé* of each lecture in pamphlet form, to be sold at the smallest possible cost, in all likelihood one halfpenny each, so that the influence of the course may not be confined simply to the audience. The lectures will probably be given in November.

PODMORE'S "Patent Sash-Fastener," which is now being introduced, seeems an effective one, and has one new feature, inasmuch as by turning a screw it tightens up both sashes. The shoot is held back by a stop bolt, which rises when the front sash is lifted or the back sash lowered. The self-acting form is actuated by a spring, about the duration of which we are doubtful. The non-self-actor is of equal use in preventing the rattling of windows through the turning of the thumbscrew. When in working the thumbscrew must be turned back as far as it will go, and the shoot pushed into its case, then a half turn of the screw sends the end of it into a countersink, which holds it in its place. A slight turn of the screw releases the shoot and fastens the window.

IN order to promote efficiency on the part of carpenters, joiners, builders' foremen, and clerks of works, the Worshipful Company of Carpenters propose to hold examinations in their Hall and at their Technical Institute at Stratford, and to grant to candidates certificates of their theoretical and practical acquaintance with their craft. The first examination will take place in June, 1888, and full particulars, with specimen of examination papers, can be obtained at Carpenters' Hall, London Wall, E.C.

THE exhibition of the works submitted in the National competition by the Schools of Art throughout the kingdom was open to the public yesterday (Thursday), in the North Court of the South Kensington Museum, and will remain open until the beginning of September. The free days are Mondays, Tuesdays, and Saturdays. This year about 465 works have been selected for exhibition, being those to which prizes have been awarded, out of nearly 365,000 works sent up from 2,347 schools of art and classes for the annual examination at South Kensington. The subjects of the competition are figure drawing and modelling, painting in oil and water colours, and design, especially as applied to manufactures. The prizes awarded are 7 gold medals, 54 silver medals, 112 bronze medals, and 210 National book prizes. In addition, honorary awards have been made to students in the training class of 5 gold medals, 19 silver medals, 25 bronze medals, and 33 National book prizes. Besides the medals and prizes awarded by the Department of Science and Art, the Princess of Wales gives two scholarships, value £25 and £11 respectively; the Plasterers' Company prizes for designs for plasterers' work, drawn in chalk or pencil, or modelled in plaster; and the Society of Arts the Owen Jones Memorial prizes for designs. The following gentlemen have acted as the examiners:—Mr. E. J. Poynter, R.A.; Mr. G. D. Leslie, R.A.; Mr. W. F. Yeames, R.A.; Mr. H. S. Marks, R.A.; Mr. H. H. Armstead, R.A.; Mr. Hamo Thornycroft, A.R.A.; Prof. George Aitchison, A.R.A., F.R.I.B.A.; Mr. W. Morris, Mr. J. J. Stevenson, Prof. W. C. Unwin, Mr. Walter Crane, Mr. Alan Cole, Mr. Armstrong, Director for Art, and Mr. Bowler, Assistant Director for Art.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Society of Architects. Visit to Terry's new theatre, Savoy-buildings, Strand, conducted by the architect, Walter Emden, M.S.A. 2.30 p.m.

Architectural Association. Visit to the following churches at Streatham:—St. Peter's, G. H. Fellowes Prynne, architect; St. Andrew's, Ernest George and Peto, architects; and St. Alban's, E. H. Martineau, architect. Trains from Victoria to Streatham-hill 2.20 p.m., and from London-bridge at 2.25 p.m.

A new pulpit of marble and alabaster is about to be placed in Harlow parish church, Essex. The designs have been prepared by Mr. C. S. Adye, M.S.A., of Bradford-on-Avon.

The tender of Mr. J. Martin, of Eastbourne, has been accepted at £5,982 for the erection of the proposed new infirmary in that town. Mr. F. G. Cooke, of Eastbourne, is the architect.

A full-length marble statue of the Queen, erected at Reading, was unveiled by the Duke of Cambridge on Wednesday. It has been executed by Mr. George Simmonds, who also designed the monster lion in the Forbury of that town, commemorating the Berkshire heroes who died at Maiwand.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Shop Fitter, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ALCOMBE.—For building new dwelling-house. Mr. C. H. Samson, F.R.I.B.A., Taunton, architect:—

Rendell and Son	£2,505	0	0
Verrier	2,450	0	0
Templeman	2,360	0	0
Pittard	2,205	0	0
Langdon, Minehead (accepted) ...	2093	11	0

ALCOMBE.—For building new stables. Mr. C. H. Samson, F.R.I.B.A., Taunton, architect:—

Langdon (accepted)	£353	0	0

ANDOVER.—For mansion and offices, Enham-place, near Andover. Mr. S. Knight, F.R.I.B.A., architect. Quantities supplied by Messrs. Stone and Sons:—

Luscombe and Son, Exeter... ...	£7,800	0	0
Bird, London	7,525	0	0
Estcourt, Gloucester...	7,431	0	0
Grover and Son, Islington... ...	7,088	0	0
Stephens, Bastow, and Co., Bristol*	6,849	0	0
Beale, Andover	6,528	0	0

* Accepted.

AVONMOUTH.—For gasfittings in connection with a shed at Avonmouth, for the Bristol Docks Committee:—

Scull, G., and Co., Clifton	£143	16	0
Williams, A. G., and Co.	112	19	8
Edbrooke, M. L.	109	2	4
Leary, J. S.	106	11	4
Norman, H. G....	94	10	6
Dawson, R., and Co., Stalybridge ...	93	0	0
Parry, J. C.	91	4	6
Chivers and Son, Bedminster ...	87	1	0
Wilkins, R., and Sons...	85	6	6
Harris, T.	81	0	0
Edbrooke, T. and R.	80	0	0
Wilkins, J.	77	10	0
Jones and Hudson	69	14	10
Guernsey, C. E. (accepted)	67	10	7

(Rest of Bristol.)

BERMONDSEY, S.E.—For painting the town hall, for the vestry:—

Harrison and Spooner...	£977	0	0
Batley	948	0	0
Giles and Co.	734	10	0
Baker	673	0	0
Bargeman and Sons	624	0	0
Dudley, W., New Southgate, N.* ...	470	9	5

* Accepted.

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THE EMPHASIS OF STRUCTURE.

WHEN reasons are given for disposing materials in particular forms, for distributing windows and piers, for marking horizontal divisions, and for designing certain features and ornamental accessories of buildings, we may conclude that we have reached a stage of national architecture and have passed beyond the reproductive and imitational era. For a long time English architecture has been in the throes of this critical stage. Amateurs and architects have talked themselves dumb about the claims of Greek or Gothic to be considered a truthful exponent of national wants and materials; homilies on falsehood of construction, the morality of art, the terms *pseudo* and *quasi* have been flung by Mediævalist and Classicist against each other reproachfully, and all this controversy and wordy wrangling has ended in a sort of reconciliation of the claims of both kinds of art. A stage has been reached in which both sides have begun to think for themselves, and to admit that each was in fault in not making the essentials of building the primary consideration; in reviling one another for what each was guilty of, and in discovering after all that even the tirade against "shams" and counterfeits may be carried to a ridiculous extent, and would logically lead us to regard the material texture of higher importance than form, and the structural skeleton as the only logical development of architecture. The "muscular" type of architecture has long since lost its hold of the public, in spite of those enthusiasts who maintained that every room and floor ought to be made visible, every step indicated, every joint and nail exhibited in the external architecture. They were on a par with those morbidly inclined painters of the human figure who sought to delineate the bones and muscles, and to give us the ideal of asceticism, rather than natural beauty of the human form divine.

This ultra-structural idea of architecture, however, was a healthful reaction from a weak dilettantism. Too little had been thought of structure, and a great deal too much of mere style. Of late years, architects have learned to observe a happy medium between structure and ornamentation. America, which has been following the steps of the mother country, is already entering upon this stage of development. The materials and structural types of the old land has been long imitated in wood, and even in metal, monumental forms have been copied which were designed for stone and brick, till the *raison d'être* of design was almost lost. A change is rapidly taking place: we now see buildings which vie with those of the old country, an architectural prescience is noticeable, and much of the change is due to the influence of the works of the late Mr. H. H. Richardson, and to other well-known architects of the States. The connection between structure and architecture is one that must force itself upon architects of even that free and practical people, and the Illinois State Association of Architects have made it a topic in a recent symposium. The question proposed was "To what extent is it necessary in design to emphasise the essentially structural elements of a building?" Now, it is obvious the structural elements of buildings vary much — a simple monument or memorial would require only stability and protection against the external forces of the atmosphere—a tower and spire of a church, for instance. A building destined for Divine worship might have less marked structural elements than a factory or a house; in short, these elements would become more prominent in proportion to the simplicity and cheapness of the building. These are obvious truths. To refer to the essays of those who undertook a solution of the question, Mr. William W. Clay, who read the opening paper, dealt with the limitations to be observed in an exposition of truthfulness in construction. Mr. Clay considers first a misrepresentation of materials, and, secondly, a denial of true construction. He endeavours to answer the question, "To what extent, and with a hope of what advantage to itself or us, shall it be permitted to conceal the truth or formulate a falsehood?" When the falsehood is resorted to to avoid penalty and the disadvantages which follow a disclosure, there is nothing to commend it; but, on the other hand, when disguise has been prompted from the benefits to be derived from it, when the end is made to justify the means, the excuse or incentive opens a field at least for discussion. In brief, Mr. Clay holds, upon the ground that falsehood is a freak of selfishness, there is nothing but condemnation for the act; but upon the ground that beauty, however false, becomes an instructor in form and in colour, so that the form and detail are good, the selfishness is turned to sacrifice, and the means are justified. In other words, when an iron girder is hidden or partially concealed to obtain an agreeable form for the eye, the counterfeit is justified; but only so far as the assumed form and detail are expressive of the purpose and otherwise truthful. In general the author observes "that the emphasis placed upon the essentially structural elements of a building should be at least a polite acknowledgment of their several and individual existences." A girder may be hidden altogether from view, or so disguised as to make it appear an arch, or something different to what it is. There is less to be said for the means when the falsehood becomes more deliberate when the endeavour is to misrepresent the real construction to the spectator. The next essayist, Mr. Frederick Baumann, agrees with the doctrine that giving "grace of form and beautiful enrichment to structural elements" is commendable; but he does not believe in the necessity of giving an express emphasis to structure, but rather a harmony between structure and expression. This author classifies buildings according to their uses, and so far appears to discuss the question on a practical basis. He first takes manufacturing buildings. Wealth prompts builders to consider two points, an educational and an advertising one. With buildings of this class there is naturally a tendency to show all and every material in its appropriate mass, form, and colour; everything contrary to constructive use is prohibited. Ornamentation is confined to construction. The "store building," or, as we should say, mercantile class of buildings, are taken next. The logical treatment is still permissible. Office buildings, tenement buildings, houses, &c., allow of a freer and more artistic treatment. The fourth class, or auditory buildings, comprising the foremost and highest order of structures, is one taxing the architect's imagination most severely. The last class includes all residences—the most numerous and varied class; the architect is here free to exercise his powers. The author submits that the architecture of this class ought to hold a connection with the surroundings, as was the case during the 17th and 18th centuries in Great Britain. Urban residences demand stateliness and order; the suburban may be more freely treated; but the country residence is not bound to urban regularity and correspondence, while the landscape calls for consideration in the planning and architecture. It is the broadest field for a gifted architect. The other contributors to this symposium view the question with less regard for structural truth. One of these, C. M. Palmer, says: "Art has to do with the pleasing, the fanciful, the artificial. She delights in mimicry and fictions." The writer clearly is one amongst those who thinks good architecture ought not to take a too serious view of structure, and that the architect should accept the privileges of other artists. He is not called upon to make a skeleton of his creation. Innocent deception may be resorted to according to their ideal.

There will always be two opposite views of art—one, that of giving a license to the imagination and freedom to the fancy; the other, that of curbing it and making the structure of prominent importance—of rendering technical expressions of facts. In landscape painting and, indeed, other kinds of painting and sculpture, artists are found who adopt one or other of these views of the mission of art. There are those who laboriously and patiently render every leaf and tuft, every wrinkle and defect, they believe that the right duty of the painter is to render nature with a microscopical eye. Minuteness and laboured detail are aimed at; others endeavour only to give us the general impressions of nature, they sketch broadly by abstractions of line and colour the natural effects of distance, of texture and colour. So amongst architects, some would give us skeletons of structure, others would clothe the skeleton in the lineaments of beauty or of mere fancy. And, after all said, it is impossible to lay down any strict rule or to draw the line of demarcation between structural and artistic expression. Every building must, and ought to, evolve a law of its own. There must be a law of differentiation to be observed arising out of plan, material, structural arrangement, destination, and cost. It is as decidedly wrong to fall into mere caprice and licence as to express crudely the mere mechanical structure. It is decidedly wrong to mask one material by another in order to make people believe the structure is of marble when it is really of iron; to veneer a girder or beam with slabs of marble or imitational painting with intent to deceive the eye, to make a chimney appear a turret, or to exhibit an arch, when really the weight is carried by a beam, and there is no palpable abutment for the arch. There is no excuse for telling so direct a falsehood; there is a violation of truth in all such expedients. On the other hand, to encase an iron column by concrete, or cement, or faïence in such a manner as to emphasise its office as a support, or to clothe an iron girder in plaster or pottery without an attempt to make it appear something else than it really is, to ceil a timber roof by a plaster vault, to plaster or veneer a rough brick wall, are within the legitimate functions of art, and are sanctioned by everything of beauty in nature.

The upshot of all this is that whenever the attempt is made to conceal with an intent to defraud the eye, or whenever the structure is so falsified that the parts of it deny one another, there is a violation of truth for which there is not the slightest justification or excuse whatever. There are hundreds of things done by builders which cannot be justified by any pretence for the higher sanctions of art; they do not express the structure—they are, in fact, invented to contradict it and bewilder the mind, thinking this the acme of artistic skill. What a miserable delusion and snare! If we do not emphasise, let us never falsify by contradicting that natural expression which is the highest object of the architect's art. Let us improve, clothe, and beautify by every way within our power; but let this be done sympathetically, never in violence of, or contradiction to, the structure, always conscientiously and in harmony with it and the materials employed.

NATIONAL COMPETITION OF SCHOOLS OF ART PRIZE DRAWINGS.

OUT of a number of 364,986 drawings submitted from schools of art throughout the kingdom, 2,127 have been selected for National Competition. These drawings are now on view on screens in the South Kensington Museum. Seven gold medals have been awarded; these are taken by the following schools: — Hanley, Hertford, Macclesfield, South Kensington, Stoke-on-Trent, West London, and Westminster. The 54 silver medals have been chiefly awarded to students at Birmingham, Cork, Manchester, South Kensington, West London, and Lambeth. No less than 14 of them go to the Manchester schools. In addition, 112 bronze medals and 210 book prizes have been distributed. Confining our attention chiefly to the designs and drawings of architectural subjects included in stages 23*a*, 23*b*, and 23*c*, it is gratifying to have to notice the improved character of the works. The design for a cathedral by James H. Tonge, Barrow-in-Furness, for which a silver medal is awarded, is a favourable advance upon former designs of this class. The author exhibits knowledge of detail without sacrificing breadth. Though a Late Decorated style is chosen, there is no want of dignified grouping. The towers at the west end are plainly and broadly treated, and are surmounted by low spires of timber; the centre tower is similar. A pleasing variation in the window heads is made in the choir: these are square, under flat, segmental arches, the traceried windows of clerestory show variety of design; the vaulting of nave and choir is sustained by flying buttresses. The cross section indicates detail of a refined character and feeling. No plan is hung. Alonzo P. Widlake, Bristol, takes a bronze medal for the same subject; the work, however, is marked by certain faults, amongst them being the ill-proportioned western towers and spires, and a very pretentious study of details, which are mechanical in effect; though the execution (in firm, ink lines) is deserving of recognition. A Nottingham student, E. H. Palmer, wins the same prize for a design of a church, the meritorious feature of which is the upper stage of the tower at the west end crowned by a low spire. The plan has an apsidal east end with transepts. Though the apse is narrower than nave, the roof is shown level throughout. A hardness of effect is given to the drawings by the very objectionable backlining. Another design by John F. Wilkinson, Kendal (book prize), is not happy in the proportions. A book prize is also awarded to William H. Higginbottom, Nottingham, for a design for a parish church of Geometrical character and cruciform plan, with central tower and spire and large clerestory windows, in which careful drawing is shown, though, like other designs, it has too much of the academical type about it. The other designs are not equal to those of former years. Among those which are hung is a design for an academy of fine arts by Robert Coxon, Newcastle-on-Tyne, exhibiting a few good points, such as a deep frieze. There is a lofty centre, and the detail is freely sketched in a Renaissance character. Near this is a design for local board offices and assembly-hall in a Classic Italian style, rather severe in treatment. There are pediments at the ends of the façade, which is of stone. For both these designs bronze medals are awarded. Walter H. Cooper, of Leicester, obtains a bronze medal for a design for a free library, a clever, coloured perspective, broadly treated. A silver medal has been won by William C. Midgley, Birmingham, for a design for an entrance to an art gallery. Italian Renaissance is the style chosen, which has been treated in a rather florid manner with Composite capitals to the main columns; the lower portions of the shafts are sculptured in relief; sculpture is also introduced on the pediment. Several designs for country residences are sent in. We may first notice two silver-medal designs. One is by Harvey Allport, student of the Training Class at South Kensington, a coloured drawing, Elizabethan in style, fine in execution, but weak in detail, the material being stone; the other is by Alfred Cox, of South Kensington, in a red brick and half-timber style, showing a carriage porch and tower over between the house and billiard-room. The plan is rambling, the entrance hall and stairs defective and wasteful. There is a kitchen court and offices round. A clever coloured elevation and drawings accompany the set, showing breadth of treatment and knowledge of Domestic work. A bronze medal is taken by Edwin L. Lutyens, South Kensington, for a country house of red brick, with coupled fluted pilasters at the angles and diapered ornament of 17th century character—meritorious and with feeling. The drawings are coloured. An hon. award is given to Tracy Tratman for a design for small mansion, with studio and music-room; the material is stone, and the style Italian, the drawings coloured. Next to which is a design for a board school, by William A. Watling, Newport, Mon., Queen Anne in style, of brick. The windows are mullioned, and have flat arches of double curvature; a bronze medal is awarded. We also notice a design for a municipal mansion by Arthur F. Davies, of Chester, for which a book prize is awarded —a pretentious Italian building, with tower entrances, shaded rather heavily in ink. A book prize is also given to the design for a gamekeeper's cottage, by W. Roland Howell, of Reading; a half-timbered design of Domestic Gothic treatment. There is merit in the drawings, which are coloured. Walter A. Catlow, Leicester, takes the same distinction for a design for a shop front and details, a design submitted in the Leicester Society of Architects Students' Competition. A. Pauline Cocks, Vauxhall, is the exhibitor of a pen-and-ink drawing for a cathedral church, weak in execution, with low western spires, chapter house, and a very bald-looking centre tower. A tinted design for a board school, by W. T. Conner, Glasgow, has some merit as a Classic elevation; the recessed orders and proportions are good, but the quoins in the lower story look weak. A bronze medal is awarded. Several drawings for entrance to an art gallery are hung. We have already mentioned one. Harry O. Hawkes' (Birmingham) design lacks gradation in the orders; Richard A. Rouse has two pediments superimposed—an arrangement that is never a desirable one; H. J. Pitts' is more pretentious: there is a flat dome over the hall, the façade being of two orders. These receive book prizes. Very few designs for interior decoration are hung. Percy R. Allen's (Nottingham) drawing for decoration of a drawing-room (book prize) is neatly executed. The author shows an Elizabethan treatment, but the design is cut up into parts, and there is a want of connection between the chimney or ingle-nook and the side-panelling of the walls. A village church, by John Mackintosh, Accrington, is simply treated; the nave and lean-to aisle on one side is roofed in one span, a dormer clerestory and small transept breaking the simple outlines. The ridge level is broken by a plain flèche, the details being of Decorated character. Why should this design only receive a book prize? Near it we notice two bronze medal designs for a wall fountain. George H. Graham has an idea that might have been worked out better. The figures in relief below the basin are cramped and out of place. Alfred C. Weatherstone's design, showing a niched recess in wall, with shell canopy and panels, with figures for jets, is meritorious; the coloured drawing represents marbles of several tints. Both receive bronze medals. A design for mantelpiece, by Joseph A. Pearce, is clever, but the proportions unsatisfactory.

We may now draw attention to a few of the measured drawings which have been submitted. On the whole the draughtsmanship is of less merit than it was last year. James A. H. Harper, Birmingham, takes a silver medal for drawings of King Edward VI. Grammar School—a Late Gothic porch with rampant lions on buttresses drawn boldly in ink. A silver medal also goes to Harry Percy Adams, Ipswich, for carefully-executed drawings of a font and screen. The former, in Ufford Church, Suffolk, is a particularly fine example of carved woodwork decorated in colour and gilded, of the lofty pierced tabernacle type. The screen is from Dennington Church, Suffolk, of 15th-century character, and occupies the south side of north transept. The colours are in yellow, red, green, chocolate, and black—a fine example of polychromatic decoration. Both drawings are carefully executed in ink. A silver medal is awarded also to Andrew Erskine (Manchester) for measured drawings of portions of Haddon Hall. The elevations of the ball room and a sheet of details of the woodwork are executed with vigour, though the shading is "woolly," and would have been better omitted. Benjamin John Fletcher, Coalbrookdale, contributes drawings of portions of Benthall Hall, Shropshire; Charles B. Howdill, Leeds, drawings of Oakwell Hall, Birstall, rather heavy and mannered in style; Harry Brooke, Leeds, drawings of oak chancel screen of St. John's in that town, a massive work dated 1631, of Elizabethan character; William George Townsend, Derby, drawings of wrought-iron gates of All Saints Church, with panels; Herbert C. Reid, Wakefield, drawings of the Gate of Honour, Caius College, Cambridge; Charles J. Brooke, Great Yarmouth, details of No. 54 Room, South Quay, in that town, well-executed drawings of the panelling of wall and door, and ceiling decoration; William Henry Lord Peterborough, drawings of parts of Peterborough Cathedral, all of which drawings receive bronze medals. A book prize is won by drawings of St. Mary's Church, Shoreham, by Arnold D. Smith, Brighton.

We now turn to designs. Gold medals have been awarded to two modelled designs, one by Charles T. Williams, of Hanley, for a vase of classic outline, jug-shaped, relieved by low relief figures and guilloche borders round the body; and a modelled frieze by Walter Turnbull, Westminster, in low relief, a scroll with amorini and a cupid within a centre wreath, very chaste, and refined in treatment, and Adamesque in character. In the silver-medal class we note two modelled designs for door knocker by Oliver Wheatley, Birmingham, clever and spirited in execution; a modelled design for a panel with centre mask by N. Illingworth, Lambeth; a design for a Jubilee cartouche in the plasterers' competition, by Ethell Ellerby, Manchester, which lady student sends a pleasing figure composition for decoration of majolica urn. Both display refined taste A design for a frieze (modelled), by John Shields, of the same town, and a design for a panel, introducing figures and foliage, "Earth, Air, and Water," modelled by Lehmann Oppenheimer, also a Manchester student; another by President J. Brooks of the Technical School, showing a modelled design for a frieze, with female figures in a folial scroll. The Regent-street Polytechnic Art Class, F. T. Dickens and R. Williams, take bronze medals for designs for pillar and a panel in carved wood. A design for decoration of a water-jug by Saranna Schofield, of Manchester, representing "Narcissus," is worth notice as a graceful composition in colour, for which the silver medal is awarded. Gertrude Ginn, who wins a gold medal and Princess of Wales scholarship, of Hertford, sends a pleasing design for floor tiles in flat tints of blue,

green, and brown; lizards and conventionalised foliage make up the design. Ellen Batters, of the same school, receives the silver medal for a tile design. Amongst the designs for wrought-iron must be mentioned Herbert C. Cane's (South Kensington) drawings for gates for a baptistery, one of the panels containing cross in the South Kensington Museum, and others made to agree—a clever arrangement of metal-work. Maud C. Fisher, Bristol, shows a chancel screen or gates of wrought iron in St. Mary Redcliffe Church, a finely-executed drawing; and Gerald Hutchinson coloured drawings of wrought-iron gates in Temple Church, and details, all of which receive bronze medals.

The wallpaper and textile designs are numerous. In this class we must notice a folial design, green on white ground, by James West, of West London School (silver medal), and another design by Amy Woodall, of the same school (bronze medal). A design for a carpet, by Jane Glanvill, Manchester, who receives silver medal, exhibits an original disposition of flowers and foliage arranged geometrically in squares, and in nice colours. John Macfarlane, the same school, wins Owen Jones's prize, a silver medal, for a table-cover design, in which there is a festoon border with medallions introduced in the centre for initials, of a pale sea-green. Fanny Roylance also has a bold scheme of treatment for printed cotton, in which flowers and green leaves are arranged on a blue ground, spotted with small white flowers. Thomas J. Donohue, Macclesfield, wins the gold medal for a design for silk-hanging. Amongst the bronze medal designs we may name a printed hanging in bright blue with birds and foliage, by Jonathan Kirkpatrick, Glasgow; a rich silk-hanging by Samuel H. Moss, Macclesfield; another printed hanging with birds and foliage, on blue ground, by J. Lattimer, Manchester; a bright and delicate treatment for Madras muslin curtains, by Maud Johnson, of West London school. A silver medal is awarded to Caroline Beatson, Cork, for a panel of lady's silk dress in crochet lace. A lace flounce, by Agnes E. Farman, Leicester; Emily Anderson, Cork; and the lace curtains by Charles S. Cullen and W. H. Pegg, Nottingham, take bronze medals. In the designs for cotton prints we notice neat arrangements by Arthur E. Jones, and F. W. Hatton, of Manchester; other designs being exhibited by Herbert Davies, Thomas McLoughlin, E. T. Orrell, T. Redfern, G. Warren, H. Bayley, Ellen Robinson, Scarborough. We cannot further here allude to the designs in this stage, which are numerous, and worthy of the prizes awarded.

In other stages a gold medal is won by William H. Prosser, of West London, for two models of figures from the antique, of wrestler and thrower of spear. W. Sadler, of Lambeth, takes a silver medal for a model of figure, in which class also we must mention the clever models of the figure from the nude, by John Rhind, of the S. K. Training Class (gold medal), the models of figure from life and the nude by Frank Bowcher (silver medal). Alfred C. Weatherstone has a full-size cartoon of a stained-glass window, and a design for a frieze—maidens with musical instruments, both of high merit as composition. In the same stage of study May Bowley, of Blackheath, sends a design for a painted panel, representing music—a well-arranged figure composition in water colour. Amongst other studies is a design for room decoration, by Alfred H. Coyle, of West London, for a side of room in oak, in which a deep frieze of subdued colour is introduced, and a nice distribution of panels in the wall surface below. A design for a piano front, by Emma Hinchcliffe, St. Thomas Charterhouse, is clever. A figure design for stained glass, by Georgina A. Mair, in which there is a nice, quiet, domestic treatment of figure panels representing seasons; a frieze and door panel, in oil, by Henry C. Morrow, and monochromic studies in oil of ornament from the cast by Paul F. Maitland, and Thomas McKeggie, receive honorary awards. The chalk drawings of figures from the antique and the nude, and the oil and water-colour groups and studies of still life are of much merit, and we must reserve them for another notice.

THE RIGHT WAY TO PROMOTE TECHNICAL EXCELLENCE.

JOHNSON and Boswell were one day discoursing on the universal thirst for knowledge. "There is," said the Doctor, "nothing which we would not rather know than not." Taking a wherry from the Temple Stairs, Johnson pursued the subject, and took occasion to illustrate his contention by asking the waterman what he would give to know about the Argonauts. "I would give what I have, sir," replied the boy. "But the acquisition of universal knowledge," continued Johnson, "is rendered impossible by the nature of the limitation of the human powers." This omniscience would now, however, appear to be regarded as possible, and as the true aim and end of education. To satisfy the modern craze for a vast lateral extension of knowledge, the nation blindly sacrifices accuracy and depth. All the notions that prevail with respect to technical education, for instance, are founded upon the undue importance that is attached to this lateral extension; it is erroneously supposed that those who possess the greatest amount of information are the more intellectually efficient—the better prepared to achieve technical excellence. The public forgets that the English workman was unrivalled before science teaching and technical education were dreamt of, either here or on the Continent, and that he is still, and without this now-fangled education, unrivalled in all the essential qualities of good workmanship. He may possibly be somewhat behind in the decorative arts; but if in these, in these only, for to excel in these requires a delicacy of sensuous perception, which all the science teaching in the world would never confer, but which would, on the contrary, rather impair than develop; for this sensuous constitution, if it be not by nature, can be developed only by a judicious system of training. We know that the great school of colourists, the Venetian school, did not come of science teaching, for no reliable theory of colour had at that time been formulated; they were fine colourists on account of their perfectly constituted sense of sight. All good workmanship, in so far as taste and the handicrafts are concerned, depends upon the perfection of the human mechanism, and not upon a prodigious amount of information, and this perfect constitution, or mechanism, if a man have it not by nature, can only be developed by a remedial process of training—a *re*-formative process. It was the perfection of the native human powers that enabled the workmen of Egypt, Greece, Rome, Mediæval Europe, China, and Japan to produce marvellous work without the knowledge of reading and of writing, before even physical science was thought of, and, therefore, without any such system of technical education as is now proposed. We may perceive, then, that what is now contemplated by the would-be technical improvers is not in the slightest degree essential to the production of excellent workmanship, and, if not essential, the forcing of technical education upon the workman is utterly unnecessary, and not only unnecessary, but mischievous.

Certain it is that since this cramming of knowledge has been the fashion, and has prevailed in Europe, its peoples have not rivalled the famous art epochs; and this new education, it should be borne in mind, has prevailed for a longer period than it took either Greece, or Italy, or the Netherlands to achieve excellence in the fine arts and in the art manufactures. Consequently this superficial extension of study has not accomplished what was and what is still vainly expected of it. The fine arts and the art manufactures, it is true, have not received that liberal and continuous encouragement vouchsafed to them in former times. More especially has this encouragement been lacking in England, where it has long been the fashion to collect ancient art and workmanship instead of employing native and contemporary talent in adorning private mansions and great public edifices. The capacity to excel in the decorative arts may have suffered deterioration in crowded centres of population; the human system may have degenerated senses, intellect, and physique. The remedy for non-encouragement is simple and obvious; but that for deteriorated senses requires further consideration and explanation.

From the fine arts we may pass on to review mechanical work, craftsmanship, and of this we may also affirm that the greatest inventions and the finest work, inventions and workmanship, that gave us pre-eminence amongst the nations, were the products of times in which "obsolete" was coupled in our dictionaries with "technical," and when technical education was undreamt of. The English workman holds his own in the marts of the world without such education; nevertheless he is repeatedly admonished that if it be not immediately adopted his case will be hopeless.

Whatever technical means be openly adopted for the improvement of workmanship will, we may rest assured, be followed by other nations. Are we not capable of holding our own in workmanship without copying French and German technical procedure? The project for a Central Technological College, which I put forward in 1851, was put forward before the "cry" for technical education was heard either on the Continent or in England; but that college was designed, not for the education of the workman, but of the manufacturer, the controller, the director of work. The workman's function in manufacture is distinct from the master's, and is one that depends on correctness of eye and dexterity of hand. It would, indeed, be a political and a social injustice to tax the middle classes in order to place the working classes in an educational position to compete with their children and to obliterate the landmarks in a graduated social domain. But this is just what your over-zealous technical educator is doing.

Then, what are we to say of the School of Wood Carving? It is a plan of encouragement in direct contravention of the principles of political economy. What was the nature of the encouragement which brought forward Grinling Gibbons, Mount, and others? It was essentially the same as that which was adopted in all the great epochs—viz., demand, a liberal demand for the exercise of their talents. Is the nation losing its head, that it must needs invite an Italian carver to come over to instruct apprentices in the art, and call this the encouragement of wood-carving? Who is to employ the carvers after they have served their time? "What would you have, then?" it may be asked. "You yourself confess that educational reform is needed; what is the nature of the reforms you would propose?" Let me endeavour to answer the question. To answer it, and to explain precisely what I mean, is, however, by no means easy, because most persons have not yet learnt to discriminate between the physiological perfection of the intellectual powers and the intellect of the memory, a kind of second-hand intellect—between the perfection of the instrument of thought and a mass of materials with which that perfect instrument can alone satisfactorily deal; these are two very different kinds of things. The former is by far the more important of the two, and in considering the subject of technical education we must never for one moment lose sight of the important truth that unless the intellect, the instrument of thought, be perfect in its constitution men will be unable to rightly handle any kind of knowledge or any kind of tool.

As a general principle it may be assumed that the perfectly constituted human being, mentally and physically, is the most fitted to excel in any human aim, and, on the contrary, that all imperfectly organised human beings are in various ways and in different degrees less fitted for the performance of truly excellent work. The aim of education, therefore, the primary aim, should be that of developing the man intellectually and physically, the perfect human constitution, by a remedial or *re*-formative process; for in the

vast aggregations of human beings, which is one of the characteristics of modern times, there are deteriorating influences which tend to mar the senses, the intellect, and the physique, to specialise and exaggerate some faculties, and to dwarf others—which, in other words, tend to induce disparity in the system—at the expense of that healthy and efficient symmetry in which perfect well-being consists at the expense of that balanced condition of which it can alone he said that the *mens sana in corpore sano* inheres. And as it is from this condition alone that we can reasonably expect good workmanship, we should lose no time in instituting an educational system calculated to reinstate or restore it when impaired by untoward circumstances. A true system of formative training, at the same time that it is health giving in its tendency, is the best preparatory discipline of every kind of work.

This formative motive, as an educational principle, was, I have every reason to believe, thoroughly understood by the Greeks, and to this circumstance may be attributed their excellence in every kind of human attainment. This formative motive, however, has been entirely lost sight of by Mediæval and modern educationists. The educational routine adopted by our ancestors has been preserved intact and as if it did not admit of being improved. The curriculum is a course in book-lore, and the only change that has been attempted in recent times is a change for the worse—viz., an extension in quantity, miscalled the higher education. Hence the mistaken notions which prevail with regard to technical education, and the fallacy that men can be made more perfect intellectual instruments, better workmen, by "cramming" them with all kinds of knowledge. What does this education, which has remained in Chinese fixity for several hundred years, do towards improving organisation? Nothing, literally nothing. It compels every individual, no matter how differently he may be constituted, to labour over precisely the same course. It seems to have been thought, and still to be thought, that knowledge itself is power, whereas knowledge is alone power in the grasp of the intellectual mechanism that is capable of wielding it. The less perfect that mechanism is, the less capable will a man be of doing good work. The Mediæval system of education to which we persistently cling was founded on the fallacy that the packing of *impedimenta* in the memory was education, and the modern extension of this system, miscalled the higher education, on cramming much more into the memory. Modern education takes no thought how to improve the imperfectly-organised eye, or the imperfectly-constituted ear, or any constitutional imperfection whatever, and it is by addressing ourselves to the correction of such defects alone that we can reasonably expect to exalt the quality of work. The committing of the sciences to memory will neither improve the senses of sight nor of hearing. We still refuse to make either the blind to see or the deaf to hear, and yet we are absurd enough to expect perfect work from the maimed. We still fail to perceive the significance of the precepts of the Great Teacher, and that the true purpose of education is that of "healing." This is where your general as well as technical systems of education are at fault; your educational nostrums, instead of being remedial, only tend to exaggerate the evils you would correct. That increased taxing of the memory, which is your sole idea of educational reform, would only tend still further to exalt that faculty at the expense of observation and of reason. It is that surcharge of the memory which is day by day making the national intellect more superficial and incapacitating it to deal masterfully with anything. The history of the arts and of the manufactures proves beyond doubt that a knowledge of reading and writing and of the sciences has little or nothing to do with excellence in handicraft. To excel as an instrumental musician, the prime requisites are a perfectly constituted ear and a dexterous hand; to excel either as a painter or sculptor the prime requisites are a perfectly organised eye and a dexterous hand; and so of all other workmanship, perfect senses and dexterous hands are the important requisites. A knowledge of the sciences will neither perfect the sense of sight nor of touch, nor produce dexterity of hand. All bad workmanship proceeds either from defective organisation or want of practice, not from deficiency in scientific knowledge. If, therefore, we desire to improve technical skill, my contention is that we must, above all else, bend ourselves to the rectification of marred organisations. To attempt this with any reasonable chance of success, we must commence the work whilst the human system is plaster and ready to yield to the "potter's hand." It is to our School Board schools that we must turn for the improvement of British workmanship. In them we must initiate a system of formative training for one of "cramming," a system which shall have for its object the symmetrical development of the man. To complicate this stage of education with the use of tools would be absurd, and but to muddle up the distinct functions of the school and the workshop. What tools is it proposed to introduce—carpenters', masons', or engineers'? The project will not bear the slightest reflection. Every kind of tool could not be introduced, and if one kind were adopted you would turn out some special class of workmen out of all proportion to the demand for them. As soon, however, as we leave the consideration of handicraft, and turn to that of braincraft, to inventing, to planning, and directing, a knowledge of principles of scientific theory is required. But this is altogether a different *mètier*, the business of another class, and it is for this class and not the working man that technical education should be provided. It is scarcely necessary for me to state that although it may be proved that the finest workmanship may be produced by men who can neither read nor write, yet that I by no means undervalue these acquirements. Reading is the gate to knowledge, to the storehouses of experience. It is the gate both to instruction and entertainment. It is an acquirement by which men can become better informed and wiser; but an acquirement that will not make men one whit more skilful as workmen. Science is constantly opening up new fields to workmanship; but the power of handicraft will be no greater than it was before scientific knowledge was more generally diffused, and since which in the fine arts and the art manufactures it has declined. The good workman, like the poet, is born, not made; unless we can take up either an arrested or a deteriorated organisation and develop it to finer issues. I believe this to be, to a very considerable extent, possible if educational training would only address itself to the work when organisation is plastic and capable of being moulded aright, and when now we only "cram" with information. We must rectify defective nature by training the senses, the memory, the reason, and the physique during the season of youth. We should regard the School Board shools as preparatory schools, as the nurseries of technical skill, looking more to the development of the manhood than to how many subjects can be "crammed" into a poor boy's brain. We should then have in those schools a course of intellectual and physical gymnastics and a curriculum consisting of the national language, drawing, music, and physical exercise. I hold that at this period the course should, in the main, be gymnastical intellectally and physically. The State has no proper business with special or technical but only with general education. Special education should be provided by voluntary effort, and should, in all cases, be purchased by the would-be recipients. The general education of the country should be essentially "formative." The following list appears to give the measures which are imperatively needed for the preservation and promotion of technical excellence: (1) A system of formative training in the School Board schools—in all the elementary schools of the kingdom. (2) A grand central technological college for the education of the manufacturer, the master, and the controller of work. (3) Local colleges, wherein any special talent might obtain the knowledge required at a moderate cost; where popular lectures should be delivered in the evening. I have suggested that the schools of the Art Department should be utilised for these purposes. (4) An annual exhibition of workmanship, both in the manufacturing centres and in the Metropolis. (5) A more lively and discriminating encouragement of art and art manufacture by the wealthy classes; the prompt abandonment of the practice of making private mansions museums of the old masters and of bric-à-brac. (6) To testify to the manufacturers throughout the kingdom the expediency of looking to the efficiency of their apprenticeship systems. (7) The reinstatement of the guilds as Trade Intelligence Departments; each guild should have travellers to go abroad and to report what is being done in their special craft; each guild should meet every kind of information appertaining to the craft it represents, and be the centre of reference for that craft.

W. Cave Thomas.

8, Fitzroy-street, July 31.

THE PROFESSION OF A CLERK OF WORKS.—III.*

By Thomas Potter,

Author of "Concrete: its Use in Building," "The Construction of Silos," &c.

WHO SHOULD BE CLERK OF WORKS?—SALARY—PLEA FOR EXAMINATION AND DIPLOMA—CIVIL SERVICE CLERK OF WORKS.

VERY few buildings nowadays take longer than two years to erect and complete, and as the salary is supposed to cover all his expenses, the moving of himself and family, should he have one, is a constant source of expenditure, and, as a result, many prefer a fixed abode, obtaining employment as near thereto as possible, and living in lodgings convenient to the works, provided that the latter are too far distant to travel to and from daily, in which case once a week has to suffice, or, if very remote, once a month, or less frequent even than that. The ascertained addresses of 50 architects' clerk of works five years since, and at the present time, show that 30 have changed their residence, and, of course, not one is engaged at the same building now as at the former period, although several are employed by the same architect. Probably, those whose families have not adopted migratory habits belong to the section who prefer a settled home, making use of it when they can, and perforce doing without it when they cannot. Another disadvantage is that, on the completion of a building, the architect may not have another vacancy, and the clerk of works has, therefore, to seek "fresh fields and pastures new," and often to wait for some time before a suitable appointment offers itself. He is, indeed, very much the victim of circumstances. He may be sent to, and remain perhaps for years in, some far-off locality, engaged in superintending the erection of mansions, public buildings, or extensive works of some kind or other, and on completion he returns from his starting point to find his old associates have gone away or deceased, or, like himself, have been sent to distant parts. New men have also risen, new building appliances and forms of construction have been invented, and he finds it not so easy to obtain a "berth" as formerly, and after making endless inquiries, and, like Mr. Macawber, waiting for something to turn up, perhaps advertising, all without success, he takes the first offer he can get on the assumption that "half a loaf is better than no bread." Then, again, when incapacitated by age, accident, or infirmities from further active work, having had, not from any fault of his own, a number of different employers, he possesses no moral claim or expectation from anyone for long servitude, nor can he look forward to extraneous aid from such quarters. Still another factor in the matter of "salary" is that there is no prospect of further promotion when once a man has risen to be a clerk of works—or fallen—as is sometimes the case when a builder in an extensive way of business fails, and is unable to find friends and means to give him another start in life. If he is known by architects to have a good knowledge of building matters, and is of temperate habits, he falls back upon that occupation, and if the saying that an old smuggler makes a good custom-house officer holds good, he should be the right man in the right place. Once a clerk of works always a clerk of works for the term of his natural life—unless indeed he so far misconducts himself that he can find no architect who will employ him or recommend him—is the lot of nearly every member of that profession. No amount of perseverance or increased knowledge gained by close attention and long practice can help him, for his salary

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remains much about the same from the commencement to the end of the chapter, and this raises another matter in connection with the subject — the uniformity of salaries. The employer of labour who numbers his workmen by the thousand, does not pay his managers or agents having charge of works on which hundreds of workmen are employed a salary but little above that of others who may only have the work of a score or two at most to look after; but according to the extent of work to be supervised, and the capacity and energy of the person appointed to supervise it. Per contra, the clerk of works engaged on a building upon which thousands of pounds are being expended, and which is being hurried along at high-pressure speed, receives as a rule but a trifle more than another whose work—practically a sinecure—consists in supervising the erection of, say, a village church, which may be jogging along at a "go-as-you-like" kind of speed. As before remarked, the notion clings to many people that if a man is a superior workman that alone is the sum total of the attainments needed, and the remuneration should accordingly be equal to, or but little superior to, that of a first-class artisan. Some architects even are of this way of thinking; one eminent in his profession, and with a large practice, is noted for the low salaries he is in the habit of paying, recruiting from builders' foremen when his clerk of works find more lucrative employment. Occasionally, candidates anxious to change their position for clerk of works' appointments, and more or less qualified, will accept for a start in that direction almost any remuneration offered them, no matter how small it may be, in the hopes that it will lead to something better, and that a reference to an architect of repute will insure them future employment of a more substantial character. But every man knows his value, and it is the underpaid clerk of works who, as a rule, thinks it no sin to rob Peter wherewith to pay Paul; some of the grossest swindles in connection with building contracts have been perpetrated—many never having been brought to light—with the full knowledge and direct connivance of the clerk of works in charge; but three-fourths of such cases might be traced to the fact that the latter individual has been selected for his apparent cheapness, better men being able to command better salaries, and more careful of their reputation and honour. Corporate bodies are supposed to possess no souls, and the individual members thereof, to enlist the sympathy of those by whom they are elected or appointed, by cutting down expenses and the salaries of officials; but the Birmingham Board of Guardians appear to look upon matters of this kind in quite a different light, for in 1886, having determined to build a new infirmary, they advertised for a clerk of works at £6 a week, and the committee's report says, "they did this in order to attract exceptional good men, and the applicants included such men." A guardian remarked that the salary was excessive, for the clerk of works who superintended the erection of the Council House was paid four guineas a week, while the one at the Art Gallery received three guineas at first, but subsequently three and a half guineas. Another guardian, in reply to an observation that if the board paid £6 it would be the same that clerk of works were receiving in other parts of the country, said there was only one in England who received as much. This assertion, without any possible means of obtaining such information, must have been entirely guesswork. In the end the £6 was agreed to. It is not suggested, however, that the clerk of works is, as a rule, badly paid; perhaps taking the average qualifications of all calling themselves by that title and acting as such, and their remuneration, they are fairly paid; but the grounds of complaint arise from the practice of paying a fixed salary more or less, according to the architect's or the employer's ideas of what clerks of works are, on the average, worth, and not by merit. All other occupations and professions of a similar nature are subject to a more or less elastic sliding scale of remuneration; but the clerk of works' salary is regulated in the way described, or it may be according to the employer's point of view as to how much an individual who will undertake the duties can be obtained for, the consequence being that large employers of labour always command the best ability, for, as before stated, they recognise no fixed remuneration for services rendered, and are alive to the fact that by paying more than the standard salary of a clerk of works they can retain the services of the most competent men. Until it becomes a recognised fact that the clerks of works' salary shall depend upon their standard of efficiency so long will their average attainments be only those of mediocrity, and there is no denying the fact that while very many are efficient and trustworthy, others are unfitting and unreliable, and act as an incubus on those who are striving to do their duty. The two great disadvantages that candidates for the position of clerks of works have to contend against are that, beyond the workshop and the buildings as training grounds, they have little else to fall back upon as means of gaining the supplemental knowledge essential to competency, and that no diploma or certificate is obtainable which at once and for all would stamp its recipient as efficient, or indicate in what degree he may stand in this respect; some such means are open to most other professions, and although many may be of doubtful value, yet there is scarcely any other class whose services are of so responsible a nature, which has no channel whatever from whence to obtain some evidence of competency and fitness. South Kensington has been instrumental in affording material aid in advancing practical and scientific knowledge; but this is only one place, and its advantages limited to those who may be residing within easy distance. Many provincial branches of that establishment are not credited with being able to give very valuable assistance in obtaining an advanced knowledge of building technicalities, and their honours, diplomas, and certificates of competency in building construction have not as yet been regarded as very satisfactory evidence of undoubted ability to superintend the erection of important buildings. If the incapable element could be eliminated, and if architects would themselves take steps to render it necessary that every clerk of works should obtain some reliable certificate of competency before he could assume that position, it would have the effect of establishing degrees of individual fitness, placing the best men in the foremost ranks of their calling, and relegating those who have no business to claim the title at all to their proper sphere in life. As a matter of fact, it is somewhat remarkable that the class of men upon whom architects have to rely so much for the proper carrying out of their designs, who are perforce left, perhaps, for weeks or months free from any personal control or observation, gain all their knowledge and experience in a haphazard kind of way, totally unaided by the advice and assistance of their future employers—architects. No lines are laid down by the latter as to the course of study necessary to pursue; no one ever hears of an architectural society discussing the qualifications needed by a clerk of works, and how best to acquire them; and the presence of the latter at any of their meetings where purely technical matters are discussed, if allowed in some cases, is certainly not encouraged, and is an extremely rare occurrence; and yet who would be so likely to gain information on many matters that hitherto he has not come across from papers and discussions which are so frequently taking place before scanty audiences limited to architects and their assistants? or who so capable of throwing light upon many matters affecting materials and their use as the clerk of works of many years' experience? Surely it cannot be *infra dig.* for the members of architectural societies to admit to their meetings when technical and constructive matters are under discussion, for the purpose of benefiting themselves and their employers through what they might hear and see, the men whom they are about to intrust to carry out their designs? If, as a body, the standard of fitness requires to be raised, means should be permitted and adopted to accomplish this. If architects require thoroughly-qualified and trustworthy clerks of works, they should create facilities for acquiring competency where none exist, and recognising ability and trustworthiness where proved. The lately-adopted registration of plumbers, the compulsory examination of the R.I.B.A., and similar means of establishing a guarantee that individuals who claim to be experienced in their avocations or professions are what they profess to be, is finding favour in many quarters, and were one or other of the architectural societies to establish a voluntary system of examination for clerks of works, mutual benefit would be conferred on employer and employed. Many of the latter would no doubt differ as to the feasibility and advisability of accomplishing this, especially those with but a small chance of passing even a mild examination; but a standard of efficiency would be the means of placing the best men in the foremost ranks and weeding the profession of many who make up for their want of necessary attainments by the possession of a fawning obsequiousness and an abundance of assurance. The only way an employer has at the present time of ascertaining whether an applicant is a fit and proper person to act as his clerk of works, except from personal knowledge or from having previously employed him in a similar capacity, is from testimonials which he carries about with him, or references to architects and others under whom he has previously served. The former are in many cases valueless, for they refer possibly to antecedent periods in his history, since which he has perhaps very much altered in his general character; moreover, the writers may have had but few opportunities of judging his conduct and abilities, and been hoodwinked in many ways. Again, some persons from a charitable feeling that they would not wish to step in the way of his future advancement, allow their good nature to overrule their better judgment, and gloss over his bad qualities, while they make as much as possible of any good ones he may possess. It has been said that forged testimonials are not altogether unknown; under any circumstances, written testimonials given to the person they are intended to benefit are at the best doubtful recommendations, and should be accepted *cum grano salis;* for this reason, personal references are now more generally permitted by architects in their relations with clerks of works, and are in every way preferable. But references to individual architects are sometimes attended with disadvantage as far as the clerk of works is concerned. A man may possibly remain in the service of one employer for years; the latter dies, and the reference which to the clerk of works seeking a fresh appointment is almost indispensable is gone for ever. The fact that he has been under a certain architect for a considerable period is not always sufficient evidence of his abilities, while employers experience the fact that it is far from safe to place implicit reliance upon testimonials or references of years ago, or to present habits of temperance and sobriety. But associations or societies, composed mainly or entirely of architects, would be in a far better position to fix the standard of a clerk of works; they would not as a body possess the susceptibilities of individuals in such matters, and they would be justified in making searching inquiries as to the previous occupation, and past and present character and capabilities of voluntary candidates. Examiners selected for their skill in individual occupations connected with building processes, and in every way practically acquainted therewith—not all-round men possessing a mere superficial knowledge of half a dozen of the most important callings, and no complete knowledge of either—would very soon be able to determine the proficiency of candidates in each branch, and collectively the position they should occupy in the sliding scale of competency so far as the practical details of building construction were concerned. The moral and general character and auxiliary attainments so valuable and necessary for a clerk of works to possess, could be just as readily ascertained, and the result would be that while architects would be able to know the antecedents, present character, and actual capabilities of a clerk of works before engaging him, the latter would be under no necessity to produce a string of testimonials, or become a victim to the possible whims and vagaries of his last employer. The position of civil service clerks of works is undoubtedly better, all points considered, than that of the architects' clerk of works: the salary is higher, the employment is in most cases permanent, and the knowledge required is not greater. Portsmouth, Devonport, and Chatham Dockyards have each a clerk of works to superintend building operations and repairs, at a salary

commencing at £250, and rising to £300 a year, with a residence provided or an equivalent in lieu thereof. The Office of Works employs nine permanent first-class clerk of works at similar salaries, and provides each with a residence, and sixteen second-class, whose remuneration commences at £150 and rises to £220; while at Broadmoor Lunatic Asylum the title of foreman of works is given to the individual who fills a similar appointment, with a salary of £140 and annual increments till the maximum of £190 is reached. These appointments are mostly open to competition, and which it is almost unnecessary to add is becoming keener and more hotly contested than when the system was first introduced. For the Office of Works, the following are the necessary qualifications:—"Handwriting, geography, English composition, arithmetic (to vulgar and decimal fractions), geometrical drawing, knowledge of materials, designing simple buildings, with specifications and estimates, and working drawings of details of carpenter's and mason's work, taking out quantities from plans, measuring and valuing buildings, and modern sanitation. Candidates must possess the practical experience necessary to qualify them for a situation of this nature. They must have been employed for at least five years in the superintendence of buildings, and will be required to produce satisfactory proofs of their efficiency and practical knowledge. No candidate will be qualified for an appointment in England or Scotland who has not acquired his practical knowledge, and been employed for the required time in England and Scotland respectively." It is a significant fact that competitors must not be under 28 years of age, and that there is scarcely any, if any, other appointment in the Civil Service but which is open to candidates several years younger. Why this should be is not explained; but assumedly the authorities conclude that efficient knowledge and capacity for the position is not as a rule attainable under that age. Clerks of works in the Prisons' Department of England are paid salaries commencing at £225, rising to £275; in Scotland, £300 to £350; and in Ireland it is fixed at £200. The limits of age for Civil Service clerks of works are 28 and 35, and as the number compared with other Civil Service servants is small the competitions are few and far between, and the chances of obtaining appointments therefore somewhat remote. The duties generally are of a similar description to any other class of clerks of works—viz., to superintend the erection of new buildings or alterations, and the same qualifications are essential. Clerks of works for railway companies superintend the repairs of alterations of stations and other buildings, and are necessarily under the control of the engineer's or architect's department.

"ONLY THIRTEEN!"

UNDER the above head a correspondent comments smartly in the new number of the "A. A. Notes," which continues as bright and interesting as ever, on the very few members of the Association who pass the examination of the Institute. He says:—

It is impossible not to be struck with the great contrast presented by the immense amount of good solid work accomplished year after year by the Architectural Association, with its many and far-reaching classes and lectures, and the number of its members who emerge triumphantly from the final ordeal of the Institute Examination.

The exact number of our members who have passed the Institute Examination during the last three years is 31, being an average of just over 10 per annum. How interesting, is it not? The National School of Architecture ought well to be proud of such a record.

Now, the remedy I suggest for all this is full and complete publicity in every sense of the word; and some of the means which might be utilised for this purpose are as follows:—

(1) Let the names and addresses of every successful candidate be published in full, not only in our own professional Press, but also in the ordinary newspaper of every-day life. Let the general public see what *we* think of our examination, and they will very soon begin to duly appreciate it, and to ascribe some meaning, and some honour, to the mystic letters which this examination now confers.

(2) Let every possible rite and ceremony at the command of the Institute be impressed into the presentation of the certificates. Let there be a full and complete meeting of the Council, and in the presence of the Professors, the Examiners, and other eminent members of the profession, together with the parents and friends of the candidates, and as many of the general public as can possibly be induced to attend, let the coveted honour be conferred. Let it be the great architectural ceremony of the year; and again—let the public know it.

(3) Let the certificates themselves be more in character with the examination. Great care should be taken in their preparation, as candidates like to possess some visible and tangible evidence of their success; and, surely, the small cost involved in the preparation of these documents would not be termed an extravagance. Men want something more than a circular.

But methinks I hear some cynical reader, in sarcastic vein, remark: "Why not ask for hoods at once?" and I take up the question in all seriousness. I do not know the rules and regulations affecting Academical Hoods, but I do most sincerely urge that a candidate, having passed his examination successfully, is, morally, as much entitled to a hood as his brother or old schoolfellow at the Universities. It is his degree, and should be regarded as such; and it is a grievance, aye, a distinct slight, to the architectural student that honours within reach of his brethren in sister professions should be denied him.

When the examination is a reality—that is, when it is the portal to the profession of architecture, and not to the mere membership of one of the professional societies—there will be no need to have to recourse to the expedients suggested. Meanwhile the members of the Association, which is a reality, and a credit in every way to the profession, naturally hold aloof.

A DECORATIVE PULPIT.

MESSRS. HEATON, BUTLER, AND BAYNE, of Garrick-street, W.C., have just finished the paintings and decoration of a pulpit for St. Barnabas Church, Oxford, which will surpass many other works of the kind in artistic interest. The pulpit was designed by Mr. Arthur W. Blomfield, and may be described as in the style of the Italian Renaissance, of polygonal form on plan, supported on six fluted columns with voluted capitals, which stand on a hexagonal shaped plinth, and is surmounted by a massive moulded and enriched sounding-board of octagonal shape. The material of the pulpit is walnut, and this has been used as the ground of the very rich and costly scheme of painting and decorations with which the whole is covered. The upright framing of pulpit is divided into nine sides or bays, exclusive of the staircase opening; the angles are adorned by pilasters, which carry consoles supporting a massively moulded cornice, each side having below the cornice a circular panel, and below it a long arched panel with side pilasters, the two panels being separated by an ornamental stringcourse of green ground with gold ornamentation. These nine sides have on the lower and larger panels figures of the saints with the nine orders of angels above on the circles in the following order:—1. St. Clement, with the Angeli, angels, above; 2, St. Ignatius, with the Archangeli; 3, St. Polycarp, with the Virtutes or Virtues above; 4, St. Athanasius, with the Potestates or Powers; 5, St. Chrysostom, with the Dominations; 6, St. Augustine of Hippo, with the Principalities; 7, St. Leo the Great, with the Thrones; 8, St. Gregory the Great, with the Seraphim; and 9, St. Augustine of Canterbury, with the Cherubim above, these numbering from the left hand. These figures have been painted with scholarly elaboration; the vestments have been carefully studied from old examples of the best period, the delicacy of the colouring and diapers being remarkable. The figure work is upon a gold ground diapered. The cornice, pilasters, and surbase mouldings are enriched by colours and ornamental gilding of Italian patterns and arabesques; the upper member of base is a rich ovolo moulding picked out with a leaf ornament on gold, and the bottom of pulpit is formed by the intersection of the twelve sides with the six sides of the columnar pedestal, forming an effective groining, the surfaces being enriched by gold ornamentation of grotesque birds and foliage upon the dark walnut ground. Each of the six columns forming the pedestal is fluted above in gold with dark fillets, the lower portion of shaft having the vine foliage in gold on a dark or brown-black, the voluted capitals picked out in gold. The deep, close string of the staircase is decorated by seven circular panels with doves representing the Seven Gifts of the Holy Spirit on red ground, with intermediate foliage panels. The balusters are also richly shaped and decorated. The sounding-board, supported on a framework of pilasters, with niche between, gilded, is a flat testoon massively moulded along the edge, and enriched by colour and gilding, with angle drops, and crowned by gilded cresting. On the underside of the sounding board is a cross and pelican centre, which is surrounded by thorns, and has an aureole of rays all in gold. The dark ground of the walnut, and the deep brown-painted background enhance the value of the gilding, and the colours confined in the plain mouldings are chiefly a deep red and greyish-green, the whole rich but harmonious in effect. The painting and decoration were designed and executed entirely by Messrs. Heaton, Butler, and Bayne, under the superintendence of Mr. Blomfield. The work has been, we hear, a considerable time in hand, and is to be fixed in St. Barnabas Church during the present week. We have called particular notice to this pulpit as showing the reactionary taste for Italian church building and decoration, and as displaying work designed and executed by an eminent church architect, and an eminent firm of ecclesiastical artists.

THE BOSTWICK FOLDING STEEL GATES AND SHUTTERS.

WE have examined some full-size models of the patent folding steel gate and shutter, named after the inventor, Mr. W. W. Bostwick, and manufactured by the Bostwick Folding Steel Gate and Shutter Company, 73, Queen Victoria-street, E.C. On a former occasion we referred to this improvement on the old-fashioned hinged gate, which has been for some time in use in some of the leading commercial houses in New York. One of the models we inspected represents a folding gate suitable for shops, stores, or offices, about 4½ft. high and 5ft. in width. This is composed of the folding pickets which slide level top and bottom—the patented feature of the Bostwick gate, hinged together by bars on the lazy-tongs principle, which are not only strong, but are ornamental features in the gate. There are two rows of these sliding hinges. Each leaf of the gate runs on a metal track or bar, which is hinged near the jamb so as to turn up, and they are stiffened at the top when closed by a stiffening bar, which also is hinged to the jamb, and can be folded up out of the way. When the two leaves are folded back they occupy scarcely 3in., the pickets sliding up close to one another, and can then be turned aside out of the way. A gate 10ft. in width can in this manner be folded in the space of 10in. and turned back out of sight. Nothing can be easier to work, neater in appearance, or stronger. A window-shutter which slides into pockets inside of the sash frames, is one of the most useful applications of the folding steel gate, as it allows light and ventilation for the room, and is much more secure than an ordinary shutter. These shutters can be made either to slide into pockets or boxes out of sight, or be folded back on the jamb or reveal of window. Our readers know what a clumsy contrivance the old hinged shutters and boxings are, how the back flaps get out of order and drop by their weight, and the difficulty experienced by servants in folding them back. The folding steel shutter, while being a better security against burglars, can be handled with the greatest ease, and the shutters are quickly opened or closed without coming into contact with chairs or people in the room. In planning windows or doorways, the only provision to be made is a small recess to receive the shutter or gate. The gates and shutters are made of pickets of rolled steel of a grooved section, which gives lightness and strength, the hinges working within the grooves. For interior purposes they can be made of bronze or brass or may be nickel

plated. These gates and shutters are secured by specially made locks, but can be fastened by ordinary padlocks. The Bostwick gates and shutters are worth the attention of all architects engaged in the planning of shops and storehouses. For closing lift openings nothing can be better adapted. However wide the opening, they can be applied by having tracks of metal above or below. For shop fronts nothing certainly can equal them in lightness, security, and easy working.

LEEDS ARCHITECTS AND THE LEEDS SCHOOL BOARD.

THE following appears in the *Yorkshire Post*:—

I have only to-day seen the remarks that appeared in your paper of the 16th inst. with regard to the terms upon which several Leeds architects have agreed to undertake architectural work for the School Board.

As I am one of these architects, I should be glad if you would kindly insert in your paper of to-morrow the letter which I wrote to the clerk in response to his circular of the 10th July, issued to Leeds architects, and asking them to name the terms upon which they would undertake architectural work for the Board.

The circular was forwarded to me while absent in Scotland, and the date at which I received it obliged me to reply by return of post. I had therefore no opportunity of consulting with any others of the profession in Leeds.

The Clerk of the Leeds School Board.
Gairloch, 14th June, 1887.

DEAR SIR,—I am obliged by your letter, forwarding copy of the resolution of the Sites and Buildings Committee. I should be very glad to place my services as an architect at the disposal of the board, but I am afraid that if the preference is given to the lowest offer, without reference to any other considerations, my terms would exclude me.

I may remind the board that in the first competition instituted by it, the first place was awarded to my plans, and the building of the first school—Bewerley-street—was therefore allotted to me, and that plan became in a great degree the basis for the arrangement of all the succeeding ones. I was also successful in the competition for the Green Lane school, and erected it. I also gained the competition for the Municipal Offices, which included offices for your board, and these also were erected from my designs.

Notwithstanding these successes in competition, no work has been given to me by your board without a contest, although commissions have been given to other architects without competition, who have either never competed, or else been unsuccessful.

I would therefore submit to the board that less favour has been shown to me, successful in three competitions, than to others who have not competed or have been unsuccessful.

I would suggest that as Messrs. Kelly and Birchall have been employed without competition to design and erect the higher grade school in Albion-street, that a similar principle should be adopted for the other architectural work of the board.

I do not know upon what terms these gentlemen agreed, but I am willing to undertake the architectural work of the board upon the same basis of remuneration as they accepted on that occasion.—I am, dear Sirs, yours truly,
G. CORSON.

On the 8th July Mr. Lee wrote to me that the Board proposed to put in my hands the extension of the Green Lane School for central higher grade teaching. I then for the first time learnt that Messrs. Kelly and Birchall had accepted much lower terms than those recognised by the profession, and totally inadequate as a remuneration for the services required.

I wrote to the clerk that these terms were totally inadequate, but that as I had undertaken to accept the commission upon the same basis of remuneration, I did not consider myself justified in repudiating my offer, and would execute the work accordingly.

I think it is very unfortunate that a firm of architects of such standing as Messrs. Kelly and Birchall should have set the example of receding from the recognised scale of charges. I can only hope that in all future work they and all other Leeds architects will settle upon terms which all can adhere to, and thus leave the question of employment by the Board to rest upon another basis than cheapness.—Yours very truly,

Leeds, 29th July, 1887. G. CORSON.

The Wesleyan chapel at New Romsey, Kent, is being enlarged and reseated from the plans and under the superintendence of Mr. H. J. Jeffery, architect and surveyor, of Ashford. Mr. G. Terry, of Lydd, is the contractor.

OUR COMPETITORS' COLUMN.

THE responses to our last invitation (for the present) have been fairly numerous. We place first the paper by "An Architect," which embodies the experiences of a well-known member of the profession, that by "Scotus" second, and that by Mr. H. Bragg third. On the whole—with the exception of last week—we are pleased with the results in the new column we have opened, and we trust to resume it in a few weeks when the holiday season has passed.

PRIZE PAPER.

"THE EXPERIENCES OF AN ARTICLED PUPIL."

PERHAPS it may be more interesting, and at the same time conveyed more clearly to the minds of those who are now undergoing their term of pupilage, if I relate my own experience of how I became an architect. At the age of eight years a public school, where some eight or nine hundred pupils were being educated, was to be my destiny. Going into a large school, with so many strange faces around me, it was months before I began to settle down to the routine of school life. There were naturally many likes and dislikes, but above all others the drawing school soon proved to have great attractions for me. Being particularly interested in drawing, I received great encouragement at home, and this probably determined my future. Freehand copies were given to me; simple though their outlines were, I remember spending hours over them, and never being satisfied unless they were true to the copies. A year had scarcely gone when the science and art examination was passed. Model drawing was my next step. What with the choice of groups and positions, it seemed as if there was to be no end to it. However, at last I succeeded in giving satisfaction to the head master of the drawing school, and he became more interested in me. Perspective, practical geometry, and the study of light and shade were next proceeded with, and at the age of 14 years I had passed the South Kensington examinations in these subjects. At this juncture I began taking private lessons in addition to school work. I studied from the cast in black-and-white, sepia and water-colour drawing, and often had the opportunity of accompanying the head master on sketching tours. The hints then obtained were never forgotten. All details and advice on various art matters were carefully recorded in a note-book kept for them. The last two years of school life proved of great value. I obtained prizes for water-colour and black-and-white drawings at South Kensington, and the first prize for drawing given at the school. My thoughts now turned toward two professions—an architect and artist. The former was selected, but not before I had asked my parents the question, "Whether an architect was an artist?" The reply was, "He ought to be." Arrangements were then made for my being articled to an architect for five years. I was fortunately the only pupil, and this, together with the kindness of the architect, enabled me to learn more than I otherwise should have done. My first idea was to make friends with the draughtsmen. They soon found I was always willing to try and do everything that was given to me, and it seemed to be a pleasure for them to answer the questions I asked. Plans of buildings were set before me to copy, and isometrical drawings were made from the plans copied. It used to be interesting to take notes of the different criticisms on each drawing when completed. At the end of two years, however, a change was made in my pupilage. The architect, on account of old age, retired from business, and it was then that I entered the office of one of our leading architects in the North of England to complete my articles. I became connected with two pupils in this office. One of them, through loose habits, soon caused me to be careful in office work, and not to spend more time than was necessary out of office hours. It was by no means a rare occurrence that I was asked to complete this pupil's work, so that he might enjoy himself. At the end of twelve months I had made drawings of all the Orders, with the details, and learnt the technical terms for each member, whether the Tuscan, Doric, Ionic, Corinthian, and Roman. At this stage I visited the buildings in progress, and was never weary of asking the men employed anything that seemed wrapped up in mystery. Whenever business demanded it I was always willing to sacrifice an evening's amusement to it. Fortunately there was a good library in the office, which I took care should be well looked into. Weale's series of constructional works, Tredgold's "Carpentry," Fergusson's "Handbook," Parker's "Glossary," and Nicholson's were all included in the list. In the last two years I was able to make plans from sketches supplied, and obtained a fair knowledge of prices by studying the several bills of quantities, and write a specification, together with a building contract. Upon the completion of my articles I became assistant in the office, and after some years was taken into partnership. In the foregoing I have endeavoured to give but a brief account of a pupilage. I may add a word of advice to all those who are now entering the profession. Learn to thoroughly understand everything you do. Visit all buildings you can; note any peculiarities in construction; make a free use of your note-book; work willingly and honestly; then doubtless in time you may become an architect, and one who may be justly proud of his calling. AN ARCHITECT.

PAPER PLACED SECOND.

Whether the experiences of an articled pupil are interesting or the reverse generally depends to a considerable extent upon whether he was anxious to enter the profession himself or whether he was put in by his parents on the erroneous assumption that it was a good paying business. It is of vital importance that a man should have his eyes open before being articled, or else he is very apt to find, after a few months, that he is in the wrong place, and that he will have to unlearn all he is learning whenever he has finished his time. The ideas which parents and the uninitiated have of the method of procedure in an office, and what really takes place, are an amusing contrast. The fond parents pay Mr. So-and-So a good many hundred pounds, and picture the great man personally instructing their boy, guiding his hand with almost maternal tenderness. He will take him to all his big buildings, introduce him to all his clients, he will be constantly with him, &c. That is the ideal. Let us now take a glance at the real state of affairs. The first morning Young Hopeful arrives in the office he is probably shown into the great man's ante-room, which is occupied by an individual who acts the dual parts of confidential clerk and "chucker out" of the ever voluble commercial traveller, men with patents, draughtsmen applying for "cribs," and objectionable callers generally. As this youth must necessarily, to some extent, be in his employer's confidence, he imagines himself a very important personage, and strikes great awe into the new pupil, who has probably the pleasure of sitting in his room for an hour and a half at least. At the end of this time he is honoured by an audience of his future master, who says that the best thing he can begin with is to do some tracing work. This short but trying ordeal over, our friend is then ushered by the said clerk into the room in which he is to disport himself for the next three or four years, where he sees two or three men and a youth, in seedy-looking coats, who regard him with evident suspicion. Here he gets started to his tracing at a back desk till the dinner-hour. An hour for dinner, he was told, so out he goes, and is back again to the minute, but is surprised to find no one else in the room. In another hour the men come dropping in; but the youth does not turn up till about four o'clock, and leaves before five, although the office hour is half-past. All through the long afternoon our tyro works laboriously at his tracing, always expecting a visit from Mr. ——; but before the day is done he learns that the "Governor" is away for a week, and he will find out in time that, far from receiving any personal instruction from him—what with the great works he has in progress, and the still greater that he is fishing for—he is a lucky youth if he occasionally catches sight of his master's back elevation as he dives into a cab at the office door. The remedy for this state of things would appear to be to go into an office where there is a small amount of work, and where, consequently, the architect has more time; but this, I think, is a mistake. The truth is, that for the first

eighteen months or so of his pupilage a man can learn just as well from the other men in the office; but, still, the master should take an interest in the pupil's work from the moment he enters the office. Some architects when they have pocketed the premium, and supplied the youth with a stool at a back desk, seem to think that their part of the contract is at an end, and either leave him entirely to subordinates or else to flounder about at his own sweet will. There is no doubt that a considerable number of the ills that the pupil's flesh is heir to are the result of the large premium system. "You mus'nt look a gift horse in the mouth," and a pupil with his father's big cheque in his pocket is rather like the gift horse. The architect hardly likes to look too closely into his antecedents, or to discover whether nature ever intended that he should put his head into the architectural collar. I would recommend those pupils who are still at the tracing stage to remember that, though it may seem an unmitigated bore, it is really the very best thing that they can be doing, provided it is done intelligently. Always insist on seeing through everything as you go along, and you will very soon get to understand the method in which working drawings are got up, and will consequently very soon be set to making working drawings yourself, as no architect is such a fool as to keep a man tracing if he is fit for anything else. A grievance which I have heard many articled pupils enlarge upon is that they never have a chance of seeing any practical work. If this is the case, it is a very real grievance indeed. When an architect takes a pupil, seeing that he generally takes no personal charge of him, the least he can do is to give his pupil every opportunity of picking up information for himself. I think all pupils who are with architects whose work is entirely in the provinces are entitled to get down for a week or longer at a time, to get as much practical knowledge as possible. You will never learn to distinguish between a well and a badly built wall, though you study "Rivington" on the subject till you are blue in the face, nor will you get a practical knowledge by tracing working drawings, and still less will you be able to write good practical specifications by copying the old ones in the office. This is a branch of work generally very much neglected by pupils. It is, however, of extreme importance to anyone who is anxious to become a good all-round man. In some offices the specifications are all written by the same man. This method, though it minimises the architect's trouble, is very unfair to the pupils, as it never gives them a chance, while in many offices the drawings are handed over to the surveyor without any specification at all. This may answer pretty well if the drawings are covered with notes, or where the surveyor has a thorough knowledge of the architect's style of work, but at best is a slip-shop and unpractical way of doing business. Any architect who does country work entirely, and sends his pupil down to live for a couple of weeks at one of his "jobs," will find he is amply repaid by the quickness with which the pupil will learn. Studying books is all well enough when combined with actually seeing work; but unless it is it is almost no use. A man may pore for hours over his "Rivington," studying "different bonds in brickwork," and find himself at the end so mixed that he probably knew more when he began; whereas a clerk of works could in five minutes explain and sketch all the bonds that are actually used in practice. When on a job, be there early and late; pump everybody and take copious notes, which ought afterwards to be copied into a book—any student who combines practical work and reading in this way should not have great difficulty with the practical part of the Institute examination. When a pupil is with an architect who has a lot of work going on in town which can be inspected either before, during, or after office hours the case, of course, is different; and this brings me to another point, which is, that I don't think pupils should be expected to stick slavishly to office hours. If a pupil wants to inspect some building in progress, or visit some workshop, he should not scruple to turn up an hour or two late. In offices which are managed on the "go-as-you-please" system there is no difficulty about this; but in others, managed on the factory system, it is not so easy, as there is probably a book to sign as you pass in the morning, or some member of the staff is told off to check the time. If there happens to be anything sketchable near the office, I think a man is quite entitled to put in a couple of hours' sketching in the middle of the day, or, if the office is not particularly busy, to take a forenoon or afternoon occasionally. These little matters can, however, generally be arranged without bothering the "governor" by asking for leave. I have sometimes heard pupils say that whenever their work comes to be directly remunerative to their masters they ought to begin to get a salary. I must say I think this is not a very serious grievance. A man knows before he enters an office what he is doing, and, considering that such a large percentage of pupils are never anything but a nuisance, when an architect gets one who is useful he is quite entitled to benefit by his work. However, there are sometimes exceptional cases, and it is an open question whether a pupil who comes to be a really valuable member of an architect's staff is not entitled to some "compensation for improvement." As regards the length of time a man should serve, I think four years is the proper length. Three is long enough for very clever men; but, for an average man, if he is in a good office, four is not too long. Five years certainly is. It is in vain for a pupil at the expiry of his articles to try to get into a good office as a paid assistant unless he has a good collection of measured drawings and sketches, and most men will find that to master even to a small extent the arts of sketching and making accurate, artistic measured drawings will keep them uncommonly well occupied for four years. For provincial men, who have not a chance of seeing the drawings at the Academy and the Institute prize drawings, no guide can be more valuable than the admirable plates of this kind which appear from time to time in the pages of the "B.N." Scotus.

PAPER PLACED THIRD.

After leaving school or college a timely advertisement in a local daily paper very often settles the business or profession that a lad first adopts, and afterwards figures in more or less conspicuously, and it is as well for parents or guardians to arrange, if possible, for the lad to go for a month or two on trial. He may at school develop a taste for drawing; but the work he does at school and the work he is expected to do in an architect's office are widely different. The master may not like his pupil, and the pupil, after a month or two, may find the work distasteful to him; but, on the contrary, if a lad likes his work after a trial, it is as well to get the indenture signed as soon as possible. And before this can be done the premium is usually a crotchety question, and it would be as well to have a clause in the indenture: "In the case of the master's death within a limited period of the articles being signed, that part of the premium should be returned"; and the parent should set aside a sum of money large enough at least to pay the pupil's lodgings during his articles, or it is possible for our young friend to find himself cornered through some unlucky financial speculations or the death of his parent. A pupil—I don't know why it should be so—is generally expected to do a good deal of fagging for about a year (in the shape of copying specifications which he does not understand, tracing, mixing ink, washing pallets, copying letters, running errands), or until some other pupil is drafted in to take his place. It is a good plan for a pupil to keep an office-diary, and dot down each day the principal items going on, and to make sketches of the same; this will often be referred to, not only in the course of a few days, but it is useful for reference years after. Where there are three or four pupils they are greatly encouraged by the governor, manager, or assistants getting up competitions for them, with a useful book as a prize, and there will be as much interest taken in the work as if the premium was large. The pupil should remember, if he is asked to do anything, to do it willingly, to the best of his ability, and to set about it as soon as possible, and in return he will have a good time. Any man in the office will assist him, and will be glad to have him out to measure up any building where work is to be executed, or will take him on the job, and in the course of an hour tell him what it would take months for him to notice; will show him a bit of old work worth measuring, and advise him about books worth reading, and very often where they are to be had. Then comes a month or six weeks' work on competition drawings, on which he figures largely with a pot of ink and a brush, blacking in the walls, or making a block plan showing drains, and when the premium is as good as in the governor's pocket, he may be asked to a dinner. Suppose we say you have had three years of office routine, your health would be improved, and you would get a lot of practical knowledge, if you can get on a building as clerk of works (alterations are as good as anything for you to superintend); you don't want to be too far from the office, so that if anything turns up that you are not quite sure about you can slip away to the office and make certain. You ought always to give your orders to the foreman and never to the men. And the foreman will give you a lot of information if you ask proper questions; but if you ask where he is going to make a start, he will most likely tell you they usually make a start at the foundations, and with the question you will drop fifty per cent. in the foreman's estimation. If the pupil knows a resident civil engineer on a railway in course of construction he would do well to spend his holidays with him, and in the course of a month he would learn to use the dumpy level, theodolite, and get some sound advice about surveying, sewers, girders, skew arches, &c. He can, with advantage, attend a school of art, and with a little persuasions with his friends they might start a modelling class, if there is not one already. The masters, as a rule, are very glad to receive suggestions, and to second any efforts of the scholars. It is a good plan to finish one drawing before starting a second, providing you are not designing a building; and to make as good use of your time generally as you can, or you may regret when you have only yourself to rely on that you did not make better use of your time when a pupil. H. Bragg.

BOOKS RECEIVED.

Elementary Treatise on the Strength of Materials and Strains in Structures, for the use of the Senior Students of the College of Science, Poona. By N. A. Moos, B.Sc. (Edin.), F.R.S.E. (London: Griffith, Farran, Okeden, and Walsh) Although professing to be an elementary treatise for the use of students at Poona, Mr. Moos's volume will be read with profit by many others. The book is written in the form of lectures, and not only enters into the mathematical principles of the subject of strain, but shows the application of formulæ. The deduction and examination of the principal formulæ occupy a large share of attention necessarily. Longitudinal strain, compressive and tensile loading, are considered at some length for different materials. Transverse strain is thoroughly exemplified, and examples are worked out with the aid of diagrams, chiefly of iron girders. Girders with concentrated rolling and distributed loads; braced girders, lattice girders, continuous girders, roof trusses, masonry dams, are treated fully, and the design of a girder forms the subject of the last lecture. There is very little that a young engineer wants in construction that he will not find explained; the explanations are concise, and, what is of much importance to students and practical men, only an elementary acquaintance with algebra and trigonometry is required. In the lecture on roof trusses, the author gives some very clear examples of stresses found by trigonometrical calculation, and also graphically, both methods in use being shown. The mode by reciprocal figures, and the method of lettering the diagrams, which is of first importance to prevent confusion, is made quite clear, and this part of the treatise will be found of especial value to architectural students. —— *Pocket Technical Guide, Measurer, and Estimator*, by A. C. Beaton (London: Crosby Lockwood and Co.), is the fourth edition of a well-known guide. The whole of the directions and data is comprised within the size of a waistcoat pocket-book, clearly printed, well illustrated, and carefully revised throughout. No architect, surveyor, builder, or valuer should be without his "Beaton's Guide."

BRICK CHURCHES IN THE SOUTH OF LONDON.

SEVERAL new churches in South London have been recently completed, or are in course of erection. A few weeks since we noticed the church of Corpus Christi, on Brixton-hill, from the designs of Mr. Bentley—a very fine example of a Roman Catholic brick church, relieved by stone in the dressings. Last Saturday, the Architectural Association visited three other churches at Streatham, in which brick has been wholly or partially employed. St. Peter's Church, in the Leigham Court-road, a very charming rural thoroughfare leading from Streatham Hill Station eastwards on hilly ground, was mainly erected in 1870 in the Early Decorated style. It consisted of a nave and side aisles, a square-ended chancel of some length, an organ chamber and vestry with a high-tiled roof with level ridge throughout, the whole being built of stock brick, with red brickwork and stone introduced in patterns and dressings. The church has been lately lengthened by the addition of two bays and baptistery from the designs of the architect, Mr. G. H. Fellowes Prynne. There is a slight projection made in the aisles at this end (to give increased width, and to be continued eastwards), beyond which are two porches giving access to the aisles, and a new baptistery of apsidal form semi-octagonal on plan. The baptistery and side porches, together with the new gable-end, form an agreeable termination towards the road. The gable end of nave has a wheel window and is flanked by low turrets and relieved by red brick diapering; the side aisles are finished by low horizontal walls, with pinnacles and flying buttresses abutting against the nave. In front project the apsidal baptistery, with hipped roof, and the porches; the south porch has a circular angle turret. Three-light windows and shafts of stone pierce each of the three sides of the baptistery; the interior shafts are detached. Only three lights, in the centre, are filled with stained glass, the gift of the vicar. These windows are intended to be filled with the nine orders of angels, the archangels now occupying the centre lights, executed by Messrs. Clayton and Bell. When completed, the entire series of windows will make a very effective interior. Below the baptistery is a meeting-room, lighted by a series of two-light windows traceried in the heads. The rapid fall of the ground at this end has given apparent height to the baptistery; two flights of steps give access to the porches. The interior has an arcade on each side of circular stone pillars, carrying stock brick arches of simple square members and dog-tooth ornament; the tympana and walls are relieved by patterns of red brick and bands and sills of stone, the lower part of aisle walls to the window sills being of red brickwork. There is no clerestory, the spaces between the arcading and the nave roof being partly adorned by frescoes of Scriptural subjects. The roof has arched ribbed principals, with collar and king and struts above, these being carried on short corbelled wall shafts of grey stone. The altar end is decorated by panels with mosaic figure subjects. Exteriorly the roofs are of red tiles, and the ridge line continued throughout. Messrs. J. and C. Bowyer, of Upper Norwood, are the builders.

The church of St. Andrew, Lower Streatham, designed by Messrs. Ernest George and Peto, is a building of unique character, built entirely of red brick with terracotta dressings. It has a nave, chancel, two aisles, organ chamber, and vestry with porch at the west end. The organ chamber is carried up and gabled, forming a transept externally. At one angle of it rises an octagonal turret of brick, with a pierced terracotta bell-cot and spire, some blind panelling in the same material being carried down below the base. The aisles are gabled longitudinally by a series of three gables, each having a four-light window of Perpendicular design, the mullions and tracery being of terracotta. The clerestory is pierced by a row of low, pointed traceried windows, and the roof is covered with red tiles. Internally there is an arcade of three arches on each side; the pillars are octagonal, but without capitals, the arch members dying away into the sides of octagon, the arcade being entirely of terracotta. Above are flat segmental pointed clerestory windows. The nave roof is of the hammer-beam type, with collar curved braces. The walls behind the altar are arranged in diapers of terracotta panels with relief ornament, and red brick; a mosaic picture representing the Lord's Supper forms part of the reredos. The flooring is of wood blocks, laid herringbone wise, and the seats are open benches of deal. On a brass plate let into one of the pillars is an inscription stating that the church was consecrated on Ascension Day, 1887, and was built by friends of the late Stenton Eardley, B.A., first incumbent of Immanuel Church, Streatham-Common. The nave and chancel are of the same width, and the roofing is level throughout, there being no internal arch or visible separation externally. There are few modern churches in the neighbourhood of London which presents so satisfactory an evidence of the practicability of uniting brick and terracotta without sacrificing character and detail. The window tracery, mouldings, and internal arcading are exceptionally true in line and sharper than ordinary stone would be. The architects have, we think, very judiciously obviated the stone capitals between the shafts and arches, and have indicated how well the continuous shaft and arch members suits the capability of the material. Horizontal impost mouldings are thereby avoided, and the springing blocks are moulded with accuracy. The design in its general grouping has a freshness and character of its own which might have been expected from the talented architects engaged.

In Streatham Park is a third church entirely of red brick, with few details of warm-coloured stone introduced, contrasting rather strongly in its severe plainness and monotony of colour with the previous edifices. Externally, St. Alban's is an unfinished church, consisting of a nave and aisles, with a temporary chancel. The style is plain Norman or Romanesque; the windows are two-light, circular headed, with Mansfield shafts in the jambs and sills, An unfinished tower at the south-east corner adjoining the chancel is at present surmounted by a wooden bell-turret, and is simply panelled in red brick round the upper stages. There are in all five bays, with porch at west end, and red tile roof. The cost has been about £6,288. Mr. E. H. Martineau is the architect. Relief here has only been attempted by the massing of the parts of the projecting piers which divide the bays and emphasise the angles. Another red brick church, St. Anselm, has been commenced; but here the more judicious plan of completing the chancel and transepts has been followed, the nave at present being nothing more than a galvanised-iron shed, with a huge "hopper"-like excrescence, or roof, against the western wall of nave, to shut off the chancel. Frightfully ugly the result of the temporary combination of iron and brick is now, and must lead to a speedy raising of the necessary funds for completion. One other church, though not a recent one, may be mentioned as a good example of the brick style representing some of the Italian or Lombardian features of Romanesque churches. We refer to Christ Church, leading out of Brixton-hill, designed by Mr. J. W. Wild, and consecrated in 1841. A severely plain gable end of low pitch pierced by a circular window faces the road, and a lofty bell-tower, which diminishes as it rises, equally severe in outline and majestically plain, stands at its side—recalling one of those campaniles which are so common in Italy. The only practical doubt as to the merit of the style as here shown is the exceeding smallness of the windows, which are mere slits in the walls.

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.

THE members of the Somersetshire Archæological and Natural History Society, in connection with their Bristol meeting, made an excursion last week through some of the most beautiful scenery in Gloucestershire. In the morning the party assembled at the Queen's Hotel, Clifton, where vehicles were waiting. The first place at which a stoppage was made was Westbury-on-Trym. The party having entered the church, Mr. J. Taylor read a paper which commenced by referring to the original grant of land in the parish and the subsequent bequests. He then passed on to dwell upon the connection of Westbury with the commencement of Benedictinism in England. In 1286 a successful attempt was made to convert the building at Westbury into a college of deans and canons. Precentor Venables, of Lincoln, followed with such a description of the church as he was able to give after a hasty survey. He said when they entered the church it seemed to be at once a building of the 15th century. All the windows were of the Perpendicular order, though windows were by no means an adequate index of the age of a church, as the windows were being continually altered, and the walls were often much earlier than the windows which pierced them. The church was an exceedingly shapely building of several different dates. He dared say there was a prior church to this on the spot; but the earliest part one saw was of the Early English style, probably before 1250. The whole of the south wall was Early English, and the western window of the south aisle was a triple lancet window of unequal height, which was a mark of the architecture of the 13th century. The sedilia and piscina were peculiarly interesting examples of the Early English style. He called special attention to the tomb of Bishop Carpenter, which was found in a mortuary chapel underneath the chancel, and he said that proved the chancel to be the work of Bishop Carpenter, who died in 1476. The tomb had been beautifully restored by the authorities of Oriel College, with which the Bishop was connected. After the church was quitted the party proceeded to the college, a 15th-century structure, at present converted into a dwelling-house. A drive to Henbury was varied by a stroll through the fields, the path leading by steps to the churchyard. The Rev. J. H. Way, the vicar, proved a ready guide to the church. He stated that the building had been unfortunately pulled about in 1830 and 1831, some large pillars taken down and Norman arches removed to give place to others put up in brick. The line of the chancel and the nave did not agree, as, though the chancel pointed east, the line of the nave was not in strict accordance. The reason of that discrepancy might be that the nave was first constructed and laid out somewhat at guess, and when, subsequently, the chancel came to be added, that portion was more carefully undertaken in order to insure accuracy. A few years ago Mr. Street was consulted, and under his direction the church had been carefully restored. The registers dated from the time of Henry VIII., and they might be examined in the vestry. A drive through Hallen brought the archæologists to the parish of Compton Greenfield, where they were welcomed by the rector, the Rev. G. Hope Dixon. Quitting the rector's residence, the party were shown over the church, which, if rather disappointing at the first glance, contains striking features. The principal feature is undoubtedly the fine Norman church at the entrance, the date of which is 1140. Rarely is so excellent an example to be met with, and fortunately it has not suffered at the hands of injudicious restorers. The rector said the church was restored in 1835 on the old lines, and then consisted simply of the nave and chancel without the transept. The tower, built of magnesian limestone found at Aust, was of the date 1360 or 1380. To Aust was a long but pleasant drive, and the party congregated under the cliff to hear some details, specially of the bone bed, from Professor Lloyd Morgan. The church at Aust, nearly a mile distant, was visited, the main object of interest here being a celebrated Elizabethan chalice. Memories of John Wycliffe have hallowed the church, and a key is now shown which he is supposed to have used in 1360. The Rev. Mr. Turner, the vicar, acted as guide in connection with the church. At Thornbury the party proceeded to the church, which they surveyed; they then went to the Castle, where Mr. E. Buckle read a description of the structure such as it was in the palmy days of the Duke of Buckingham. On their way back to Bristol the archæologists stopped at Almondsbury Hill, in order to enjoy the prospect.

Messrs. Herbert S. Wood, Herbert G. Lidstone, and H. V. Lanchester have been awarded the first, second, and third prizes respectively in the examination held in June last in connection with Mr. H. Lovegrove's lectures on "Construction" at the Architectural Association.

CONTENTS.

The Emphasis of Structure... 197
National Competition of Schools of Art Prize Drawings 198
The Right Way to Promote Technical Excellence ... 199
The Profession of a Clerk of Works.—III. 200
"Only Thirteen!"... 202
A Decorative Pulpit 202
The Bostwick Folding Steel Gates and Shutters... ... 202
Leeds Architects and the Leeds School Board 203
Our Competitors' Column 203
Books Received 204
Brick Churches in the South of London... 205
Somersetshire Archæological Society 205
Our Lithographic Illustrations 206
Sketches at the Home Arts Association... 206
Bedroom Furniture by Messrs. Jenks and Wood... ... 206
Competitions 206
Wayside Notes 227
Building Materials 227
Architectural Association Excursion, Wilts, 1887 ... 289
Building Intelligence 229
Architectural and Archæological Societies 230
Correspondence 230
Water Supply and Sanitary Matters 231
Intercommunication 231
Parliamentary Notes 232
Statues, Memorials, &c. 232
Legal Intelligence... 232
Our Office Table 233
Meetings for the Ensuing Week 233
Tenders 234

ILLUSTRATIONS.

ST. ANNE AND THE VIRGIN.—ST. JOSEPH AND THE INFANT CHRIST.—CHRIST BEFORE HEROD.—NEW OFFICES OF THE "EAST ANGLIAN DAILY TIMES."—SIDEBOARD FOR A HOUSE AT HAMPSTEAD.—LIBRARY, BONALLY TOWER.—NEW CHURCH AT STRATTON.—SKETCHES AT THE HOME ARTS ASSOCIATION.—BEDROOM FURNITURE BY MESSRS. JENKS AND WOOD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. ANNE AND THE VIRGIN, AND ST. JOSEPH AND THE INFANT CHRIST.

THESE are two more examples by Carl Müller, of whose Scriptural subjects we have already given one or two reproductions which seem to have found favour. We shall give another in a few weeks, of "The Repose in Egypt," by the same painter.

CHRIST BEFORE HEROD.

WE have recently referred at such length to this panel as to render it unnecessary to say more now. We congratulate Mr. Tinworth on the accomplishment of what is in many respects his best work, and Messrs. Doulton and Co. on its successful completion.

"EAST ANGLIAN DAILY TIMES" OFFICES, IPSWICH.

THE new publishing office and printing works of the *East Anglian Daily Times* are at the corner of Carr-street and Little Colman-street, Ipswich. The premises, necessitated by the growth and the continuing success of the paper, are two doors west of those occupied for the past thirteen years by the same newspaper publishers, and occupy the site of a 17th-century residence and garden, the area being an irregular oblong 150ft. in depth, with a width increasing from 43ft. on the Carr-street frontage to 76ft. at the rear. The style adopted for the new buildings by the architect, Mr. Thos. W. Cotman, M.S.A., of Northgate-street, Ipswich, is a free rendering of Renaissance of the latter portion of the 16th century, with a large use of Flemish details—a treatment peculiarly appropriate in Ipswich from historical associations. The buildings are in two distinct but adjoining blocks, the principal or publishing department being placed in Carr-street, part of the main thoroughfare through the town, and its main and return façades are marked by greater richness and elaboration of handling than is the block devoted to printing, which forms the chief part of the Little Colman-street front. Red Suffolk bricks are employed for facing the street elevations, Dutch bricks being introduced for carved work and for outlines of gables; the latter bricks were specially imported for this work for these premises and Mr. Felix Cobbold's residence at Felixstowe, and are 8in. by 4in. by 2in., of a deep red colour and considerable weight. The roofs are covered with Broseley tiles. At the angle of the two streets the building is canted off on the ground floor, and the entrance doorway is placed here. A semi-octagonal turret is carried over on a corbel of red Dumfries stone, and rises two stories in height, being capped above a frieze of carved brickwork and brick coving by a steep-pitched roof covered with copper scales; the height to the weather-cock is 52ft. Over a second entrance to the publishing-office, nearly in the centre of the Carr-street front, is a projecting balcony carried on carved stone consoles, with wrought-iron railing. The windows of both stories of the publishing department have square heads set under projecting hood moulds, the tympana being filled with masks and foliage in cut brickwork; and above a deep frieze, treated in the same manner, are gabled dormers, having scroll outlines. The printing department block, treated more simply, is covered by a separate and higher roof. Beyond this block, which has a frontage of 70ft., is the workmen's and cart entrance. At the further angle of the site a circular red brick shaft rises 90ft. high, and adjoining are cart sheds and stables for the outdoor news trade. The ground floor of the business department is arranged as an advertisement office, at the angle of streets, 36ft. by 18ft. in clear, with manager's room behind; and to the right is the editor's room, which is still fitted up with the 17th-century oak-panelling from the old merchant's house which formerly occupied the site, and behind this is the file-room. Beyond the manager's room in Little Colman-street is the wholesale publishing office, with sorting, packing, and strong rooms behind, and to the north of these is the machine-room, which is 60ft. by 30ft., containing two Wharfedales and folding-machines, each erected on separate beds of solid brickwork. At the back, on a lower level, are the engine and boiler-rooms, and in the basement are damping-room, stock-room, heating chamber and electric-dynamo store. At the rear of premises is an irregular L-shaped room, averaging 60ft. by 14ft., used for general printing. The first floor contains in the front block a second editor's room, sub-editor's, chief and assistant reporters', and readers' rooms and lavatory. The sub-editor's and reader's rooms are placed at the back, and communicate by serving hatches with the composing room. This measures 67ft. 3in. by 28ft. 6in. in the clear, and is lighted by a range of eight square-headed windows along the east side, and by a semicircular headed window 8ft. across and 8ft. high in centre in each gable. The lower part of internal walls are faced with a dado of glazed bricks, and the upper part with white Chiltons. The roof is open to level of purlins, each set of principals consisting of a tiebeam carrying queenposts and diagonal straining pieces; the half-ceiling is of pitch-pine, perforated in decorative panels. On the eastern side of room, exactly opposite and adjoining each window, is a compositor's frame, fitted on either side for three men, accommodation being thus provided by the eight double frames for 48 compositors, and the imposing tables are placed on the western side of the room. In the centre of this western wall is one of Messrs. R. Waygood and Co.'s patent lifts communicating with the machine-room. At the north end of room is a long desk for the overseer, just behind which a sliding hatch opens directly into a sub-editor's room; while a similar hatch from the readers' closet faces the galley-press on which proofs are pulled. At the north end of room are provided steam-jet and water supply for washing type, and beyond are the lavatory and compositors' staircase and entrance from Little Colman-street. All the rooms are heated by hot-water pipes, and lighted by a duplicate system of gas and incandescent lights. Messrs. George Grimwood and Sons, of Sudbury and Ipswich, were the contractors; and Mr. Harry Cockrell acted as clerk of works. The carving has been executed by Mr. Knox, of Peckham, S.E.

SIDEBOARD FOR A HOUSE AT HAMPSTEAD.

THIS Sideboard was designed *en suite* with some furniture for a dining-room for a house at Hampstead. It is of walnut, the side projecting cupboard doors being filled with lead glazing, the centres being of bevelled glass, and the leadwork gilt. Behind the balusters to the top cupboards silvered glass is placed. The sideboard was designed by Mr. R. A. Briggs, A.R.I.B.A., of 2, Devonshire-square, E.C.

LIBRARY, BONALLY TOWN, MID-LOTHIAN.

THIS room forms part of a new wing which has just been added to this picturesque old mansion which was long the residence of Lord Cockburn, a famous Scottish judge. The ceiling and bookcases are of wainscot, and the fireplace is a replica of that which was lately destroyed in the Hall of the Knights Templar at Linlithgow. The two circular turrets and the deep ingle nook form cheerful and pleasant features in the room, and give it a comfortable and homely air. The architect is Mr. Sydney Mitchell, Edinburgh.

NEW CHURCH AT STRATTON.

THE new church now being built from Mr. Jackson's design at Stratton, in Hampshire, is to supersede a very mean modern structure of brick which stands on low ground in Stratton Park. The new church, which is being erected at the expense of the Earl of Northbrook and the Hon. Francis Baring, is situated on higher ground nearer the village. The materials are brick, with flint facing and dressings of Chilmark stone externally and of chalk internally. The spire is of timber and shingled. The seats and other fittings are to be of oak throughout. The contractors for the general work are Messrs. Parnell and Son, of Rugby, and Mr. Evans is clerk of the works.

SKETCHES AT THE HOME ARTS ASSOCIATION.

SINCE last year the above Association has greatly improved both in quality of work, quantity of work, and an increase of the number of teaching centres. We illustrate a few sketches made from the annual exhibition. This we noticed in our issue of June 17, so it will be only necessary to say a few words about the articles illustrated. The White Mantel was made by the Ashridge Class, and has been purchased by the Countess Brownlow for £10 10s. The Chest of Drawers was made at Corstorphine, a Scotch class. It was of oak, well carved, and yet not too much ornamentation on it. The little Screen was stained green, and we hope the Home Arts Association will be able to make the colour permanent, as, unless a very strong acid be used, the colour is not at all permanent, and when faded looks very queer indeed. The other works, Inkstand, Bellows, &c., are, we think, copied from old examples.

BEDROOM FURNITURE BY MESSRS. JENKS AND WOOD.

THE sheet of Bedroom Furniture illustrated this week is of a Georgian character, and an agreeable effect has been obtained by the application of Tynecastle Tapestry to the panels and friezes, which are thus enriched in low relief. The furniture is all of pine, painted and varnished, and consists of a Wardrobe of pleasing design, with a pediment over, with rounded ends and an arcaded recess in the centre. The kneehole Toilet Table has fixed glass, and cupboards over; the kneehole Washstand has a marble top and tilted back. There is also a Towel-horse, beside Table and Rush-bottom Chairs.

COMPETITIONS.

VICTORIA HOSPITAL FOR SICK CHILDREN, HULL.—The design submitted by Mr. Samuel Musgrave, F.R.I.B.A., of Trinity House-lane, Hull, has been selected for this building; premiums of £15 and £10 respectively being awarded to Messrs. Botterill, Son, and Bilson, and Messrs. Smith and Brodrick, of the same town.

A memorial to the late Charles Longuet Higgins, of Turvey Abbey, has been set up in the chancel of Turvey Church. Two sculptured angels are represented sitting at either extremity of a tomb (with reference to the Evangelical record in St. John xx. 12), surmounted by branches of palms. Above the tomb, within a circle, is a cross between the Alpha and Omega. Beneath is the Greek monogram of the name of Christ. This memorial, which is executed in Carrara marble, is inclosed in a frame of carved alabaster, carved at the summit, the background being constructed of blue Venetian mosaic. The sculptor is Mr. H. H Armstead, R.A.









S. B. Bolas & C°. Photo : printers.

11 Ludgate Hill. E. C.

S^{t} ANN AND THE VIRGIN

BY CARL MÜLLER.

S^{t} JOSEPH AND THE INFANT CHRIST

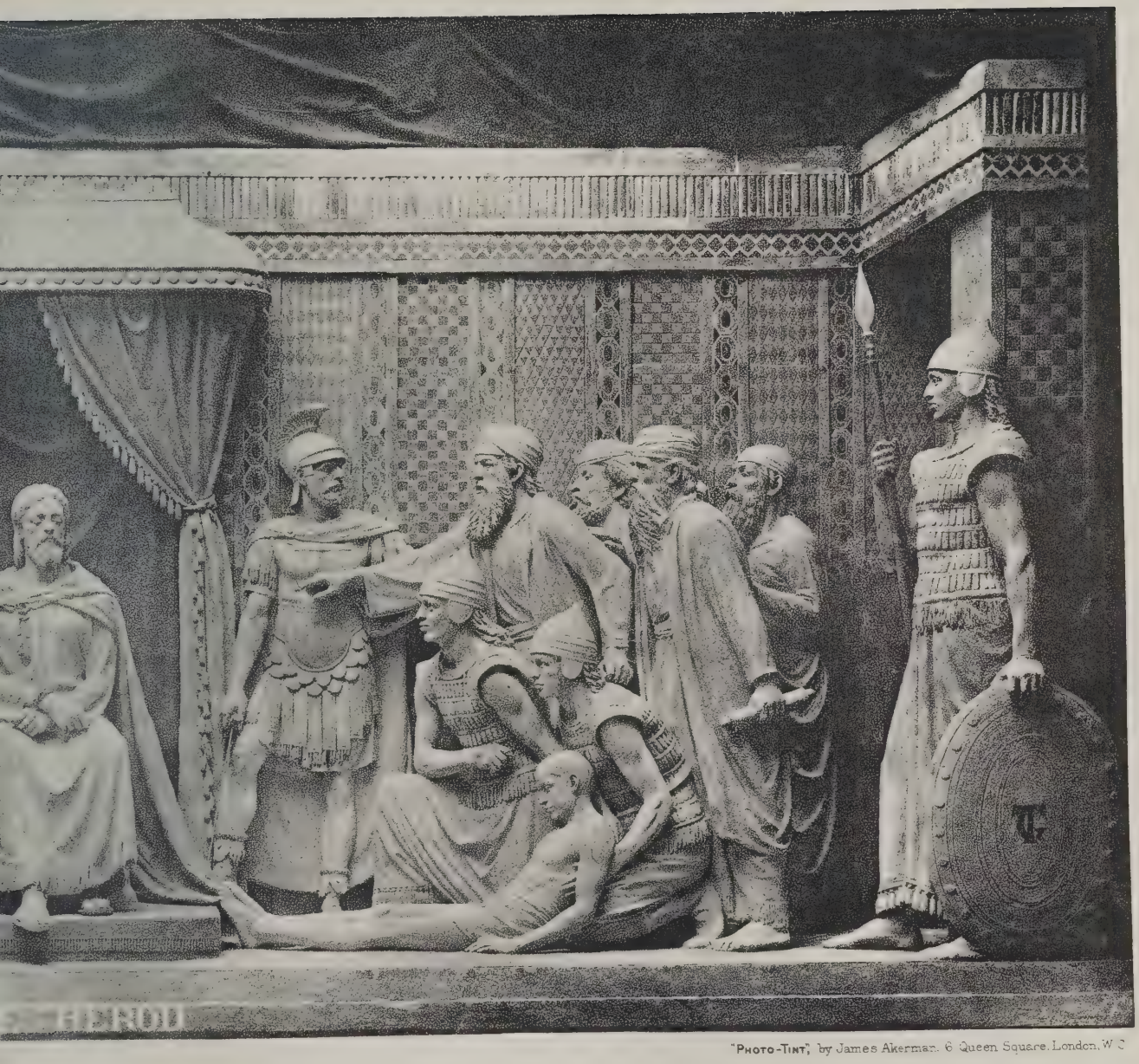
BY CARL MÜLLER.



LIFE · SIZE · T

BY · GEORGE · TIN

5. 1887.



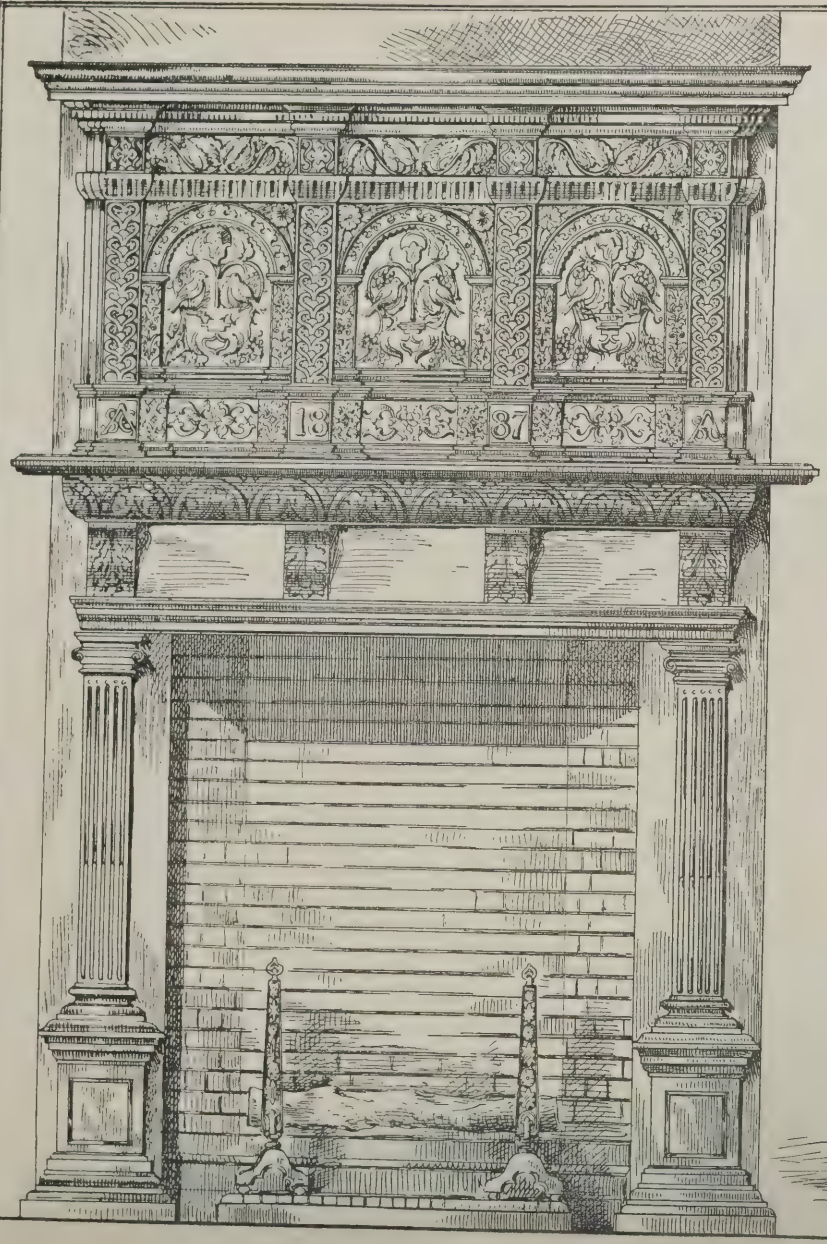
"PHOTO-TINT," by James Akerman. 6 Queen Square, London, W.C.

COTTA · PANEL

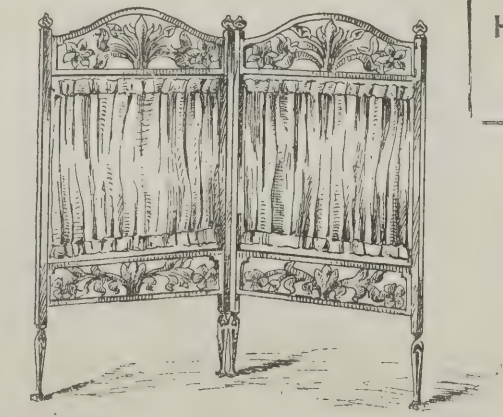
· MESSRS · DOULTON

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Sketches at the Home Arts Association Annual Exhibition



Mantel & Overmantel



Carved Screen



Carved Base For Ink



Chest of Drawers



Carved Oak Bellows

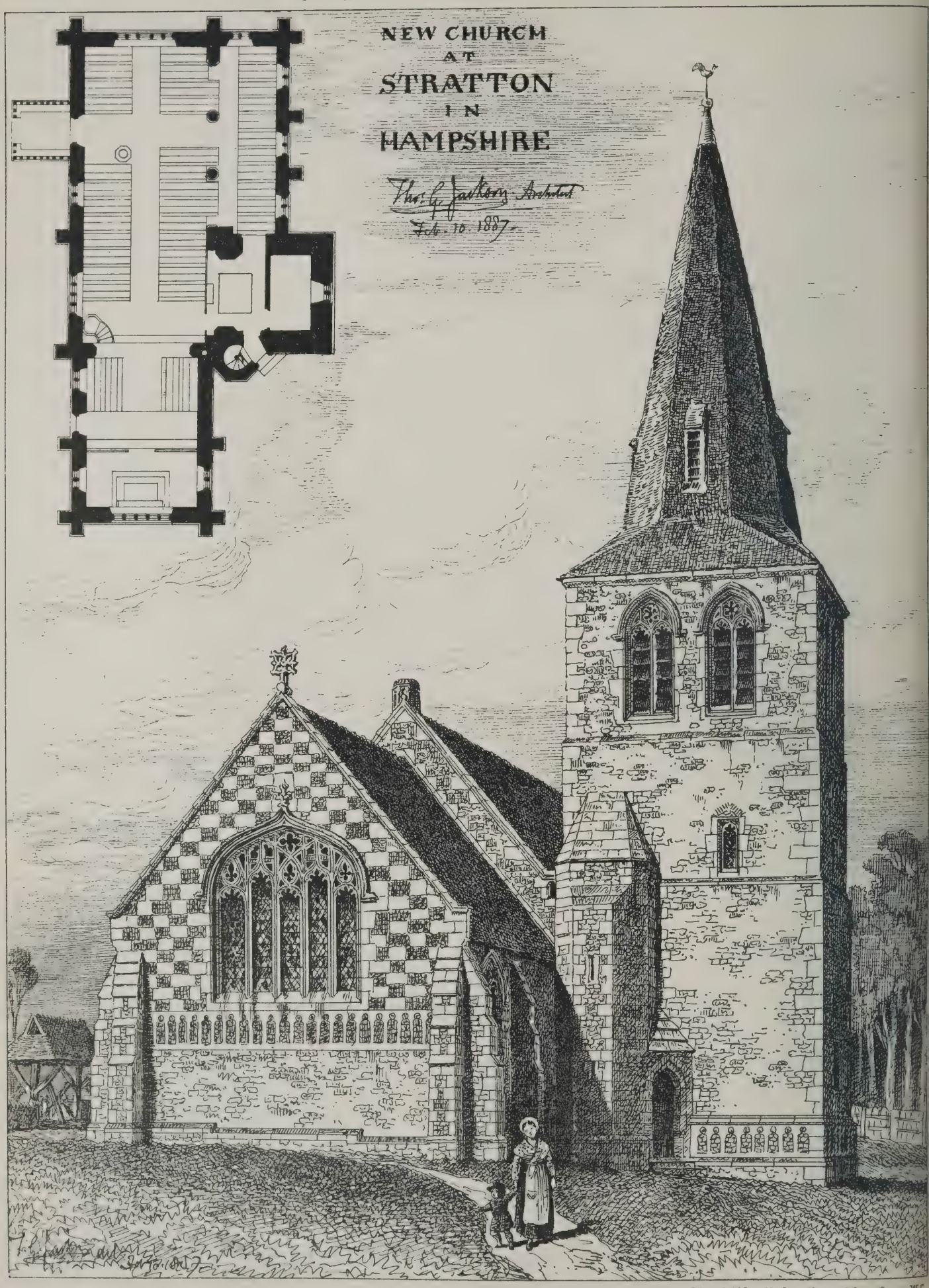


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.





NEW OFFICES and PRINTING WORKS of the EAST ANGLIAN DAILY TIMES, SUFFOLK MERCURY &c IPSWICH.

THOS. WM. COTMAN. ARCHITECT. *Northgate Street. Ipswich.*

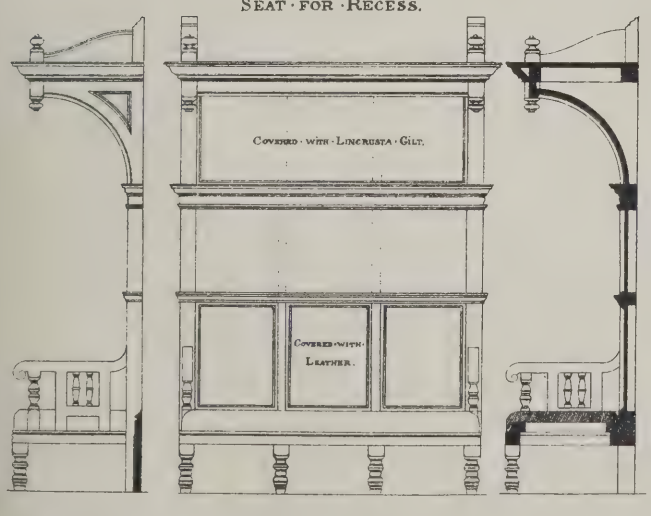
Photo Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

SIDEBOARD · FOR · A HOUSE AT HAMPSTEAD

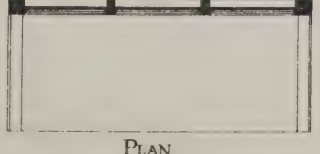


·FURNITURE · FOR · J.B.KNIGHT ESQ^RE.
DRAWING ROOM · 31 HOLLAND PARK.

SEAT · FOR · RECESS.

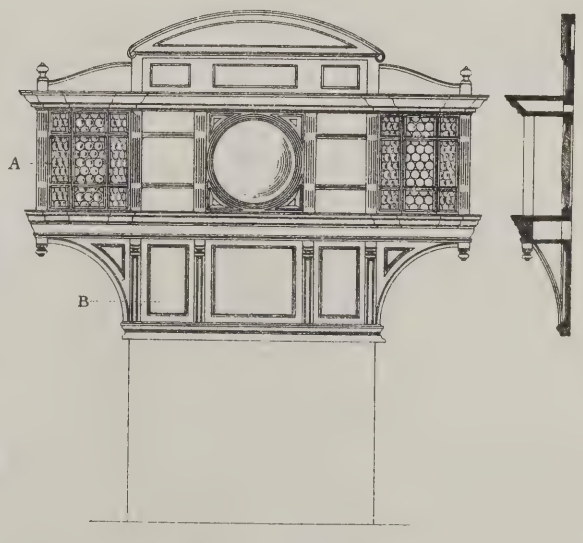


SIDE · ELEVATION. FRONT · ELEVATION. SECTION.



PLAN.

HANGING CUPBOARD.



FRONT · ELEVATION. SECTION.



HALF · PLAN · AT · A. HALF · PLAN · AT · B.

R.A.BRIGGS · ARIBA · ARCH^T.

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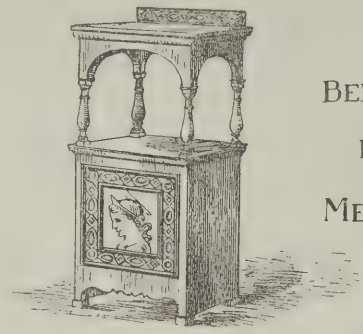
BEDROOM · FURNITURE

DESIGNED AND MADE BY

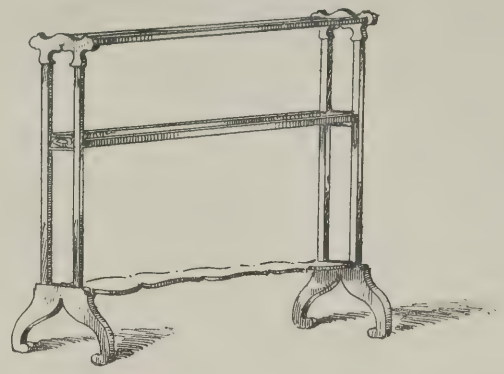
MESSRS JENKS AND WOOD



CANE SEATED · CHAIR



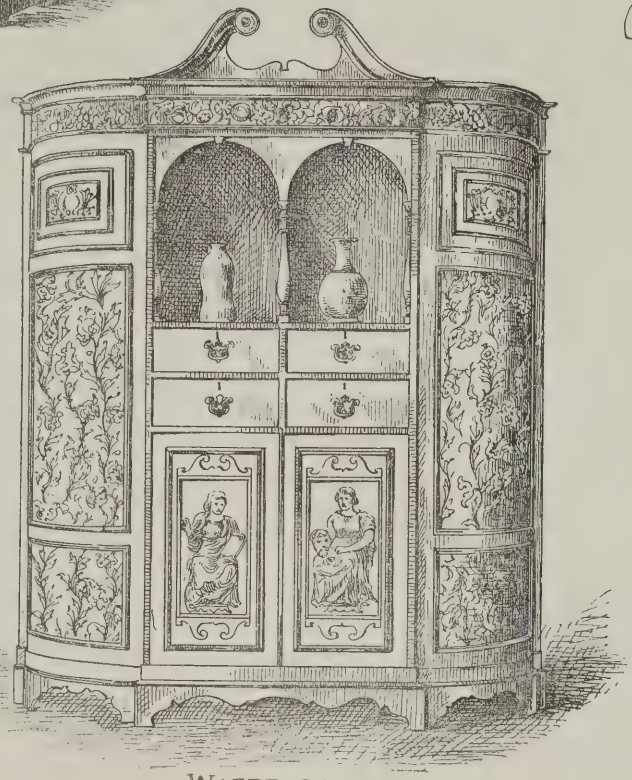
COMMODE



TOWEL · AIRER



WASH · STAND



WARDROBE



DRESSING · TABLE

WAYSIDE NOTES.

HE proposed alteration of the steps to the portico of St. Martin's Church really seems e wholly uncalled for, as those persons who best able to judge state that there has been ıerto little or no congestion of traffic at the ıt in question. Why not, then, let the evil ufficient to the day thereof? Such a proling would savour nothing of procrastina-. If the roadway is sufficiently wide why r it? Meanwhile, perhaps some ingenious ıkee, skilled in the art of wholesale building ıovals, will come along and bodily set the lding back a few yards!

ooking northward up the east side of Tra-ar-square it certainly seems as if the end of National Gallery is the greatest offender, as rojects infinitely more into the line of road- than does the church. It is sincerely to ıoped that for the present sufficient room l be obtained by setting back the railings at end of the gallery. The inexorable law of survival of the fittest must ultimately solve problem. The National Gallery may be St. Martin's Church may be fitter; but the ving tide of humanity is the fittest.

n Saturday last, I believe, the Architectural ociation visited a number of new churches he south of London—with much advantage, us hope, to its members. Messrs. Ernest rge and Peto's church is well worth seeing, the names of the architects of the other ldings visited by the A.A. should warrant d work. The Society of Architects recently ted two excellent churches in the west of ıdon; and any persons who accompanied h bodies should have somewhat increased ir knowledge of modern ecclesiastical architure.

t is curious that so many of our modern ırches are dubbed, by the public, as "barn-e." Such an impression would appear to lom disturb the equanimity of the profes-ıal. Nevertheless, the charge is often war-ıted. Doubtless, the want of sufficient money en renders our modern churches so bare and l looking, though no skilful architect can rly plead limited means as an excuse for an interesting building. Where simplicity in nposition is the result of affectation it is tainly despicable, and must be distinctly ot apart from noble simplicity—the un-ected composition that one may often find in village church, where the old builders dently went about things in a purely nmon-sense manner, building what they nted, hiding nothing, and affecting nothing. long as they were honest and true, if there s often merely negative beauty, there was ver positive ugliness.

Such an old church I had the pleasure of exining a few weeks back. I can almost see in imagination as I write, rising from the ensward, with its grey mass relieved against blue sky and fleecy clouds. It is an example that common-sense composition which not y suffers nothing to stand in the way of the ctical uses of the building, and hesitates ver to adopt any plan so long as it be but fit l true, but also turns such incidental features o objects of beauty, often lavishing more ention on their decoration than on the other rtions of the design.

It is rather a pity that we do not get more urches in a Later style of Gothic. We all te Early English; but we should possibly ost of us find a little variety in style de-ledly charming. The 15th-century period, it has its blemishes, has also very ıny redeeming features. The style has been ndemned as exhibiting "liny" mouldings d carvings. But there is no need to make em liny now. One sees, too, plenty of old Per-ndicular work that is as intrinsically beauti-l as is the work of any other period. How ıny a dull, plain, Early church is redeemed m tameness of interest by the addition of ne feature or another in all the quaintness its piquant 15th-century proportions!

It could hardly be expected that the old bey would altogether escape damage by the rations of stand-making for the Jubilee ebrations. I have not had an opportunity to examine the building, but note a letter from Mr. E. H. Walters to an evening contemporary, stating the amount of injury that, in his opinion, has been done to the venerable structure. The Coronation Chair is said to have assumed a murky colour, and the remains of its 14th century decorations that were executed in gilded gesso have been utterly obliterated. The "chair," moreover, has acquired an odour of French polish. Further, an old stained-glass window in the apse is said to have had a hole knocked in it; the stonework of the church chipped in several places; the effigy of the Countess of Lancaster roughly used; and lastly, but none the less regrettable, Abbot Ware's Italian mosaic pavement has suffered—it is said by workmen throwing down heavy tools.

The so-called restoration of Westminster Hall proceeds apace. The new stonework already rears itself above the hoarding. Whether the additions now being made are warranted by facts or not, the building will apparently prove an excellent piece of Modern Gothic, judging by what can be seen of the work from the public highway.

We may expect to hear that the death-warrant of the Mayor's Chapel at Bristol has been duly signed before long. The members of the A.A., who join the annual tour, should take advantage of the last opportunity to inspect and sketch this interesting old edifice.

The Earl of Milltown seems to be determined to do all that is possible to rescue the old relics of Burlington House colonnades in Battersea Park. Last Monday the noble earl again drew the attention of the Government to the stones on the riverside. It is difficult to even hazard a guess at the ultimate destination of the remains of the old colonnades. Something in connection with the Jubilee is the only suggestion I can make. The idea is so original!

I hear that it is probable that the Betchworth tunnel will be done away with, and a cutting substituted, as the owner of the park under which the L. B. and S. C. Railway runs has given permission for the alteration to be made. It is to be concluded that the exceptionally dry weather must have caused the subsidence of earth—possibly by weakening the natural abutments to the brickwork of the tunnel, the arch of which, under the circumstances, would burst at the weakest points.

Anyhow, it is fortunate that no train was in the tunnel at the time of the accident, as the result must in that case have proved disastrous. A falling body brings ruin in its train. A fall *on to* mother earth, however, seems a much less risky adventure. There have lately been some marvellous escapes from death and injury by falling. A few days back a man fell from the Brooklyn Bridge in New York to the river beneath, and "did not complain of any serious hurt." The most curious case, however, is perhaps that of a recent accident at the flour mills in Bexley, Kent. A man engaged in repairing the chimney-shaft, fell from the top, a distance of about 60 or 70ft., *through a slate roof*, and alighting on some sacks of flour, is now fast recovering from the mishap!

One cannot but admire the iron nerve of "steeple-jacks." And real nerve they must have, since no false courage or bravado will take a man safely to the summit of a lofty spire or chimney, whence the houses look flat on the earth, the men appear like bees upon the ground, and the very hum of the city below is hushed. Nothing is more calculated to inspire a feeling of admiration for the bold though pious confidence of the Mediæval builders, than to climb a few of their more daringly constructed open-work spires to be found on the Continent. Some of this comparative child-play is risky to the nervous. But how can we compare such a position to that of a man hanging on by a few nails to the almost perpendicular face of the spire. Still, it may be objected, I am giving too much credit to the steeple-jack, as it is "their trade," and there is nothing much in it. Perhaps so, though they do say that if an architect ever neglects any part of his duties, it is the being hauled up by ropes to inspect the top of a tall factory chimney.

GOTH.

BUILDING MATERIALS.*

By W. Y. DENT, F.C.S., F.I.C.

THE term "Building Materials" embraces so wide and comprehensive a subject, that it may be well to make some explanatory remarks as to the nature of the information that is intended to be conveyed regarding the several matters to which I propose to direct your attention. As regards one of the most important of these, stone, it will be my endeavour to point out, as far as possible, the differences which exist in the composition of the principal descriptions used for constructive purposes; and the properties which stone should possess to enable it to resist the action of those influences which tend to bring about its disintegration and decay. Your attention will be directed to the nature of the proposals that have been made from time to time for the preservation of stone, and to the results that have been attained as regards the manufacture of what may be regarded as coming under the designation of artificial stone. With respect to limes and cements, I hope to be able to afford some information as regards their respective constituents, the processes adopted in their preparation and manufacture, and the advance that has been made in the improvement of such processes during the last thirty years, and also to introduce to your notice some rather novel applications of the most important of all the different varieties of cements, generally known under the name of "Portland." As regards wood, I shall confine myself to the question of its preservation from decay, and to a description of the various processes that have been adopted to increase its durability, and enable it to resist the attacks of the teredo and other boring worms. Lastly, in connection with the subject of paints, I shall have a few remarks to make as to the nature and composition of some of those that constitute the basis of that vast and ever-increasing number used for the preservation of wood and iron, which are continually being forced upon the attention of the public. It is well known that although the differences which exist in the character and behaviour of various substances may for the most part be generally attributed to diversities in their composition, as determined by chemical analysis, yet in many cases these differences are due simply to changes in their molecular structure. It is necessary to remind you of this fact in connection with such a material as stone, because the value and quality of stone depend quite as much, or even more, upon its physical structure than upon its chemical composition. I may recall to your recollection a few familiar examples of important changes being effected in the behaviour and character of a substance without such changes being accompanied by any alteration in the proportion of its chemical constituents. By subjecting starch to a temperature of 400° Fahr. it is converted into dextrin, or British gum (as it is sometimes called), a substance differing in its physical properties, but having precisely the same elementary constituents as the original starch, the proportions of carbon, hydrogen, and oxygen remaining unaltered. The change which takes place in the starch is caused by an alteration, produced by exposure to this temperature, in the molecular arrangement of its component particles. We have another example of a similar kind in phosphorus, which, under ordinary conditions, takes fire on exposure to air, and is readily soluble in carbon disulphide; but when exposed in an atmosphere of carbonic acid or other gas that exerts no chemical action upon it, to a temperature of 460° Fahr., it assumes what is called an allotropic modification, in which form, under the name of amorphous or red phosphorus, or Schrötter's phosphorus, it is no longer acted upon by the liquid in which it previously dissolved, nor does it take fire when exposed to the air, and is thus converted into a material suitable for the manufacture of matches. Zinc is a metal which exhibits very marked changes when exposed to the influence of variations of temperature. As ordinary spelter it is brittle; by exposure to a temperature of from 250° to 300° Fahr., it becomes malleable, and advantage is taken of this change to obtain the metal in a suitable con-

* Being the Cantor lectures delivered before the Society of Arts.

dition for rolling into sheets; whilst if the temperature be raised to 410° Fahr. it becomes so brittle as to be capable of being powdered. The differences which exist in the quality of iron and steel are also, as is well known, not unfrequently due to the physical structure and not to the chemical constitution of the metal. With respect to stone, we have in chalk and marble the same chemical substance, carbonate of lime, but existing under different physical conditions. Before, however, entering upon the question of the structure and composition of building stone, it may be well that we should fully understand the nature of the influences to which it is liable to be exposed, whether such influences are derived from the atmosphere under ordinary conditions, or from the more or less vitiated air of populous cities or manufacturing towns. The subject of building stone is one that nearly 30 years ago excited a great deal of public attention, owing to the alarming reports that were then spread about as to the lamentable condition of the stone used in the then newly-erected Houses of Parliament at Westminster. In a leading article of a scientific journal of that time the following statement was made with reference to the condition of the building: "In a century it will be—but we must not attempt to prophesy what it will be, for the probabilities are rather it will have ceased to be altogether." The excitement, however, gradually passed away as it became evident that the decay was confined to comparatively small portions of the structure, and that, at all events, the building was not likely to fall to pieces during the present century. The alarm, however, produced at least one good result, inasmuch as it led to an investigation into the nature of the stone, from which much useful information was derived upon a subject respecting which but little had been previously generally known. The records of the history of our globe afford evidence that the vast changes that have taken place at different periods, although frequently resulting from some sudden and violent convulsion, have been more generally due to the slow, gradual, but continuous action of natural forces over vast periods of time. In order to understand the cause of decay in stone, it is necessary that we should know something respecting the character and mode of action of the forces arising from atmospheric and climatic changes which exert their influence on everything around us, the immediate effects of which are apparently very feeble as compared with the magnitude of the results which they are ultimately capable of effecting. These forces are partly of a mechanical and partly of a chemical nature. The former chiefly consist of those which result from the action of water which, with slow but certain progress, effects by its persistency changes so vast as to have no slight influence on the structure of the globe. That the hardest rocks will yield at length to the action of running water, their surfaces becoming rounded off by simple friction, is so well known as to have become proverbial. Besides the results produced by friction, water exerts a force of a most powerful disruptive tendency by the expansion which it undergoes in the act of solidifying or conversion into ice, of which fact some of us have probably been forcibly reminded during the winter season in a manner not conducive to our comfort by the bursting of our water-pipes, unless the necessary precautions had been taken to allow space for the increase in volume resulting from the freezing of the water. The effects produced by frost in detaching large fragments, and sometimes very considerable masses, may be observed on any exposed surface of the softer rocks, and can scarcely fail to have attracted the attention of those who are in the habit of searching for fossils in the soft and friable cliffs of the Lias formation. It is, however, in mountainous districts that we can best appreciate the enormous disruptive force that is produced from apparently so simple a cause, and the important part which water plays in the breaking up of the older rocks, and in the formation of sedimentary deposits resulting from their disintegration. All rocks are more or less traversed by natural joints and minute crevices into which water finds its way, and these, by the repeated expansion of the water in its conversion into ice, are gradually enlarged into fissures, until finally the detachment of pieces from the mass is effected. The weather-worn blocks which so frequently attract our attention, more especially in granite districts, from the curious and remarkable shapes which they assume, some of them being so evenly balanced as to form "logan" or logging stones, owe their peculiar appearance to the wearing away of those portions of the rock that are most easily acted upon by exposure to the influence of air and moisture. The effects produced by the action of the weather, combined with the mechanical force of the waves, are so great as to produce very considerable erosion of the English coast. Going back no farther than the year 1813, we find by the Ordnance map that there were then standing at Langley, near Beachy Head, four martello towers which were at that time all above high-water mark; these have since all been destroyed by the advancing waves, the ruins of two of them being still visible at half tide. Within a period of a few hundred years, the sites of former villages and farms have been covered by the sea, of which the old town of Cromer is an instance, and the rate at which the waves advance at several portions of the coast line has been estimated at two yards per annum. How little regard is generally paid to this coast erosion is shown by the fact that at a spot not far from Folkestone, upon which the sea is steadily encroaching, might have been seen, a short time ago, an advertisement board drawing the attention of the public to the excellency of the situation as a site for building purposes. Water, as we are aware, possesses very great solvent powers, but possibly we should scarcely be prepared to learn that the solid matter annually carried off in solution is estimated to amount in some districts to as much as 140 tons from a square mile of surface. The chemical changes effected by water are, to a great extent, due to the air which it holds in solution, and to the various accidental impurities it contains. The air in its normal condition consists of nearly 21 volumes of oxygen and rather more than 79 volumes of nitrogen, together with small but variable quantities of carbonic acid. From experiments made a short time ago by Dr. Russell, it appears that the purest country air contains about three volumes of carbonic acid in 10,000 volumes of air, and that on a fine summer day in the City of London the proportion will not be increased beyond four volumes; but on a still, foggy day it is much greater, and may be increased to ten volumes, whilst, in some cases, as much as fourteen volumes have been found in a dense and long-continued fog. The impurities usually contained in a town atmosphere, such as sulphates and chlorides, are also largely increased in a foggy atmosphere. The constituents of air are, however, dissolved in water as separate gases, and hence we find that the air contained in water differs materially in its composition from that of ordinary atmospheric air, the proportion of oxygen being increased from 21 volumes per cent. to nearly 34 per cent., whilst the proportion of carbonic acid is increased to a much greater extent. It is evident that such air must have enlarged powers of oxidation, and be much more capable of bringing about other chemical changes, of which we have an example in the extraordinary powers exhibited by river water in oxidising the organic matters with which it is polluted. The effects produced by moisture upon some descriptions of shale, such as alum shales containing large quantities of sulphur as sulphide of iron, afford a striking example of the action of water as a carrier of oxygen. When shales of this description are piled up in heaps, and moistened, combination of the sulphur with the oxygen contained by the water takes place, and the heat developed by the chemical action thus commenced is sufficient to produce, in many cases, disintegration throughout the mass. The oxidising power of the air is also influenced by the small quantities of nitric acid and ozone generally present, which, although never very large in amount, are greater at periods of electrical disturbance. Ozone may be regarded as a condensed form of oxygen. It is oxygen in an allotropic condition, in which form it possesses greatly increased chemical activity, ozone surpassing ordinary oxygen in this respect just as oxygen does atmospheric air, possessing the power of bleaching substances, such as indigo or vulcanised rubber, that withstand the influence of ordinary oxygen. Ozone may be recognised by its peculiar odour, which is frequently observable in working an ordinary electrical machine, and its presence in the atmosphere is detected by means of test papers dipped in a solution of potassium iodide and starch. The iodide is decomposed by the ozone, and the liberated iodine, coming into contact with the starch, strikes the well-known blue colour indicative of the presence of iodine. Ozone may be produced by means of a generator, which is made on the principle of a Leyden jar, consisting of a long glass tube, coated with tinfoil on the inside and surrounded by another tube similarly coated on the outside. Through the space between the two tubes, a current of dry air or oxygen is passed, which becomes converted into ozone on connecting the inner and outer tinfoil coatings with the terminals of an electrical induction coil. The condensation which oxygen undergoes by its conversion into ozone is considerable, three volumes of oxygen being condensed into two volumes of ozone. When ozone is exposed to a temperature of from 300° to 400° Fahr., it expands to its original bulk, and resumes the condition of ordinary oxygen. Water penetrating as it does all rocks to a greater or less extent in proportion to their porosity, is thus the means of bringing about great and very important changes which are included under the general term "weathering." The effects produced by rain in its passage through rocks are generally the results of oxidation, converting sulphides into sulphates, and ferrous into ferric salts or into peroxide of iron; the oxidation of salts of iron are the most striking on account of the change of colour which they undergo. Water, however, owing to the organic matter which it takes up in its passage through the ground, sometimes exerts a reducing action, and the results produced are reversed. Gypsum or calcium sulphate is thus converted by the reducing effect of the organic matter into calcium sulphide, which is readily decomposed into calcium carbonate and sulphuretted hydrogen, the latter, by oxidation, yielding sulphur, and thus giving rise to deposits of limestone and sulphur. This reducing action of water may also be observed in the white spots and veins which sometimes occur in red sandstones. The observations of Professor Geikie on the effects produced by this weathering upon the gravestones in some of the older burying grounds of Edinburgh are very interesting and instructive. Some of these tombstones are composed of limestone, others of granite and sandstone. In many of those composed of granite traces of decay in some of the felspar crystals were detected, the polished surface having become gradually roughened, as the individual crystals had been more or less easily attacked. Some of the sandstones have proved to be remarkably durable, and seem in some instances likely to resist the ravages of time for a longer period than the granite. On a sandstone in Grey Friars churchyard the chisel marks are still distinguishable, after the lapse of 200 years, the letters of the inscription upon it remaining sharp and distinct, the only observable change consisting of a roughening of the surface of the stone on the sides most exposed to wind and rain. Sandstones possessing distinct lines of stratification exhibited a tendency to split up along those lines under the influence of the weather, and in one instance of a flagstone set on edge, although the lettering of the inscription remained sharp, yet in the short space of forty years large portions of the stone had scaled off, affording a striking example of the necessity of attending to the well-known rule that stones should be laid on their natural bedding. Many of the marble monuments had undergone considerable decay; irregular channels had been worn, partly dependent for the direction they had taken upon the trickling rain, and partly on the form of the monumental carving, or on differences in the structure of the marble. The surface of one marble obelisk had, in the short period of sixteen years, become so rough and granular that it might readily have been mistaken for sandstone. The extent to which these alterations had taken place depended upon the position of the stone as regards exposure to rain and to the prevailing winds. In one instance the marble had been dissolved away to the depth of a quarter of an inch, the inscription having become illegible, although the stone had not been erected for more than eighty years. The

inscription on the tombstone of Professor Black, in which his friends record the genius of the discoverer of latent heat and carbonic acid, has become partially illegible, and we may be sure that it never entered into their minds when expressing a wish to mark the resting place of the distinguished Professor "by the marble whilst it should last" how short a period would be sufficient to show to what an extent their confidence had been misplaced. The experiments conducted by Professor Pfaff, of Erlangen, led him to the conclusion that the annual loss of granite and syenite might be estimated at about ·008 millimètres in thickness, and that of limestone at ·013 millimètres, the limestone experimented upon being the hard Solenhofen limestone near Munich, used for lithographic purposes. Those rocks which contain iron not in the condition of peroxide afford marked examples of the effects produced by this so-called "weathering process" on account of the changes in colour which they frequently undergo; thus, *e.g.*, the light coloured spathic iron ore from Alston Moor in Cumberland, and from the Brendon Hills in Somersetshire, is often more or less converted from a light-coloured carbonate of the protoxide of iron into a brown peroxide. Now any alteration of form by the oxidation of iron must obviously tend to disintegrate and break up the mass in which such alterations occur, and hence the presence of iron in a condition in which it is liable to oxidation is often a source of weakness. The presence of iron pyrites in slates when not in the form of cubical crystals) is considered to be detrimental to their value. Iron pyrites is most familiar to us in the form of cubical crystals of a golden yellow, but it also occurs in rhombic prisms of a paler colour, as marcasite, and in radiated nodules which are more liable to decomposition, specimens of which in cabinet collections may often be observed to break up and fall to powder. The oxidation of metallic iron, or rusting, as it is generally termed, is not quite so simple a process as might at first sight appear to be the case. It is not simply the result of the direct combination of iron with oxygen. Iron will remain bright in dry oxygen for an indefinite period of time, whilst we are only too familiar with the fact that iron rusts very rapidly when exposed to air under ordinary circumstances.

(*To be continued.*)

ARCHITECTURAL ASSOCIATION EXCURSION, WILTS, 1887.

THE following is the official programme just issued to members. The president, Mr. Slater, B.A., F.R.I.B.A., will generally conduct the excursion, and will be assisted on Monday by Messrs. J. A. Gotch and Wallace Hill, on Wednesday by Messrs. C. Adye and Gotch, on Thursday by Mr. J. D. Sedding, and on Saturday by Mr. James Fowler, who will describe Bath Abbey:—

Monday, Aug. 15.—Claverton (Terraces and Church), Hinton Abbey (Monastery and House), Hinton Charterhouse (Church), Farleigh Castle, Norton St. Philip (Inn, Farm House, and Church), Wellow (Church, Old House).

Tuesday, Aug. 16.—Cheney Court Manor House, Corsham (Mansion, Church, and Almshouses), Lacock.

Wednesday, Aug. 17.—South Wraxhall (Manor and Church), Bradford-on-Avon (Bridge), Westwood.

Thursday, Aug. 18.—Chalfield Magna (Manor House, Church), Steeple Aston (Church), Seevil (House), Edington (Church), Westbury Church).

Friday, Aug. 19.—Hamswell (Manor House), Marshfield (Church, &c.), Cold Ashton (Church and Manor House), St. Catherine (Church, Manor House, &c.) Final dinner.

Saturday, Aug. 20.—Bath: Prior Park will be visited by special permission, and the Bath Royal Literary and Scientific Institution have placed their library, writing rooms, and museum at the disposal of members during the excursion.

The mayoress of Sheffield (Lady Stephenson) on Bank Holiday laid the foundation stone of new Sunday-schools, &c., at Carbrook, of which Mr. J. Innocent, of Sheffield, is the architect.

Building Intelligence.

CARLISLE.—Mr. H. Higginson, M.S.A., architect, whose plans of a Unitarian church and school were recently selected in a limited competition, has now received instructions to proceed with the working drawings of same. The site, which is a very awkward one, has a rounded corner of 50ft. radius at the junction of James-street to Victoria Viaduct; but the difference in levels between Victoria Viaduct and the original allows of the church being placed on the viaduct level with the school below. The difficulty of the site has, however, been overcome by stepping back the walls of main building and forming a triangular porch (with curved front), which is surmounted by a circular turret; this turret forms one of the principal features in the elevation. The style may be termed Modernised Romanesque. The walls will be faced with local red stone, relieved with glazed tiles or faïence ware of a rather sombre tint, and the roofs will be covered with slates. Accommodation will be provided for 210 persons, with children and choir galleries. The internal fittings throughout will be of pitch-pine. Convenient entrances and exits to both church and school will be provided from the viaduct level. The cost will be about £1,800.

EDGEHILL.—The foundation-stone of the new chancel and transepts of St. Anne's Roman Catholic Benedictine Church, Edgehill, was laid on Sunday last. The architect is Mr. Peter Paul Pugin, the builder Mr. Urmston, the clerk of works Mr. Michael Shanley. The additions comprise one additional bay to the nave, chancel, three side chapels, priests' and choristers' sacristy, with cloister connecting the latter with the transepts. The total additional length to the church will be 62ft., and the width across transepts will be 104ft. The additional accommodation formed will be about 440 sittings. The material used will be Runcorn stone for the dressings, and Woolton for the facings.

KIRKHAM.—Memorial stones of a Wesleyan school were laid recently. The building is Early Gothic in style, and consists of a schoolroom 50ft. by 30ft., with three classrooms and a heating-chamber in the rear. The wall are of local bricks with stone dressings, and the roofs are covered with slates. The cost will be about £750 complete, including internal fittings and heating apparatus. The architect is Mr. H. Higginson, M.S.A., Carlisle and Preston, whose plans were selected in a limited competition, and the builder is Mr. J. Haslam, Kirkham.

LOSTWITHIEL.—The Home of Mercy stands upon rising ground over and above this pretty Cornish town, and commands a superb view. It was built full 20 years ago from the designs of the late Mr. George Edmund Street, R.A., and attached to it is a handsome chapel dedicated to St. Faith. Some few years ago a special gift was made to this chapel in the shape of a fine reredos in polished alabaster and marbles, designed by Mr. R. Medley Fulford, F.R.I.B.A., architect, of Exeter, and made by Mr. Harry Hems, sculptor, of the same city. Additions to this reredos have just been made at either side. Niches have been placed in the east wall, within which stand life-sized statues of St. Peter and St. Paul respectively. They are set upon corbels held up by angels. The canopies are delicately groined, and terminate with lofty crocketted spires. The new work, like the surroundings, is of Early Character, designed by Mr. Fulford, and carried out in its entirety by Mr. Harry Hems.

NEWICK.—The work of restoring and enlarging the parish church of Newick is now so far completed that the reconsecration by the Bishop of Chichester took place on Friday week. The edifice has been in the builder's hands since the 4th of May of last year. Mr. John Oldrid Scott, F.S.A., was the architect. Both internally and externally the old portion of the nave has been carefully restored, and the windows and doorways left as formerly. The heavy arches, built in 1834 between the nave and aisle, with the massive square pillar, have been removed, and now there are four arches, with pillars of a much lighter character, offering far less obstruction to sight and sound. There are also double arches in the north wall of the chancel as well as the east end of the aisle. A feature of the building is the noble east window of the chancel, its handsome tracery taking the place of the temporary wooden frame. The sedilia and piscina, which were somewhat mutilated, have been restored and refixed to the same position in the chancel. Turning to the north aisle, we find its western gable considerably improved architecturally, as besides being now capped by a handsome coping and surmounted by an elaborate cross, a three-light window has been inserted in the place of the small single light. The tower (formerly covered with whitewash) has been renovated, the whitewash being cleaned off, the stones cleaned and pointed, and a new oak ceiling, divided into panels with oaken beams and resting on moulded stone corbels, has taken the place of the former ceiling of lath and plaster. The floor of the church is laid with wood-block flooring. The church formerly accommodated about 280, now there are sittings for 371. The old Jacobean pulpit with the sounding board forms a very pretty feature. The latter had been laid aside for some years past, but it is now replaced, both pulpit and sounding board having been thoroughly restored and renovated. The old altar rail has been readapted to the present requirements, and the reredos has also been retained, and now forms a partition between the vestries and the organ chamber. The external doorways have been lowered to their original levels, and although this has necessitated the lowering of the adjacent paths to a corresponding depth, it considerably improves the appearance of the building by going down to its original ground line.

PENDLETON.—On Friday St. Barnabas Church, Pendleton, was consecrated by Dr. Moorhouse, Bishop of Manchester. In the construction, brick and terracotta have been used with stone only where absolutely necessary. The church is of simple detail, but substantial throughout, and the contract has been ably carried out by Messrs. W. Southern and Sons, from the designs and under the superintendence of W. K. Booth, architect and surveyor, of Manchester. The cost incurred is under £3,500, and the accommodation provides 516 sittings.

STROUD GREEN.—The Stroud Green High School for Girls was opened on Tuesday, the 26th of July. The elevations of the new buildings are an adaptation of Queen Anne. The walls are of yellow bricks, with red dressings and arches, relieved with a light brown stone from the Newbiggen quarries, and the gables are finished in rough-cast ornamental plaster, upon which is worked the date of the foundation and the title of the school. The school contains accommodation for 300 scholars. The walls of the large schoolrooms internally are finished in plain brick with cement dadoes. All the other rooms are plastered and finished with the woodwork in varying shades of a warm reddish-brown, but good for wear and comfortable in appearance. The total cost of the building and fittings amounts to £2,400, or £8 per scholar. The building was designed by Mr. W. S. Wilson, A.R.I.B.A., in conjunction with Mr. J. Wm. Stevens, A.R.I.B.A., of 21, New Bridge-street, E.C., but the former gentleman having to leave England for the Cape on account of ill-health, Mr. Stevens has superintended the work, which has been carried out by Messrs. Lansdown and Co., of Richmond, Surrey.

WOODGREEN.—On Thursday last the capstone of the spire of the church of St. Paul, Woodgreen, which is a landmark in the Wednesbury district, was laid by the architect, Mr. E. F. C. Clarke, of 7, Westminster Chambers, in the presence of the vicar. The work (which we illustrated some time ago) has been carried out in Codsal stone, the contractors being Messrs. Horsman and Co., of Wolverhampton, whose founder, Mr. Philip Horsman, was the original contractor for the church. A peal of bells is being prepared, with clock and chimes, for this tower.

WEDNESBURY.—On Saturday afternoon the memorial-stones of two important additions to St. James's Church—viz, a chapel in memory of the late Colonel J. N. Bagnall, and vestries, were laid. The chapel will be 32½ft. by 22½ft.,

and 20ft. high to the wall-plate; and whilst it will be open to the nave and chancel by arches, it will be fitted with an altar, and arranged in other respects for some of the minor services. The vestries (for clergy, choir, and churchwardens) will surround the apse of the chancel, and these walls will be pierced with traceried windows, and, like the main buildings, be constituted externally of stone, with appropriate dressings. The whole will be heated by means of hot-water apparatus, and the floors be laid with patent wooden blocks. The architects are Messrs. Horton and Son, Wednesbury, and the builders Messrs. Clarke and Son, Birmingham.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—The annual congress of this association takes place this year in Liverpool, extending from the 15th to the 20th August. The opening meeting of the congress will be held at the Town Hall, at 3.30 p.m., when the president and members of the association will be welcomed by the Mayor and Corporation and the local general committee. The president (Sir J. A. Picton, F.S.A.) will then deliver his inaugural address, after which the members of the congress will inspect the Town Hall—proceeding subsequently, under the guidance of the city surveyor, to visit St. George's Hall. The annual dinner will be held at the Adelphi Hotel. Visits have been organised to Wirral, the southern, northern, and eastern suburbs of Liverpool, Runcorn, Warrington, Wigan, the Liverpool docks and river, &c.

Edinburgh Association for Improving the Dwellings of the Poor.—The first general meeting of this Association was held on July 27th, Bailie Russell presiding. The secretary, Mr. David Marshall, referred to the death of the late Rev. Mr. Jolly, with whom the association originated. The Chairman mentioned that they had only about three-quarters of their capital subscribed. The provisional directors were reappointed. After the meeting an adjournment was made to the site of the model tenement in the West Port, where the foundation-stone of the building was laid by Bailie Russell.

Northern Architectural Association.—On Monday, a number of the members of this association, including Mr. G. G. Hoskins, F.R.I.B.A., president, Mr. W. Glover, vice-president, and Mr. Frank W. Rich, hon. sec., visited Castle Howard, near Malton, Yorks, one of the seats of the Earls of Carlisle. The mansion—the design of Sir John Vanbrugh—was commenced in 1702, and, with the exception of the west wing, was completed by him. The entertaining rooms are small; but for the comfort and convenience of the house as a habitation, many improvements have been made since the time of Vanbrugh. The members, after making an inspection of the building, viewing the valuable collection of pictures, and taking photographs of the north and south façades, returned to Malton, and after dining at the Talbot Hotel, commenced their homeward journey by saloon carriage attached to the 5.25 p.m. train for Newcastle.

Royal Archæological Institute.—The inaugural meeting of the Salisbury Congress of the Association was held on Tuesday at the Council House. General Pitt-Rivers, after taking the chair, delivered a long address sketching out the progress of pre-historic research since the society met at Salisbury in 1849. At the close of the meeting the audience proceeded to the Cathedral, which was inspected under the guidance of the Rev. Precentor Venables and Archdeacon Lear. Thence they proceeded to St. Nicholas Hospital, and subsequently visited the palace under the guidance of the bishop, who read a paper at night on the "Sees of the Bishop of Salisbury."

Memorial stones of a new schoolroom and classroom to the Wesleyan chapel were laid at Ham Street, Kent, on Tuesday, July 19. The first stone was laid by Mr. Alexander McArthur, M.P., two others by local friends, and the last one, on behalf of the teachers, by Mrs. Howland, the trowel being presented by the architect, Mr. Henry J. Jeffery, of Ashford (Kent). Messrs. J. Lorden and Son, of Ham Street, are the contractors.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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"BUILDING NEWS" DESIGNING CLUB.

Drawings Received.—"Truth," "Protoplasmic Globule," "Norseman," "Lost," "Stag," "Blean," "En Avant," "Ierne," "Loidis," "Aspirant," "A Student," "Try Again," "Alley N.," "Vitruvius," "Omega," "Lawton," "Iota," "Northumberland," "Rab."

Correspondence.

ARCHÆOLOGICAL SOCIETIES AND THEIR USELESSNESS.

To the Editor of the Building News.

Sir,—A copy of the Building News of the 1st inst. happened to be sent to me in this out-of-the-way part of the kingdom, and I read with special relish the opinion you so candidly express in the contributors column respecting the inefficiency of archæological societies, "which merely touch the fringe of archæology and degenerate more and more into amiable organisations for the arrangement of pleasant outings." From the experience I have had of these societies in Scotland, I would say that they are an obstruction, and not a furtherance, to research, and are deficient even in the quality of amiability. True, the members flatter each other; but that is a part of the system by which they try to make themselves appear of consequence in the eyes of the public. With the same end in view, they elect a lord as their president, and (to enable them to circulate their own puffs) the proprietor of a newspaper as their secretary. If a marquis or duke sends them an old button or shoe-buckle, they return him a special vote of thanks; but they can be discourteous and insolent enough to untitled outsiders, and I have heard a good many respectable people complain of the rude treatment they received when they ventured to communicate information or hand in old relics. I, myself, have no reason to feel grateful to them.

For the last ten years (with occasional intermission) I have been residing in various sequestered islands pertaining to Scotland and studying their archæology. I was the first to search St. Kilda and its satellites for ancient remains. I spent nearly a year in Tiree, and discovered many important relics of the prehistoric ages there. I have been for four years in Shetland, in which ancient remains of the most extraordinary character abound—albeit, unknown to closet antiquaries—the persistent and careful examination of which, aided by light reflected from folk-lore, has enabled me to discover what kind of religion prevailed in these Northern islands in pre-Christian times.

In carrying on these investigations I have received not the slightest encouragement from any antiquarian society; but, on the contrary, have more than once been treated with the grossest insolence. I have accomplished some useful scientific work; but if the smallest assistance had been given me, I could have done much more. I could, for instance, have cleared out two or three of the *brochs*, or so-called Pictish towers, which are in this district, and from the refuse that doubtless still lies under the huge blocks of stone with which the interior is encumbered, have gathered information regarding their ancient occupants.—I am, &c., J. Sands.

Vadlure, Walls, Shetland, July 25.

THE NUISANCE FROM SEWER VENTILATORS.

Sir,—Mr. R. H. Reeves, on p. 193 of to-day's issue, states that in my letter on p. 86, I "completely ignored the most vital part of the question—viz., that it was impossible to get any ventilation through a shaft when the air in that portion of the shaft underground was of a colder and heavier gravity to that of the inlet or outlet." Now, I beg to state that I did not ignore this statement, but repudiated it, and now I deny it. On p. 86 I used the word "curious." To-day I beg to state that I consider the above premise purely fanciful or untrue. If the premise be fanciful, the deductions fall to the ground.

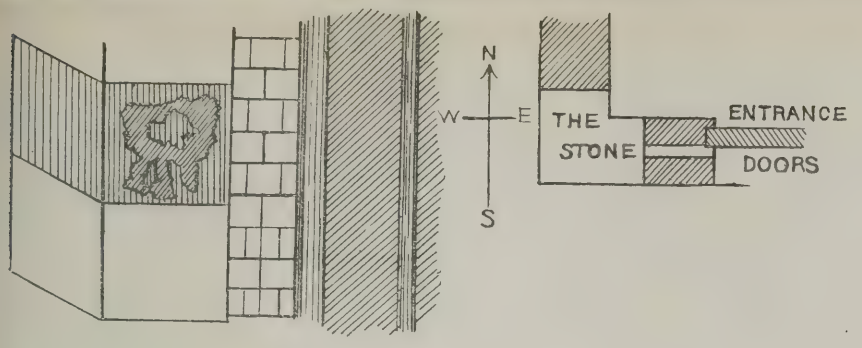
As to Mr. Reeves's numbered replies to me, I take them in their order:—

1. On p. 52, ninth line of his letter, he does mention "an offensive grating." He wrote a similar letter, in which, as published, the words "brick ventilating pipe" occur, where "6in. ventilating pipe" appears on p. 52. That misprint or mistake was not mine.

2. If a street sewer-grating has a ventilating pipe for sewer below it carried away and led up a wall, said "grating," if used to carry off water, should have a water-trap below it. If in centre of street, and not so used, an "iron grating" under the circumstances mentioned is absurd. It should have been a strong iron close plate set into a strong iron frame. I had this in my mind when I wrote as I did on p. 52. In many cases there are iron gratings on street at the edge of the pavement which ventilate the sewer in an offensive and, in my opinion, even criminal manner, owing to want of a water-trap below them.

3. Mr. Reeves's remarks in these paragraphs on p. 193 are misleading if not watched. In paragraph 4 he says of the ventilating shaft that it did not fail to ventilate the sewer "through faulty construction." I affirm that it was absurd to imagine that the ventilating shaft put up as per Fig. 1 on p. 193, and with its top or outlet "half-way up a chimney," and with a bonnet on it as depicted, could effectually ventilate the sewer or anything else. Further, supposing Mr. Reeves said the ventilating pipe was clear, I was not necessarily bound to believe him, more especially as he did not explain how he tested its clearness. If by the smoke test, it might be three-fourths or more choked at foot of bend while he supposed it was clear. I have come across lots of cases of this sort. I referred to painting the inside of the iron pipe to prevent it from rusting, and so not spoiling the ventilation by falling rust. Mr. Reeves's reference to "friction" is, therefore, uncalled for, or not to the point.

5. Mr. Reeves challenges me to prove that "stack-pipes" are useful, or will give a motive power for sewer ventilation. To this I reply, that if the stack-pipe is properly put in, and its bottom pipe led with a fall of only a half-inch or more *towards the sewer*, while the top of



pipe is set up higher than the chimney, or where the wind can get freely at one of my fixed ventilators placed on its outlet—then a current of air will go through the shaft, notwithstanding Mr. Reeves's "heavy air" scarecrow in the underground ventilating pipe.

As the Tottenham air pipe, as described by Mr. Reeves, is not properly put up, it is waste of time to talk of the effect from the temperature at its top being 106°, while temperature at street grating is 110°, and air in underground pipe 63°. And the first two high temperatures of the outer air do not occur every day. Mr. Reeves, in my opinion, is not dealing with the question in a practical manner; but in a fanciful theoretical style, as he also does when, on page 193, he further says that the difference of (barometric) atmospheric pressure at inlets and outlets will give as certain a force as that of a steam boiler. I do not think Mr. Reeves treats this subject properly and to the point on page 193, whatever he may do anon.

As to what Mr. Reeves says about a ventilator capable of producing a current at the rate of fifteen miles an hour (*i.e.*, 1,320ft. a minute) being useless for ventilating a sewer, I do not see it. If the ventilator were a wind-acting one, and only caused a third or less of the speed above stated, it would do very well.

Supposing A, Fig. 1, on page 193, were the inlet grating above one of my disconnecting traps, C the underground drain of house behind it, and B the top of its ventilating blow-off pipe set up above a chimney or ridge with one of my ventilators on it; now although the drain C were, say, 160ft. long and the vertical pipe 40ft., then, as I have often tested it, smoke applied at A would be sucked in by the current, carried along C, and be out at B in about two minutes or less.

That is *practical* ventilation; if it does not agree with Mr. Reeves' "barometrical pressures," so much the worse for his barometer, whether material or mental.—I am, &c.,

W. P. Buchan.

NEW POST OFFICE, KNUTSFORD.

Sir,—Mr. Halsey Ricardo does not appear to be too familiarly acquainted with the old examples in this style of work; therefore for his especial information I may tell him that the upper portion of façade for above was suggested by an old house at Ipswich, now, I believe, used for the Ipswich Public Library, and erected about 1567. Probably this was also the source which suggested to Mr. Norman Shaw his design for the New Zealand Chambers, which would account for the slight similarity our correspondent has been kind enough to point out. I should think, however, Mr. Halsey Ricardo will allow me the same privilege of adapting an old example to modern requirements as others.

At the same time, I am an ardent admirer of the designs of Mr. Norman Shaw, and I should be by no means ashamed of taking any hint in design that may be conveyed to me by a study of his masterly works.

Mr. Halsey Ricardo's remarks are unnecessarily supplemented with an opinion as uncalled for as it is valueless.—I am, &c.,

Wm. Owen.

134, Deansgate, Manchester.

STONE THE WRONG WAY OF ITS NATURAL BED.

Sir,—I have read with much pleasure the letter by Mr. H. T. Percival on the above subject in your issue of the 22nd inst., and as the subject is one of considerable interest to all members of our profession, you may perhaps allow me to bring before them a very similar case which lately came under my notice in this town.

In the Church of Saint Jude, Southsea, there is at the present moment a block of stone set the wrong way of its natural bed, the outer surface of one side of which is "peeling off like a skin," exactly in the same manner as that referred to by Mr. Percival. The stone is situated at the corner of the south porch, and at a height of some 9ft. from the ground.

It is somewhat strange that although two sides of the stone are exposed, only the south and least exposed side is affected, the side facing the west, far more exposed to weather than the other, being absolutely sound.—I am, &c.,

T. Gilbert Stevenson, LL.D., Architect.
24, South Gardens, Southsea, July 29.

WATER SUPPLY AND SANITARY MATTERS.

Leamington.—Major-General C. Phipps Carey, one of the Local Government Board Inspectors, held an inquiry at the Town Hall, Leamington, on the 28th July, respecting the application of the town council for leave to borrow three sums of £1,033, £1,230, and £500. Mr. Passman explained that the £1,033 was for works in connection with the watering of the streets. The water for this purpose had been taken from the supply of the artesian well; but, as it was considered that river-water would do just as well, pipes were now being laid to certain parts of the town, so that the river-water could be so used. The loan of £1,230 was required for electric-lighting purposes at the Town Hall and Free Library, the pump rooms, and lighting up the parade for about a quarter of a mile. The loan of £500 was required for the improvements at the pump rooms.

Sewage in the Lea.—A public inquiry was held at the Stratford Town Hall yesterday, before Mr. S. J. Smith, Local Government Board Inspector, into the condition of the River Lea and Bow Creek. Evidence was given by Mr. C. W. Raymond, inspector for the Poplar Local Board, showing that the Lea was full of sewage, which being pumped into the river on the flood tide, was carried upwards instead of out towards the sea. Mr. Angell, borough engineer, in cross-examination, admitted that the West Ham Corporation had not sufficient tanks to contain all the sewage for a tide, but that they intended to construct more for that purpose. On behalf of the Conservancy, it was stated that they did not think it desirable to press unduly upon the West Ham Corporation, as they were doing the best they could to deal with the large amount of sewage. The legal gentlemen on both sides agreed that, in order to see what steps the West Ham Corporation would take, the best course was to have the inquiry adjourned. Mr. Layard stated that he was preparing a Bill for the acquirement of more land for the erection of sewage works. The inquiry was then adjourned till the 27th of October.

The York City Council have adopted the report of the special committee recommending the carrying out of the Free Libraries Act for York, and to purchase for £7,000, of which amount £5,000 has been raised by subscription, the York Institute and the Fine Art Institution.

The annual conference of the Institution of Mechanical Engineers commenced on Tuesday, in the University of Edinburgh. The proceedings were opened by the reception of the president, Mr. E. H. Carbutt, and the council and members of the institution, in the Library Hall, by the local committee, the Lord Provost and magistrates, and University authorities. Several papers were read and discussed, and in the afternoon there was an excursion to the Forth Bridge Works.

Intercommunication.

QUESTIONS.

[9358.]—**Bottom Flange.**—Will some reader kindly inform me how to calculate the strength of T and double-



flanged rolled iron joists loaded on bottom flange, thus?—A.

[9359.]—**Rustless Iron.**—Can any of your numerous patrons give me information respecting the Bower-Barff process for preventing iron and steel from rusting? If they can give such practical information as to cost, durability, and where and how to get it done, the writer will be much obliged.—A Constant Reader.

[9360.]—**Fixing Photos.**—I beg to thank the readers who so kindly answered to my query under this heading, and request "Bookworm," who answered in the issue of the 22nd July, kindly to give me some further particulars on the gelatine he uses in the third process he has suggested. Any information will be most thankfully received.—G. H. G.

[9361.]—**Sanitary Stabling.**—I notice in the Building News for July 29th that in both the designs placed first and second in competition for "A Village Public-house," the dung-pit is shown against the outside wall of stabling, and the hay-shoot is fixed abutting on to the inside face of same. Both plans have windows over the pits, and in one case a fresh-air (?) inlet is marked. Is not this (a too-common arrangement) radically wrong, as the liquid from the manure is liable to sodden the out wall of stable and surrounding ground, thereby proving an insidious enemy to health and also an injury to hay-shoot and contents? Besides air admitted by windows over pits will be unsavoury and bad for breathing purposes. Should not all pits be placed at a satisfactory distance from any building, and rendered liquid proof?—Tolop.

[9362.]—**Surveyors' Exam.**—Will some reader inform me what books are needed for working up exam. Surveyors' Institute, and the most popular authors of such books?—Tertius.

REPLIES.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—It was my intention, when perusing "Rex's" original question, to send to the Intercommunication Column a reply stating my theory; but press of other matters caused me to forget until I saw yesterday Mr. W. P. Buchan's remonstrance in the issue of the 29th ult. I have been so fortunate as to be called in to advise in an exactly similar case. I found on inspection that the outlets in the inner ceiling had been closed and covered with hay, and that the outer ventilator of the roof would only permit egress; yet in spite of all, the down-draught was felt. I also found that all the air grids under the floor had been stopped up, and that inside the building heavy curtains had been hung before all doorways. As in the case related by "Rex," there was no possibility of a draught occurring, except that the presence of the draught showed the possibility. My reputation for architectural competency was at stake. I was almost at a loss what to think until it came out in conversation that the alleged draught was only perceptible on the Sunday morning, disappearing entirely by the time of evening service. I notice "Rex" also says that the draught disappears after the chandeliers have been lit for a time, which is to my mind a further proof that my theory is correct. I say in my report, which was also sent in last month, that the air above and the ascending warm air is cooled so quickly by the roof windows, &c., as to fall to the floor very rapidly, so rapidly as to feel like a draught. The cure is to get the roof, &c., warmed before service time, and I advised that the heating apparatus, which is generally lighted on a Saturday afternoon, be got to work about 12 hours' earlier. It is not too small, as is shown by the fact that the chapel does get warm, although not soon enough for all requirements. I may say that I warned them against keeping the outlet ventilators closed on account of the re-breathing of the foul air which in its turn will be cooled and descend, though I gave permission for them to be closed during the operation of heating; but to be opened whenever the congregation was above a certain number. I believe my theory to be the correct and only logical one, and should be glad, with the Editor's permission, to read the opinion of other correspondents upon it.—H. Gilbert.

[9352.]—**Rainproof Colour Wash.**—In reply to "L.," the address is "A. T. Morse and Co., Perry-road, St. Michael's, Bristol." If "L." will write to me direct and fully, I shall be glad to help him.—William A. Goss Torquay.

At the last meeting of the Cardiff Health Committee it was reported that Cardiff was a catchpit for the sewage of the whole of the Rhondda Valley, the numerous towns in which drained into the River Taff, which terminates at Cardiff. It was also asserted that the town refuse of Pontypridd and the sweepings of tanneries and slaughter-houses were discharged into the river, and that all the decomposed matter was carried down to and deposited at Cardiff. A committee has been appointed to investigate the matter.

A great academical art exhibition was formally opened at Berlin on Monday. The exhibition, which is for the works of living German and foreign artists, contains 970 oil-paintings, 39 pen-and-ink sketches, 132 water-colours, and 147 works of sculpture.

PARLIAMENTARY NOTES.

VENTILATION OF THE HOUSE.—Mr. Esslemont asked the First Commissioner of Works on Monday whether he had any reason to believe that the noxious air in the House was due to the artificial system of ventilation; and whether, by way of experiment, he would allow the present system to be discontinued for a few days, in order to allow fresh air to be admitted from the windows in the roof. Mr. Plunket: I have no reason to believe that the air in this House is noxious, and what the hon. member calls the artificial system of ventilation consists simply in this—that the air which members have been breathing is drawn out through the ceiling, so that fresh air may constantly enter the more freely from below. In hot weather this air is passed over ice to make it cooler. I cannot advise that the experiment suggested by the hon. member of discontinuing this system should be tried. Dr. Kenny asked whether the suggestion made by the hon. member for Mid Cork as to straining the air introduced into the House had been taken into consideration. Mr. Plunket said that such experiments had been tried.

THE BURLINGTON-HOUSE COLONNADES.—The Earl of Milltown asked on Monday whether the Commissioner of Works would take steps to have the colonnades of Burlington House, now lying derelict on the banks of the river in Battersea Park, protected from injury, either by a fence or some other adequate provision. These colonnades were beautiful works of art, and he had been surprised to find the representative of the Office of Works in that House inclined to pooh-pooh suggestions with regard to them. The Earl of Wemyss thought it was a great scandal that these colonnades should be allowed to go to ruin. He feared that they were already too much injured to be utilised. Earl Brownlow said he would not enter into the architectural merits of the colonnades, but he must deny that he had ever pooh-poohed their artistic value. He had on a former occasion stated that a great many schemes had been laid before the First Commissioner of Works with regard to them, which had all been pronounced impracticable not merely on the ground of expense. The noble earl had himself been invited to make any suggestion for their utilisation, but he had so far made none. With regard to the proposal that they should be fenced round, it was necessary to explain that a Bill was now before Parliament handing over Battersea Park to the Metropolitan Board of Works. Under these circumstances the First Commissioner of Works could give no pledge except that he would give the proposal of the noble earl his most careful consideration.

THE NATIONAL GALLERY.—Mr. Graham asked the First Commissioner of Works whether it was contemplated to replace the existing mean stone steps that lead to the new rooms of the National Gallery by steps of unpolished marble more suitable to the surroundings. Mr. Plunket: The question of the material to be used in the steps of the new staircase of the National Gallery received my full consideration, and, having regard to the constant heavy wear upon these steps, especially at holiday times and in bad weather, it was decided that in the circumstances Craig-Leith stone, which has been used, was a more suitable material for the position than marble. There is no intention of making any change in these steps.

LEGAL INTELLIGENCE.

FALL OF A ROOF AT WOOLWICH—CONDEMNATION OF GOVERNMENT BUILDINGS.—An inquest was held at the Town Hall, Woolwich, on Monday week, on the body of John Vinden, asphalte roofer, of 105, Tyre-street, Vauxhall, who was killed by the fall of a roof at the Grand Depot Barracks, Woolwich, the previous Friday. Henry George West, superintendent of works, Claridge's Asphalte Works, 21, Surrey-street, London, said deceased had been in the employ of the firm 42 years. He had been foreman 25 years, and had worked in all parts of England. They were working by contract with the War Department when the accident occurred. They had to carry out the instructions of Captain Booth, R.E. Department, with a view of preventing the water percolating through. They heard of the accident at six o'clock, and he came down to Woolwich. He thought it possible that the accident occurred from the bad concrete put in nine or ten years ago. The roof which fell was composed of coke breeze and cement. He had known a roof 12ft. square similarly constructed; but recommended an iron girder for absolute safety. Captain C. Wilkinson, R.E., residing in the Artillery Barracks, Woolwich, said the work was carried on under the supervision of Captain Booth. He had traced the erection of the harness rooms. They were put up from designs approved by the War Office in 1878. The roofs had from time to time been tarred over with gas tar to fill up the cracks. He attributed the accident to the concrete being badly mixed and not properly laid. The proportions of the concrete were four of coke breeze to one of Roman cement. It had to be very carefully mixed. A number of other buildings in the barracks, similarly constructed, were showing signs of weakness, and the roofs would be removed. Captain Booth, Acting Engineer at Woolwich under the War Office, said the work was in his district, and under his supervision. When he joined at Woolwich 18 months ago, he found all the harness rooms leaky, and spoiling the harness. They were all cracked transversely, and temporary remedies were applied to stop the leaking. Six weeks ago he received orders to have the roofs coated with Claridge's asphalte, and this was being done when the roof collapsed. He had conferred with deceased about the work, telling him to make a good job of it. He assured him that when finished, the roofs would be all right. The concrete was of very bad material, and very badly mixed—the worst he ever saw. The breeze was half-burnt cinder mixed with coal. He also condemed the design *in toto*. He entirely disapproved of concrete roofs. They were peculiar to Woolwich. He had never seen any at other places. When it was built, it was tested by 17 men being placed on the roof at "the double." He never knew asphalte or concrete stand an unusual heat. He had condemned all the other harness rooms. They had all been shored up. He would not sleep under a concrete roof (laughter), especially in hot weather. The jury returned a verdict of "Accidental Death," the coroner remarking that the roofs of the harness rooms were novel and unsafe. He wondered they had stood so long. It was fortunate there were no soldiers inside looking after the harness when the roof collapsed. The jury unreservedly concurred in the design and workmanship being bad, and the concrete faulty. The jury's condemnation was ordered to be sent to the military authorities.

RE J. N. PEAKE.—A meeting of the creditors of John Nash Peake, Belle Vue, Congleton, Cheshire, and trading at Knutton and Cobridge, Staffordshire, as colliery proprietor and brick and tile manufacturer, was held on Monday at the North Stafford Hotel, Stoke-on-Trent. The debtor's statement showed gross liabilities, amounting to £60,100 4s. 1d., of which £28,009 3s. 7d. are expected to rank for dividend. The assets (including the stock-in-trade £1,600, and machinery, &c., £8,700), were estimated at £12,500 0s. 7d., which, after deducting preferential claims to the extent of £3,702 8s. 1d., left a deficiency of £19,211 11s. 1d. The debtor assigned as the cause of failure bad trade and trade losses. In his observations upon the debtor's statement, the Official Receiver said that Mr. Peake had been carrying on business as a colliery proprietor and brick and tile manufacturer at Knutton and Cobridge. He first commenced business about fifteen years ago with a capital of £15,000. Since that time he had been a partner in the Tunstall Chemical Works Company, the Pontyscylte Ironworks Company, and the Pack Moor Colliery Company. The debtor stated that in all these concerns (which have been dissolved) he had sustained heavy losses. The fully-secured creditors were (1) the Scottish Wagon Company, whose debt was stated at £673 19s. 5d., the security held being wagons, the value of which is stated at £1,800; (2) Messrs. Elliot and Clyve, who are creditors for £800, money advanced, the security held being a first mortgage of colliery and cottages at Goldenhill, estimated at £1,000; (3) the trustees of Mr. T. Llewellyn, whose debt is stated at £80, money lent, the security being a first mortgage of house in Watergate street, Tunstall, estimated at £80. The creditors partly secured were (1) the trustees to Mr. T. Llewellyn for £5,500, for money lent in 1876, the securities held being a first mortgage of cottages and land at Knutton and life policies, the securities being estimated at £5,000; (2) the Manchester and Liverpool District Bank for £27,000, the amount of the debtor's banking account, the securities held being a first mortgage of the Cobridge Colliery, mortgage of share under his father's will, guarantee, life policies, and bills, the estimated value of the securities being stated at £9,400; (3) Mrs. J. N. Peake, for £2,000, money lent in 1883, the security held being "contingent share under Mr. Barber's will," estimated at £1,990; (4) the trustees of Mr. T. Llewellyn for £1,250 for money lent, the security held being "Pack Moor Colliery," estimated at £600; (5) Mrs. Peake and sisters, £3,750 for money lent, the securities held being life policies, estimated at £250; (6) trustees of the will of Thomas Peake, deceased, £9,680 14s. 11d., money advanced at various times between 1882 and 1886, the security held being "share under father's will," estimated at £9,000. A considerable portion of the furniture and part of the plate at Belle Vue House are claimed by Mrs. Peake. Distresses for rent had been levied by the Rev. Walter Sneyd for £387 14s. 2d., by the governors of the Newcastle-under-Lyme Endowed Schools for £3,015 13s. 2d., and by the trustees of the Sandbach Charity for £187 10s. He (the Official Receiver) had arranged with the solicitors acting in the two first cases that the distresses shall not be proceeded with until after the first meeting. The debtor accounts for his deficiency of £19,211 11s. 1d. by "losses in trade." The Chairman briefly explained the debtor's statement, after which Mr. Peake was called in to the meeting, but no questions were put to him. There was no offer on behalf of the debtor, and a formal resolution was passed authorising the Official Receiver to apply to the Court to adjudicate the debtor a bankrupt. Mr. T. W. Handley (of the firm of Handley and Wilde), chartered accountant, Booth-street, Manchester, was appointed trustee with Messrs. E. J. Hooley, bank manager, Tunstall, R. B. Millard, ironmonger, &c., Newcastle-under-Lyme, and P. H. Pope, accountant, Tunstall, as a committee of inspection.

PATENT CASE.—HUMPHERSON V. SYER.—(Before Lords Justices Cotton, Bowen, and Fry, Appeal Court, July 28).—This was an appeal by the defendant from a judgment of Mr. Justice Kekewich affirming the validity of the patent granted to plaintiff on the 24th of February, 1885, for an improved waste-water preventer, and finding that the defendant had infringed. The validity of the plaintiff's patent was attacked on the ground of alleged anticipation by Winn's patent of 1881, and also by prior publication by the provisional specification of a patent granted to the defendant Syer on the 14th of January, 1885, which was alleged to have been an improvement upon Winn's invention. On the question of anticipation by alleged prior publication, it appeared that the defendant had employed a Mr. Widmer early in January, 1885, to make him a waste-water preventer according to his instructions, so as "not to fall foul of Winn's patent," with which he was acquainted. It appeared that a model was made before the end of January, and remained at Widmer's workshop, capable of being seen by the workmen, though not exposed for sale, and, after a time, put upon the shelf. It was not in contest that the machine made by the defendant was similar to that for which the plaintiff had obtained a patent, and the only question in the action was the validity of the plaintiff's patent having regard to alleged anticipation of the invention. The appeal was allowed. Lords Justices Cotton and Bowen were both of opinion, without deciding whether Winn's patent of 1881 was or was not alone an anticipation of plaintiff's or defendant's patent, that there had been prior publication of the invention in this country before the plaintiff obtained his patent. Lord Justice Fry came to the same conclusion, though by a different way. The question was whether certain persons under no obligations to secrecy had got to know of the invention before the plaintiff had obtained his patent. Upon the evidence he had come to this conclusion, and he therefore concurred in holding that the plaintiff's patent was bad, and that the judgment of Mr. Justice Kekewich must be reversed.

STATUES, MEMORIALS, &c.

THE LATE CHARLES READE.—Sir Algernon Borthwick, M.P., on Tuesday unveiled a memorial to the late Charles Reade, which has been placed in the crypt of St. Paul's Cathedral by private subscription. The memorial, which is the work of Mr. G. M. Curtice, consists of a medallion portrait taken from a cast of the features after death, beneath being the inscription. In close proximity to the memorial is the bust of George Cruikshank, and one to the memory of Randolph Caldecott will shortly be erected near.

CHIPS.

Mr. J. Graham Abercrombie, architect, of 97, High-street, Paisley, writes:—"The notice in last week's BUILDING NEWS of 'Greenlaw Church, Paisley,' in which my name appears, should read *late* chief draughtsman with Messrs. Jno. Burnet and Son, Glasgow, and not as inserted, chief draughtsman at present."

A large new Welsh chapel is about to be built in Falmouth-road, New Kent-road, by the congregation of Crosby-row Chapel. The appointment of architect was settled on Tuesday last. The voting was unanimous in favour of Mr. Charles Evans, F.R.I.B.A., of 3A, Poets-corner, Westminster, who was accordingly appointed architect.

A meeting was held on Tuesday of the committee for the preservation of the Queen Eleanor Memorial Cross, at Waltham Cross, erected in 1291. A letter and report from the Society of Antiquaries was read, in which they approve the work now being done, and also of the proposals of the architect, Mr. C. E. Ponting, of Marlborough, Wilts. The Society add that the proposed repair seems to deserve support. The Council of the Society of Antiquaries had subscribed £5 to the fund. Although £650 has been promised, it appears that to carry out the repairs at present contracted for about £250 more is required, and a further £200 will be needed to produce new steps, bench, and a wrought-iron railing for the protection of the Cross.

Our Office Table.

THE annual general meeting of Turpin's arquet Floor Joinery and Wood-Carving ompany (Limited) was held at 22, Queen's-oad, Bayswater, on the 30th June, the man-ging director, Mr. M. F. C. Turpin, in the chair. he report and balance-sheet were unanimously dopted, and it was resolved that a dividend of 0 per cent. per annum be declared upon all hare capital from the date subscribed. The ompany has just been intrusted with an nportant contract for laying a large quantity f their solid oak flooring on concrete for the ew Great Northern Central Hospital, now eing erected in the Holloway-road. This ontract was secured by the company in open ompetition.

AT the meeting of the Metropolitan Board of Vorks last Friday a letter from Mr. Robertson as read, in which he stated that during the wenty-one years he had been in their service nly one property belonging to the Board had een disposed of through a relative of his. He enied that he had ever abused the confidence f the Board for his own pecuniary benefit. he letter was referred to the Works Com-ittee.

THE architecture of Jerusalem—Oriental, othic, Byzantine, or Italian—is a sermon in tones on the text that the Holy City has been or so many centuries the religious centre of ivers faiths and numerically of half the world. utside the walls a new town has sprung up, building club having been established a few ears ago, under the operation of which 130 ouses were erected in four years by the Jews; hilst along the Jaffa road many country villas ave been erected of late by European resi-ents as summer abodes. The latest develop-ent of the building of new houses without erusalem is to be found in the enterprise hich has led to much building being done on ne slopes of the Mount of Olives, the summit f which is crowned with the Church of the scension.

THE treatment of iron so that it is not ffected in any degree by rust, and so that it oes not require the frequent use of paint and arnishes to make it rustless, seems at the resent time to be attracting the attention of rchitects, engineers, and others who are terested in this matter. The Bower-Barff ustless Iron Company, of Broadway Chambers, estminster, whose process is well known to ur readers, are at present very busy with ork, and we would call the attention of anufacturing engineers to it. Several archi-cts have all their rain-water pipes treated by is process; also water-pipes where the water hard. Engineers are also having a great eal of outside ironwork treated.

WE are glad to see that Mr. H. H. Bridgman as been presented with a tea and coffee rvice in silver, subscribed for by the members f the Gas and Water Committee of the Cor-oration "in recognition of his able and alous services as chairman of the committee uring the year 1886." The presentation was ade at the Crystal Palace, when about 100 dies and gentlemen dined together, under the residency of the present chairman, Mr. W. A. lunkett. Special reference was made on the casion by Mr. Bridgman to the importance of e clauses introduced at the instance of the orporation into the recent Metropolitan ater Bills by the Special Committee of the ouse of Commons. The most important were ose rendering it imperative that all future w stock should be submitted to public com-tition, and that a reserve fund be created of l profits over and beyond 5 per cent. (for terest and working expenses), for the pur-se ultimately of purchasing the interests of e several water companies. As an instance the value of these clauses, on every £100,000 new stock that would yield 10 per cent. terest £5,000 annually would go to the serve fund, which, capitalised at 25 years' rchase, or 4 per cent., would mean £125,000 ved to the ratepayers; but for the action of e Corporation these enormous sums would go to the pockets of existing shareholders, and uld ultimately have to be purchased by the tepayers.

IT has been proposed that the Tercentenary Exhibition of Mary Queen of Scots Relics, now being held in the Peterborough Museum, under the patronage of Her Majesty the Queen, and the presidency of the Dean of Peterborough, should be further observed by some permanent memorial in connection with the restoration of Peterborough Cathedral, to be erected in memory of Mary Queen of Scots, whose first grave was in that building. The nature of the memorial will be determined by the amount of the subscriptions, which will be limited from one to ten shillings; and it is suggested that everyone who bears the name of Mary (Marie, Maria, &c.), should give a donation for this purpose. Subscriptions will be received by Mrs. Perowne, The Deanery, Peterborough, and Mrs. Gates, The Vineyard, Peterborough, from whom collecting cards may be obtained.

A CURIOUS circumstance has arisen at the audit of the accounts of the Sherborne Local Board. Considerable ill-feeling has prevailed respecting a loan, secured for the extension of the waterworks, having been partially used by the old board for works connected with the sewers. The members of the old board resigned, and at the audit last week it was discovered that the seal of the board had not been affixed to the contract. The auditor consequently refused to pass the accounts, and said he should surcharge the old board with the amount—about £2,000. At a meeting of the new board last Friday an application by the clerk for the seal to be affixed was unanimously refused.

THE Sukkur Bridge—a remarkable feat of engineering—has just been completed at the works of Messrs. Westwood, Baillie, and Co., London-yard, Poplar. The bridge, which is on the cantilever principle, is to be constructed over the Kohri Pass of the Indus at Sukkur, on the line of railway from Kurrachee and Attock. A noticeable feature about the work is the erection of probably one of the finest pieces of scaffolding which has ever been built, and which has been a conspicuous object on the banks of the Thames at Poplar and for miles around. It is 400ft. long by 120ft. wide, and 180ft. high, with about 2,600 loads of timber, which, if laid out, would measure 24 lineal miles, the weight of the bolts, nails, and other ironworks being about 40 tons. The contract has taken about two years to complete, the bridge having to be temporarily erected at the works previous to being sent out to India.

IN 1830 but 381 kilomètres (236 miles) of railway were open for traffic; at the present time, according to Dr. Neumann-Spallart (*Uebersichten der Weltwirthschaft*, 1887), the mileage of the railways of the globe exceeds 530,000 kilomèters (329,000 miles). A review of the development of railways during 1881 to 1885 shows that in Europe the growth was from 107,333 miles in 1881 to 121,205 miles in 1885, or 12·9 per cent.; in America, from 118,662 miles to 155,757 miles, or 31·3 per cent.; in Asia, from 10,621 miles to 13,791 miles, or 29·7 per cent.; in Africa, from 2,871 miles to 4,285 miles, or 49·2 per cent.; in Australia, from 5,257 miles to 8,045 miles, or 53·1 per cent According to this statement the railways had increased from the end of 1881 to the end of 1885 by a total of 58,339 miles, and, consequently, at the latter date the total length was 303,083 miles. America shows the greatest increase, and possesses more railways than the rest of the world combined; but the percentage of increase was greatest in Australia.

ACCORDING to a table published by the *Archiv für Eisenbahnwesen* last year, the average cost of construction per mile in Europe was about £24,000, and in all other countries £12,700. The railways of Europe, consequently, at the end of 1885, had a total value of £2,909,000,000, and those of all other countries of £2,295,000,000, making a grand total of £5,114,000,000. Of European countries, Germany possesses the most extensive railway system. The other countries come in the following order:—France, England, Russia, Austria, Italy, Spain, Sweden, Belgium, Holland, Switzerland, Denmark, Roumania, Norway, Portugal, Turkey in Europe, Greece, Servia. Relative to the area, Belgium has the densest network of railways in Europe, and in the world. The other States follow in this order:—England, Holland, Germany, Switzerland, France, Denmark, Italy, Austria, Spain, Portugal, Sweden, Roumania, Norway, Greece, Russia, Servia, Turkey. Of the German States, the kingdom of Saxony has the closest network of railways, being second in this respect in the world. Relative to population, Sweden has the greatest mileage of railways in Europe, the other European countries ranking as follows:—Switzerland, Denmark, France, England, Norway, Germany, Belgium, Holland, Austria, Spain, Italy, Portugal, Roumania, Russia, Greece, Servia, Turkey.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Clerk of Works' Association, Carpenters' Hall. Paper by Mr. Sims Dillon on "Technical Education and its Bearing on Clerks of Works." 8 p.m.

ARCHITECTURAL ASSOCIATION,

9, CONDUIT STREET, W.

The SIXTH VACATION VISIT will be made on the Afternoon of SATURDAY, August 13th, to the Seat of Bertram W. Currie, Esq., near Farnboro', Hants. The late George Devey, Esq., and James Williams, Esq., Architects. All members who intend to go must send in their names to W. J. H. Leverton, 15, Whitehall-place, *as soon as possible*, together with Postal Order for 2s. 9d., for special railway fare, and a stamped directed envelope.

THOS. EDWARD PRYCE } Hon Secs.
FREDERIC R. FARROW }

CHIPS.

Messrs. North and Son, London-road, Southwark, having back a large iron building lent on hire to the National Agricultural Hall Company, Kensington, have erected the same on 10 acres of freehold land fronting the Epsom-road, Morden, S.W., and last Saturday week inaugurated it by placing it at the disposal of the workmen and wives of Messrs. Field and Sons, estate agents, Borough, for their annual outing, to the number of about sixty. Next Thursday Messrs. North and Son hope to have about 150 blind persons, representing all branches of the building trades there, and they will be glad of any contributions towards entertaining them.

Preparations are being made at the Royal Holloway College, Egham, for the erection of a memorial of the Queen, who opened the Institution. The statue of the Queen is of white marble, and 9ft. high. It was sculptured by Count Gleichen.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Shop Fitter, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ABERDARE.—For the erection of a Wesleyan chapel at Trecynon, Aberdare, S. Wales. Mr. W. Drew, 22, Victoria-street, Swindon, Wilts, architect:—

Davies, D., Aberdare (accepted) ...	£550 0 0

ASHTON-ON-MERSEY.—For a reading-room at Ashton-on-Mersey, for Sir W. Brooks, Bart., M.P. Mr. G. Truefitt, 5, Bloomsbury-square, W.C., architect:—

Haywood, B.	£1782 2 10
Southern and Sons	1,460 0 0
Cross and Bell	1,395 0 0
Wilson, Toft, and Huntley* ...	1386 0 0

* Accepted.

BERMONDSEY.—For the ventilation of the Board room at the Bermondsey Workhouse, for the guardians of St. Olave's Union. Messrs Newman and Newman, 19a, Tooley-street, London Bridge, architects:—

The Eolus Waterspray Ventilation Co. (No competition).	£59 18 0

BROMPTON.—For shop-front, 215, Brompton-road, S.W., for Mr. Murphy, New-street. Mr. G. Pooley, 26, Charing Cross, architect:—

Chafin	£150 0 0
Drew and Cadman	148 0 0
Sage and Co.	147 0 0
Heath, 11, Hans-road, Brompton-road (accepted)	132 0 0

BRISTOL.—For taking down kilns, stacks, buildings, and clearing the site of new day industrial school, for the Bristol School Board, under the supervision of Messrs. J. W. Trew and Sons, 22, Broad-street, Bristol, architects:—

	Credit.	Debit.
Reynolds	— ...	£200 0 0
Turner	— ...	147 0 0
Ridewood ...	— ...	120 0 0
Balmont	£55 0 0 ...	—
Holbrook	87 0 0* ...	—

* Accepted. All of Bristol.

BROMLEY.—For new road, Queen's Mead, Bromley, Kent, for the Bromley Local Board. Mr. H. S. Cregeen, surveyor:—

Marshall, J. G. B.	£999 0 0
Mowlem, J., and Co.	785 0 0
Lansbury, T.	780 10 0
Woodhams and Fry	769 0 0
Cattley, A. T.	744 0 0
Peill, E., and Sons (accepted) ...	744 0 0

BRISTOL.—For Easton-road board schools, Bristol. Messrs. Hansom and Bond, Clifton, Bristol, architects. Quantities supplied:—

Cowlin and Son	£5,170 0 0
Church, W.	4,985 0 0
Eastabrook and Sons...	4,959 0 0
Humphreys, G.	4,943 0 0
Forse, H. A.	4,930 0 0
Stephens and Bastow	4,679 0 0
Howell and Son	4,650 0 0
Turner, S.	4,570 0 0
Davis, J. E.	4,557 0 0
Wilkins, J., and Son...	4,550 0 0
Beaven, A. J.	4,390 0 0
Perrott, J.	4,324 0 0
Lewis, J. R. (accepted)	4,290 0 0

CARLISLE.—For house and shops, Hart-street and Broad-street, for Mr. S. Neilson. Mr. H. Higginson, M.S.A., Carlisle and Preston, architect:—

Accepted tenders.

Bricklayer and mason:—

Hill, G.	£222 12 0

Carpenter and joiner:—

Latimer, W.	110 0 0

Slater:—

Newsom, M.	13 0 0

Plumber:—

Sowerby, G.	10 10 6

Plasterer:—

Ferguson, S.	18 0 0

Painter and glazier:—

Harkness, H.	14 14 6

DEVIZES.—For cottage and shed at Lower Old Farm, Devizes, for Mr. J. Anstie. Mr. J. A. Randell, M.S.A., architect:—

Boyce, G., & Son, and Chivers, W. E.	£365 0 0
Bilson, F., Rushall	355 0 0
McIlquham, W....	344 10 0
Brown, G.	300 0 0
Ash, H., sen.	297 0 0
Chivers, W., and Son	295 0 0
Webb, W., Bromham	284 0 0
Mullings, R. B.	275 0 0

Rest of Devizes.

EDGERTON.—For dwelling house, Edgerton:—

Accepted tenders.
Excavator and mason:—
Crowther, M. S., Huddersfield.
Carpenters and joiners:—
Batley and Wilkinson, Huddersfield.
Plumber and glazier:—
Earnshaw, A., Huddersfield.
Plasterers:—
Robinson, J., and Son, Huddersfield.
Slater:—
Jowitt, W. E., Huddersfield.
(Total cost £490.)

HALIFAX.—For dwelling-house, Edgerton, Huddersfield. Mr. J. Berry, 9, Queen-street, Huddersfield, architect:—

Accepted tenders.
Excavator and mason:—
Crowther, M. S., Fixby, Huddersfield.
Carpenters and joiners:—
Ainly and Barber, Crossland Moor, Huddersfield.
Plumber and glazier:—
Earnshaw, A., Huddersfield.
Plastering:—
Robinson, J., and Son, Huddersfield.
Painting:—
Holroyd, W. and P., Huddersfield.
Slating:—
Jowitt, W. E., Huddersfield.
(Total cost £400.)

GREAT WRATTING, SUFFOLK.—For the erection of two pairs of cottages, for the Right Hon. W. H. Smith, M.P. Mr. C. P. Ayres, Watford, Herts, architect:—

Brown, M., Haverhill...	£1,078 0 0
Mason and Son, Haverhill	993 0 0
Arber, J. C., Haverhill (accepted)...	875 0 0

KIRKHAM.—For the erection of a Wesleyan school. Mr. H. Higginson, M.S.A., Carlisle and Preston, architect:—

Croft, Preston	£889 0 0
Smith, Blackpool	825 0 0
Riley, Fleetwood	817 3 4
Baldwin, Preston	786 0 0
Gardner, Kirkham	779 0 0
Singleton, Kirkham	760 0 0
Haslam, Kirkham (accepted) ...	758 10 0

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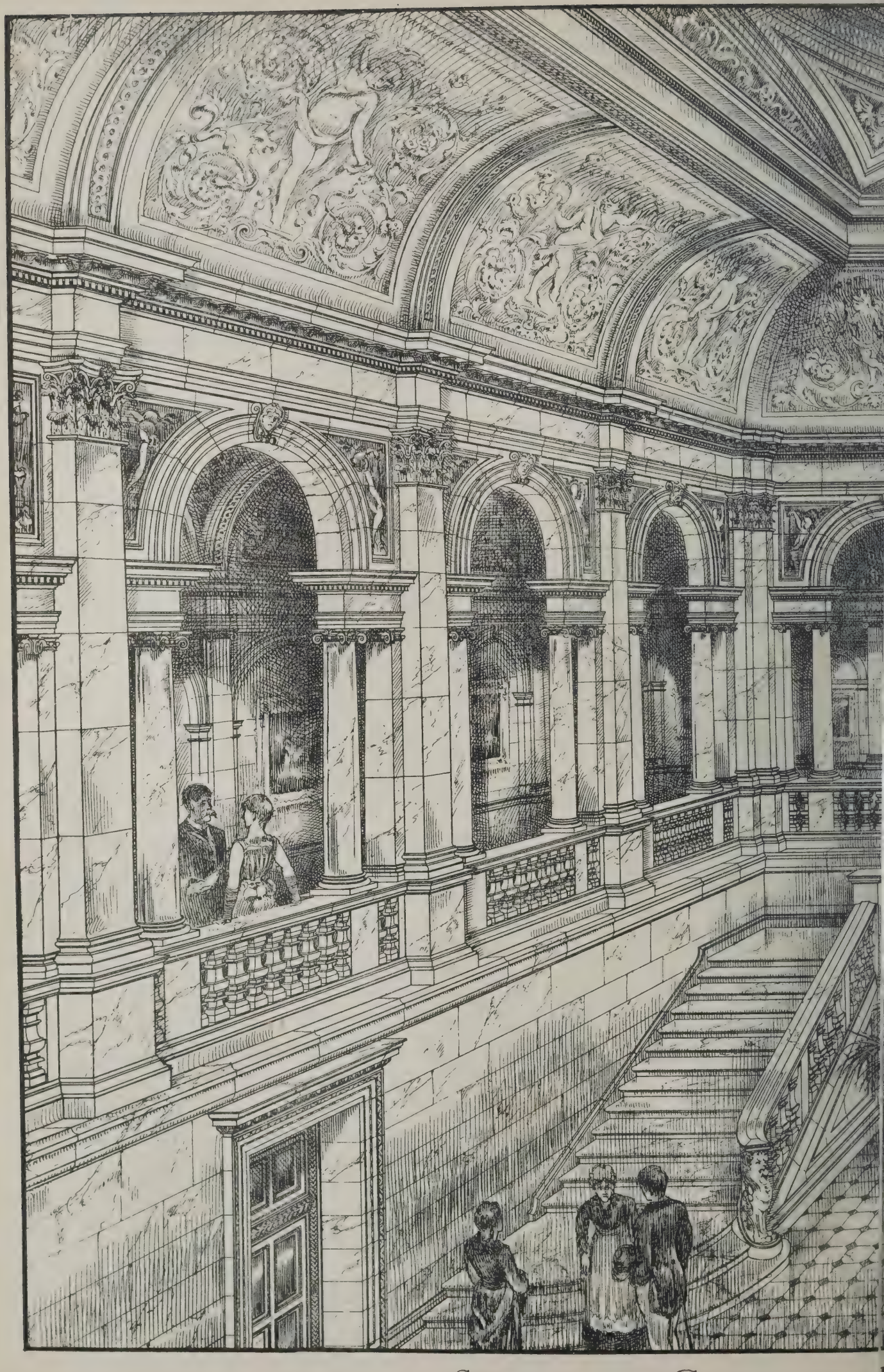
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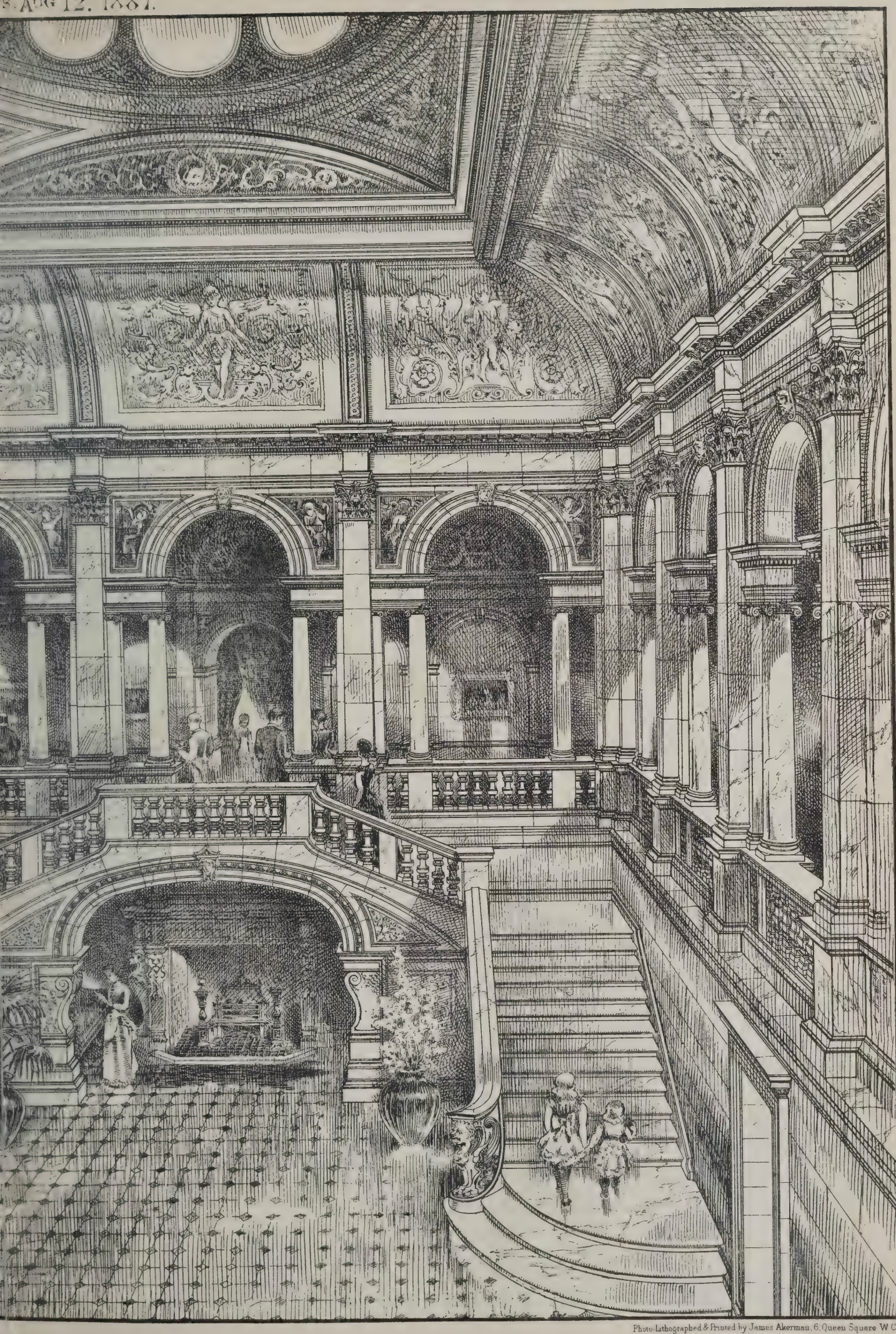


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OUSE . WILLIAM YOUNG, ARCHITECT.

THE BUILDING NEWS
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FRIDAY, AUGUST 12, 1887.

ALLEGED INJURIES TO WESTMINSTER ABBEY.

DURING the preparations for the Jubilee ceremony in Westminster Abbey, we raised our voice against what appeared to us to be a wanton crowding up of the venerable edifice with galleries and seats for the thousands of visitors who were invited to attend the thanksgiving service. A forest of timber—we should not like to say how many loads—filled the aisles, transepts, and sanctuary of the sacred building on that occasion. The aisles were occupied by tiers of galleries, the topmost of which extended to the aisle vaults, while the triforium arcade was filled with spectators. The transepts and choir were also filled with galleries arranged on a very similar plan to that at the Coronation of Her Majesty in 1838. How much injury the Abbey has suffered during these crowded ceremonials, to say nothing of previous pageants, it would be impossible to say.

One or two letters have appeared in contemporaries making serious complaints about the amount of injury to the abbey caused by the erection of the galleries, and alleging particular instances of the want of care by the workmen engaged. Owing to the publication of a letter by a correspondent of the *St. James's Gazette* on the first of this month, calling attention to various injuries which the Abbey and its monuments have sustained, we have paid a visit to the Abbey with the object of ascertaining the actual extent of the mischief which has been done. Our anticipations of the amount of injury were aggravated by what we had noticed of the immense quantity of timber in bulk and in scantlings which had been taken into the Abbey, and the hurried manner of the erection. We must admit at the onset that our examination, though necessarily superficial in character, has not justified those anticipations. We are constrained to say that, taking into consideration the immense quantity of heavy timbers that were handled and put into position, the damage done to the stonework of the structure is small, and the work of construction and taking down reflects credit on the firm of builders employed. Taking first the structure, we have scanned every portion in which the seats were fitted. In the nave there are to be seen several scratches and abrasions of the walls, diapering, broken stringcourses, arch mouldings and corbels; but from the look of many of these they appear to be old, and not recent marks. Indeed, the difficulty of saying how much of these injuries to the stonework belong to the present generation and how much to the past is very evident. Everyone who has carefully examined the interior of Westminster Abbey well knows the whole structure is full of patches of exfoliated surface, fractured stone, and chipped mouldings, yet this condition does not exonerate from blame those responsible for the Abbey in later State pageants. The very best and most careful arrangements and supervision must fail to preserve the fabric from injuries. To the repeated ceremonials of coronation—an ancient tale, as Shakespeare has said—we must attribute the present mutilated and defaced condition of the structure and monuments. On the Coronation of the Queen in 1838, much the same arrangement of seats was seen as that of the Jubilee Day, according to old engravings. All the monuments in the side aisles were encased in boards to preserve them from injury. From a description of that date we quote:—"From the west door to the screen over which the organ loft is placed [since altered and the organ divided], and which divides the choir from the nave, there were two rows of galleries erected on each side of the centre aisle, one level with the vaultings, and the other with the summit of the western door. These galleries, of which the backs rested against the walls of the abbey, had their fronts fluted with crimson cloth, richly draped at the top, and adorned with broad gold fringe at the bottom. The screen was entirely hidden under a construction of wood, which inclosed the organ and the organ loft." The triforium was filled with spectators. Proceeding to describe the choir, the writer mentions the platform covered with richest cloth of gold, upon which the chair was placed, in the crossing under the central tower. Above the altar three galleries were formed, the highest being close to the roof, holding scarcely a dozen persons, for the trumpets of the orchestra. We further learn that all the ordinary stalls, reading desks, and pews were removed to make way for the works, and in their places were erected five rows of benches, reserved as seats for the officers of State and the Household, above which were three rows of galleries, the highest being in the vaultings. The transepts had each two tiers of galleries, reaching up to the Catherine-wheel windows. It is said that more than 11,000 tickets were issued. How much damage was suffered then we do not know; but we may surmise that a very great deal more injury was sustained by the fabric then than during the last pageant.

Let us examine the present state of the interior. Scarcely a pier or shaft exists that does not exhibit the natural decay and wear of centuries. Here and there the laminæ of the stone piers are eaten away considerably below the surface, and large patches of exfoliation are to be met with everywhere, the outer skin of the stone peeling off in large pieces. Taking the interior in detail, we find the string-course of the triforium chipped in parts, and marks of hobnailed boots occur. The diaper ornament in the spandrels of arcade show patches of lighter colour, as if the surface had been scratched; but these appear to be old marks. Mr. E. Huth Walters, in his letter in the *St. James's Gazette*, says: "In the triforium arcade are numerous chips and marks of hobnailed boots. The mouldings of the principal arcade of the apse are also chipped; so is the carved diaper on the walls; so are some of the piers, not badly, but still quite visibly, even when seen from a distance. At the junction of the north transept with the north chancel aisle there is a pier bound round with cords, evidently to prevent a large piece of the capital from falling. It is already split." Our observations in the apse, or Edward the Confessor's chapel and sacrarium, discovered some chippings in the arch members and sundry slight scratchings. The effigy of the Countess of Lancaster on the north side, which the writer of the letter says has been very roughly handled, as though heavy iron tools had been thrown on it, bears certainly evidence of recent ill-usage in the drapery of the figure, and the gabled canopy of the niche is broken at the top, though it would seem not lately. The bands, *bagues*, or shaft rings round the small shafts and piers are broken in places; but there is little to indicate the damage is recent—in fact, throughout the edifice these shaft bands are much chipped and broken away, a sure witness to the fitting up of galleries for spectators on various occasions. In the nave, two tiers of these annular bands, or metal *bagues*, are introduced. These attach the four shafts to the circular pillar and are deeply moulded. In some cases there is reason to fear these bands or *bagues* have become split through uneven pressure, or through the introduction of metal into them. There is, perhaps, no English cathedral where the *bague* is so largely introduced as it is in Westminster: all the pillars of nave, transepts, and apse have them, and they are said to be of stone or brass, the former encircling the whole pier and its shafts. Mr Huth Walters directs attention to the damage done to the beautiful Italian mosaic pavement of Abbot Ware in the sacrarium. The mosaic is certainly seriously damaged by what appears to be scaffold poles or timber ends, or by tools thrown down from a height. There are clearly signs of rough usage; the mosaic in several spots on the south side has been broken away, and the bedding only remains; a loose piece of lead, as the writer says, covers a rather bad smash, that looks patched up with cement. Referring to the pier at the junction of north transept with the north chancel aisle, the second pier from the corner, the appearance is anything but satisfactory. But is this not an old eyesore? It is certainly time something should be done to remove this disfigurement from one of the main entrances to the Abbey. The shaft and capital look entirely broken away, the parts being kept together by a cord and splints, which is an ugly-looking bind.

Beyond these injuries, Mr. Walters points to a stained-glass window in the apse on the south side which he thinks has suffered damage. He says, "in the right hand light, near the head of the figure, there is something suspiciously like a hole, as viewed from the pavement below." We are very doubtful about this damage; some of the authorities ought to explain.

We must now refer to the Coronation Chair, the treatment of which is first in the list of the injuries recorded, and is justly considered the worst of them all. The general effect of the back is that of being burnt; it has all the appearance of being scorched or charred, having assumed, as Mr. Walters says, a "murky, dingy, nut-brown"; the original warm, grey tone of the ancient wood has disappeared, and with it the remains of the 14th-century decorations, executed originally in gilded gesso. We can see the uneven surface caused by remains of the gesso still adhering; but the whole seems to have been painted over with a brown paint or varnish—the entire back having the appearance of a smudgy patchiness very unlike the more natural grey tone of the companion chair, made for the coronation of Mary, Queen of William III. Then there is a gross discord perpetrated in the fresh gilded lions and base upon which the old chair stands, so entirely out of keeping with the dingy woodwork. We may notice here a description of the gilded decorations of the chair are given in Sir Gilbert Scott's "Gleanings from Westminster Abbey," written by the late Mr. W. Burges. At present nothing is decipherable in a moderately close view where the chair stands behind Henry VI.'s screen, which divides the Confessor's chapel from the sacrarium. We do not agree with general restorations of ancient buildings, but we think there is room for a little skilful treatment in this part of the Abbey. The four chapels may be left untouched, but the arcade separating the ambulatory from Edward the Confessor's chapel, which forms the apse, wants a careful examination and strengthening here and there; the wooden struts or bars between the arches at this end are very unsightly, and might be replaced. The monuments at the back of stalls in the nave are much damaged, and chips and exfoliations abound. Yet, as we have already remarked, it is extremely difficult to distinguish the old injuries and scrapings from those of recent times.

At St. Paul's, where there was ample room for the assembled visitors, the ceremony could have been as well performed and with less risk of mischief to the monuments and structure. Why was it not selected? Is precedent so strong in these observances that even so venerable an edifice as that, conse-

crated by centuries to coronation services of our kings and queens, should continue to be used for State ceremonies such as that of last June?

THE VACATION: SUGGESTIONS TO ARCHITECTURAL STUDENTS.

DURING this and the following month many of the profession who can spare the time from their daily avocations will be taking a holiday. All parts of the country will be ransacked by the younger members, and not a few will avail themselves of trips to the Continent, with the twofold object of enjoyment and profitable study. Though very few places have not been brought under contribution by the aids of pen and pencil and photography, those who seek for "fresh fields and pastures new" will soon find something in old haunts, and perchance derive new ideas from buildings and ruins which were once visited with the sole object of being sketched. The photographer, professional and amateur, both those who work for profit and for pleasure, have in no degree lessened the interest or value of sketching as one of the means of imparting instruction. A hand drawing has always a personal interest attached to it; the eye and hand have followed the lines, the mouldings, and features step by step, and the mind has, so to say, imbibed some of the original designer's feeling, till the work, whatever it may be, has been imprinted on the memory. A photograph records the impression as a whole better than a mere sketch; but in the latter only, if it be done conscientiously and truthfully, the artist can convey the sympathetic rendering of detail. Under some lights differences of surface and outline are quite lost, or appear as flat white patches, in a photographic picture; the most beautifully detailed moulding may become nothing but a flat surface of light—clear definition of surface and outline are indistinguishable.

On the other hand, labour may be immensely curtailed by substituting a photograph for a general sketch, the time so saved being spent in "detailing" the building, making measured plans and sections and notes. In this manner the photographer's art has already become a boon to the artist and tourist, and has greatly lightened the toil of the architectural student. Pictorial sketching, and finished drawings of old buildings, have on this account become less than they were formerly the object of the architectural tour, and the man who can sketch fairly, and draw plans and sections, can do as much as the accomplished delineator in acquiring accurate details.

Archæological societies, as we have pointed out elsewhere, have degenerated much of late, and have lost a good deal of their early enthusiasm and hard work. A correspondent, Mr. J. Sands, in our last issue, points out how little encouragement and aid are afforded by these societies to the individual worker in this path, how much sometimes is done to thwart his researches—a kind of forgetfulness of the original objects of these societies, arising, no doubt, from their dwindling down to mere associations of tourists, in which the interchange of compliments and indulgence in convivialities are the leading ideas. Last week we chronicled the doings and programmes of four or five different societies. The British Archæological Association are about to meet at Liverpool, a typically unpromising centre, and to organise visits to various suburbs; the Royal Archæological Institute have been busy during the week at Salisbury; the Bristol and Gloucestershire Archæological Society are holding a congress at Stratford-on-Avon; the Somersetshire Archæological Society have been making excursions into the neighbourhood of Bristol; and the Architectural Association have organised an excursion to many interesting places in Somersetshire and Wilts. There will be something to glean from such an ancient fabric as the church of Bradford-on-Avon—one of the few perfect specimens of Anglo-Saxon architecture remaining. Its very simple plan, comprising nave and chancel and a large porch, is remarkable; it is supposed to have been built about 705 A.D., and to have been attached to the Abbey of St. Aldhelm, who founded three monasteries, those of Malmesbury, Bradford, and Frome. The superficial arcading which runs round the little Bradford church, and the character of the masonry of Bath oolite, which is fine-jointed, are important features of this valley church. Another monastery chapel, Hinton Charterhouse, of 13th-century character, will attract notice for its perfect state, small size, and Early English details. The manor house was built doubtless from the remains of the priory, which is now a ruin. At Wellow Church, Somersetshire, will be found many interesting details, including a very good Early English type of font surrounded by shafts. For architectural details, Shepton Mallet, Frome, Ilminster, Keynsham, Doulting, Fifield, Fisherton, near Salisbury and Devizes, afford excellent hunting ground.

One very important source of information in connection with old buildings, that also can be made an interesting digression by those who seek holiday and rest, is geological formation and local materials. There are not ten out of a hundred tourists and students who bring home with their sketches any note of local materials and local peculiarities of workmanship. The Somersetshire hills form grand quarries. Within a few miles of Gloucester may be found freestone of fine grain, compact, oolitic in structure, and durable, capable of being used for carving. Stroud, Minchinhampton, Bathampton, Chippenham, and Doulting are quarries from which the stone of the great churches of the West of England has been obtained, amongst them Bath Abbey Church, Wells Cathedral, and Glastonbury Abbey Church. These are all in fair preservation. Again, the light brown oolite of Barnack, in Northamptonshire, is part of the great limestone range, which is noticeable as the building material of many of the beautiful churches of that county. In Lincolnshire there is a brown or rich warm oolite, used in Lincoln Cathedral, Grantham parish church, and a variety of other well-known buildings. So, again, near Bristol—all students must have noticed the hard bluish-grey stone quarried at Fishponds, near Bristol; the greenish-brown sandstone of Tisbury, in Wiltshire; and the warm red sandstones of Nottinghamshire, which colours very strongly distinguish the buildings of each district. This matter of colour has much to do with our impressions of the counties we visit, and, from an artistic point of view, is of consequence. We have known sketches made of buildings without any notes or indications of structure to enable anyone to tell whether they are stone or brick. The prevalence of brick in some localities and its scarcity in others is a point of vital importance. Structural peculiarities, dependent on material and method of working, are things which the least artistic amongst tourists may notice without much labour to themselves. In nearly every great district we may find peculiar features. Take, for example, the church towers. In Gloucestershire and Somersetshire we have fine towers of Perpendicular character; in Northamptonshire, towers with spires; in Kent, low, sturdy-looking towers, with angle stair turrets and clerestory-less churches; in Norfolk and Suffolk, the circular tower and flint masonry relieved by flush dressings of stone. Still greater diversity will be found in domestic buildings where local materials have developed styles of singular variety. The natural landscape and scenery have had some influence on architecture, though less marked. What style and features have been most favoured in certain localities would be an interesting inquiry. In the hilly and wooded districts of the West and South one may expect to find different forms of roofing and features to those that prevail in the flatter districts of the Midland and Eastern Counties, though of these modifications due to scenery we have nothing published to guide us. The building stone—its abundance, hardness, or softness—has always been a powerful factor in determining elaboration or richness of style. Thus, it will be observed, the more florid and Perpendicular styles of Gothic have flourished more in districts where good freestone is abundant, very little in districts where stone is scarce, and scarcely at all where granite prevails. Visits to quarries, to factories, to large building firms' works form no part of the programmes of those who take tours; they would probably be thought to smack more of business than of pleasure; at the same time they would be more profitable than desultory loitering in one old church, or aimless saunterings under the guidance of a county handbook. Organised excursions planned before starting give time and opportunity for sustained study, and we have lately indicated in a prize paper one or two routes of interest to the architect and artist. To students we would recommend the saving of much time, or the profitable expenditure of that at any chosen building, by taking with them plans or outline maps of noted buildings and districts that may be accessible before starting, by which the filling-in of details will be facilitated. Hundreds who yearly go away do so without preparation, without even having mastered superficially the topography of the district to be visited and its chief features.

NATIONAL COMPETITION OF WORKS OF SCHOOLS OF ART.—II.

WE now resume our notes of prize designs and drawings, oil and water-colour studies, on view in the Museum at South Kensington. The chalk drawings of figures from the antique are not quite so strong as they have been in previous exhibitions. A Birmingham student, Ernest G. Treglown, wins a silver medal; the same distinction is won by James Riddel, of Edinburgh; by Clare B. Ashton, Manchester; and John Hamer, South Kensington. Three silver medals are given to students of the Training Class at South Kensington for works in the same stage. The chalk drawings of heads from life represent excellent work. We notice a chalk study of figure and drapery, a head of girl, by Clara Atwood, Chiswick; also by Sarah Thomas, of the same school, a study of man's head, side view, very darkly shaded. Other figures are by Louis Cockrell, Hilda K. Robinson, John Shields, for which bronze medals are awarded. Honorary awards are well merited by Robert B. Dawson and F. Stead, the latter for a woman's head under strong light and shade. Arthur Garrington, Bristol, sends a boldly-drawn charcoal study from the antique (silver medal).

The drawings of figures from the nude are consigned to a part of the court by themselves, dictated, no doubt, from the British Matron's view, though the authorities could hardly have done more to excite a prurient curiosity from such a course. If it was thought necessary, from feelings of delicacy, to place these studies by themselves, why was not the same course followed with the models of figures from the antique, which are publicly exhibited in the open part of the court, and are quite as much, if not more, open to the like censure, and which equally disregard the modesty of those who frequent the court? The fact is that a promiscuous interminglingling of these works with other drawings and studies of the figure would have been less likely to invite the attention of those for whose eyes they were not intended. The studies show

different attitudes and effect of light and shadow, the body at rest and in motion, in exercise, and in other employments. One gold medal is awarded to Hilda K. Robinson, South Kensington, who wins also the Princess of Wales Scholarship for a figure of a woman leaning, her feet crossed, and three other studies. Charles T. Dodd receives an honorary award gold medal for studies of male figure in different attitudes. Kate Andre, South Kensington, and John Lee show studies; the latter has a silver medal for a figure of a man, one foot raised. A silver medal is awarded also to George Robertson, St. Martin's, for a back view of male figure and a seated figure, both drawn with skill, and showing good modelling and anatomical study.

A few good drawings are placed so close to existing screens that they cannot be viewed, or are very imperfectly lighted. We notice Nos. 197, 69, 72, 368. John Collins, a Birmingham student, takes a silver medal for studies of much merit; and Maud Hiley, Manchester, for a seated figure, displaying careful study of form and modelling. Albert John's anatomical studies, and Oliver Silk's, Liverpool, of male figure, both take silver medals. The oil studies of the nude include one or two admirable works. L. M. Kilpin, West London, and Philip Hall send careful studies, the former a partially-turned figure of a woman.

The oil-colour groups do not take the high place in the exhibition which we had anticipated; the subjects selected are not very happy as a rule. These groups are given to exercise the student's power of rendering light and shadow, colour and texture, and in one or two instances the results are satisfactory. No gold medal has been taken in this stage. Walter Freeth, Birmingham; May Elizabeth Sumner, Lincoln; and Philip Hall, a training student, take silver medals. We notice one very pleasing group consisting of a broken red earthenware jar, roughly painted green, with dark drapery background, for which Ethel Buckingham, of Norwich, receives a silver medal; also one painted by Gertrude E. Offord, Norwich. The colouring of broken jar and accessories is harmonious, and the textures painted with skill. Gertrude Howes, of the same school, sends a cleverly executed group of the same in water-colours. George Percival Gaskell, Ilkley, shows a group in quiet colour; and Haywood Rider, South Kennington, a trophy of bronzes and fan. Kate Young, Southampton, has a group representing a table, basket, loaf, &c., a promising work; and, from the same town, we must notice F. V. Poole's ornament from cast in water-colour—a monochrome study in sepia—the subject, a panel, with foliage in relief carved, executed with much delicacy and feeling. Both take book prizes. Another excellent monochrome in water-colour, of ornament, is by Patrick O'Sullivan, Cork, a bold scroll of Classical design, to which a silver medal is awarded. Edith Edwards, North London, sends a water-colour (monochrome) study of a head from the antique, displaying a skilful handling in the shaded face; we must also mention a monochrome drawing of ornament from cast by Bessie Gough, Bristol, a honeysuckle enrichment in architrave, and a monochrome in sepia by Constance Ethel McCabe, Ryde, of a small spandrel with folial ornament in relief. A monochrome in oil of mask from the antique is sent by Ada Howell, North London. We must also notice the gold medal monochrome oil-colour and tempera ornament, by William H. Allen, of South Kensington, a pilaster ornament from the cast, a folial design; two other studies on blue ground, and a monochrome oil-frieze by Thomas McKeggie (bronze medal), on red ground, refined in treatment; also a panel on green ground, by Paul F. Maitland, of delicate treatment, may be named. A few designs and drawings we omitted to mention in our first review. Of these we may notice a design by Henry C. Morrow for a frieze by Dosso Dossi, on yellow ground, in oil. A figure design for frieze, by John M. Nichols, looks rather straggling. A quiet, delicately-treated, and nicely-toned design for wall paper, with foliage adaptation, by Amy E. Woodall, West London, receives a bronze medal; and George Redfern's (Manchester) flock paper in light citron colourings may be noted. Alfred W. Weatherstone's figure designs—one for a frieze with figures in blue ground is exceedingly refined and harmonious in colour; and Adele Muller's figure composition for majolica vase is suggestive. A neat drawing of parvise of Peterborough Cathedral, by William H. Lord, of that city, takes a bronze medal; and we must also mention William Townsend's (Derby) drawings of gates executed in 1725. Several very creditable groups in water-colours are hung. Catherine Kitson, Bloomsbury, is awarded a silver medal for studies of flowers and grass, and Paul Holden a bronze medal for flowers without a background, and Charlotte Alston sends a charming spray of pink mayblossoms. We hope that the next exhibition of designs and drawings will find a more convenient room for hanging, as it is impossible, from the arrangement of the works between permanent screens of the court, to follow consecutively any particular stage, and many works are so mercilessly "floored" that they are not seen at all. The classification appears only intended to bewilder.

ANCIENT EGYPTIAN TEXTILES AT THE SOUTH KENSINGTON MUSEUM.

FOR some time past the textile collections at South Kensington have been in course of rearrangement, and the valuable series of examples of weaving, embroidery, and lace have recently been brought together in a gallery under the new library. Students of decorative art are scarcely alive to the fact that in these collections a veritable storehouse of design has been accumulated for their use. In almost any country on the Continent such a museum would be thronged with the representatives of manufacturers eager to turn these specimens to practical account; but here in England the visitor passes through the gallery unconscious alike of the beauty of the fabrics and of their value to the designer and to the art workman. The collection of Dr. Bock, of Aix-la-Chapelle, which was purchased for the museum some ten or twelve years ago, has from time to time received important additions from other sources, and now we have to record the acquisition of a series of ornamental textiles from Akhmîm, on the banks of the Nile in Upper Egypt, which consists of over 300 specimens, the fabric being in every case of linen, and the ornament wrought in tapestry, in some instances enriched also with needlework or embroidery. Although but few complete garments have been obtained, there are ample indications of the derivation of the panels and borders, which form the bulk of the present collection. The Arabs, when they rifled the ancient burial ground of Akhmîm (Panopolis), cut out from the shrouds and tunics in which the bodies of the dead had been wrapped all the decorative details, and these are for the most part in a wonderfully good state of preservation. We have here portions of the grave clothes and garments of the dwellers in this part of Egypt during a period which has been estimated to extend to little short of eight centuries, say from the 1st century of the Christian era down to about the year 800. The interments took place in the dry sand, which prevented the tapestry work from decay for upwards of 1,300 years, and it is possible to recognise every stitch and thread in tunics and ceremonial cloths which date back to the Roman occupation of Egypt. It is needless to observe that our knowledge of the textile fabrics of that date is extremely scanty, and that the specimens thus obtained will throw a new light upon manufactures and processes concerning which much has been hitherto a mere matter of conjecture. The garments which have been obtained entirely represent, no doubt, the ancient tunic, in its simplest form—a short-sleeved, loose-fitting coat, resembling the herald's tabard, or the church dalmatic. The ornament consists of strips, or bands, passing over each shoulder, vertically down the front and back, of pattern or panels on the shoulder, and sometimes on the breast and back, with cuffs or narrow bands surrounding the sleeves. In the woollen tapestry-woven ornament, we find a prevailing purple tint in several shades, but occasionally the use of several colours may also be remarked. The colouring of some of the later examples, which are supposed to be of Christian Coptic origin, is much more varied than in the earlier work, where a Roman influence is clearly manifest. The bands (*clavi*) are enriched with leaves and foliage, and with quaint animal forms; the panels (*adjunctæ tabulæ*) are in many cases of elaborate design, an excellent effect being obtained by stitches of embroidery on the surface of the woollen tapestry. Many of these examples recall vividly, both in the style of their enrichments and in the manner in which the ornamental forms are conventionalised, the treatment of the Roman mosaic pavements, and it would seem almost as if the same limitation of the material which evoked certain degraded forms of ornament in mosaic work had led the tapestry weaver to produce precisely the same effects in the loom. The linen which forms the groundwork of the majority of these specimens is coarse in quality, and appears to be unbleached. Certain of the examples present us with a fabric of the nature of rough towelling, or one which has the threads looped up on either face, like the material known to housekeepers as "Turkey towelling." There are strong signs of a gradual decay in the art instincts of the race by whom these works were produced, and we find, along with the vigorous and tasteful ornament which has either a Greek or Roman character, some debased and degraded types of art which remind us strongly of the specimens of manuscripts and embroideries brought back by the Abyssinian expedition against the ill-fated King Theodore. Here we often find Christian emblems and forms which record stories of the saints and martyrs of the Eastern Church. The fabrics were no doubt produced by the Coptic Christians as late as the 8th and 9th centuries, when the latest interments must have taken place about the period of the Arab conquest. The collection is at present in process of being framed for exhibition, and only a small portion of the specimens are available for public inspection, but the examples now shown are no doubt of the greatest possible interest and value.

BUILDING MATERIALS.*

By W. Y. Dent, F.C.S., F.I.C.

(*Concluded from p.* 229.)

IT is probable that we do not yet fully realise what a serious effect on the durability of many of the iron structures that have sprung up within the last forty years may be produced by this liability of iron to rust, because a number of years must elapse before such massive structures, as many of them are, become sufficiently weakened to render them dangerous; although it would seem from Mr. Clark's report, made in 1878 relative to the condition of the Britannia tubular bridge in reply to some alarming statements which had appeared as to the injuries it

* Being the Cantor lectures delivered before the Society of Arts.

had sustained from the rusting of the iron, that where proper care is taken to preserve the iron there need not be much ground for uneasiness, since the report states that during a period of twenty years the entire loss from the whole mass, about 10,500 tons, did not exceed 1lb. in weight. This rusting or combination of iron with oxygen results from the exposure of iron to the combined action of air, moisture, and carbonic acid. That moisture plays an important part in the oxidation of iron is proved by the fact that a piece of steel is rapidly corroded when exposed to the influence of a mixture of moist oxygen and carbonic acid, whilst but little, if any, effect is produced upon it by the dry gases. The influence exerted by the presence of carbonic acid is probably due to the tendency it would have to induce the formation of a carbonate of the protoxide of iron or ferrous carbonate, which is subsequently converted into a hydrated peroxide. It is well known that the tendency of two substances to combine with each other is increased by the presence of a third substance, which exhibits a powerful attraction for the compound resulting from their union. We have a familiar example of such action in the formation of saltpetre (potassium nitrate), which takes place under favourable circumstances in soils containing potash and nitrogenous organic matter, the union of the nitrogen with the oxygen of the air to form nitric acid being promoted by the presence of a powerful base, such as potash, for which the acid has a strong affinity. The advantages derived from the use of lime in agriculture are to some extent due to a similar cause, the beneficial effects resulting from the application of lime being most evident when it is applied to newly broken-up ground or soils containing a large quantity of vegetable matter, the decomposition of which is promoted by the presence of lime inducing the formation of organic acids with which it combines. The well-known protective influence which lime or any caustic alkali exerts in preserving iron from rust is to be attributed in a great measure to the absorption of carbonic acid. The coils of fine iron wire used in deep sea soundings (any rusting of which would be of serious consequence) must necessarily, for obvious reasons, be put away whilst they are wet, and therefore under the most favourable conditions for rusting; but they are preserved by being stored in a solution of caustic soda. Lime is also very commonly employed for preserving articles made of iron. It is well known that when iron has once begun to rust its corrosion proceeds with increased rapidity. This may be due partly to the porosity of the oxide of iron formed, which causes it to absorb moist air more rapidly, but principally to the galvanic action arising from the porous oxide acting the part of an electro-negative element, and the metallic iron that of an electro-positive element, whilst the moisture absorbed performs the function of the exciting liquid in the cell of a galvanic battery. Hence we see that in order to preserve iron from being destroyed by rust it is essential that every particle of rust should be removed as soon as it is formed, and that the smoother, brighter, and more polished the surface of the iron can be maintained, the better will it be able to bear exposure to oxidising influences. Besides the serious effects produced by oxidation upon iron structures, which, of later years, have grown to such vast importance, the products resulting from the oxidation of iron possess a special interest in connection with the subject of stone, inasmuch as the oxides and other combinations of iron form the chief colouring matter of all rocks. In some cases, such as flints, which become white when calcined, the colouring matter is of a carbonaceous character; in other cases, the colour may be due to manganese, chromium, copper, as well as other metals, but the presence of these is rare, as compared with the oxides and other compounds of iron which are almost always present, giving rise to a variety of colours, including black, blue, grey, green, as well as every shade from light yellow to a deep red. The hard kidney-shaped nodules which are found in the red hæmatite ore of Cumberland consist of pure anhydrous peroxide of iron, whilst the brown ores, such as those of Northamptonshire, consist of the hydrated oxide, and in the well-known magnetic iron ore of Sweden we have the black oxide. Black oxide of iron is produced when steam is passed over iron at a red heat, the vapour of water being, under these conditions, decomposed, the oxygen combining with the iron to form the black or magnetic oxide, and the hydrogen being evolved as gas. This reaction has been utilised as a means of obtaining hydrogen gas on a considerable scale for filling balloons, and also for producing a coating upon iron which will protect it from further oxidation. This method of preserving iron from rust was made the subject of a patent some years ago by the late Professor Barff, and the process has been successfully carried out with respect to articles that are capable of being subjected to a high temperature without injury. The iron to be preserved, which must be clean and free from rust, is placed in a chamber which is heated to a temperature of from 1,000° to 1,200° Fahr. Steam is generated in a boiler under a pressure of about 30lb. on the square inch, and superheated by passing through a series of wrought-iron pipes protected from the effects of the fire over which they are placed by others of cast-iron. When the chamber is filled with the articles to be operated upon (which may consist of either wrought or cast iron), the door is closed, and the temperature maintained chiefly by the steam admitted for a period of from three to five hours. Another method of preserving iron from rust by means of a coating of this unalterable black oxide has been patented by Mr. George Bower, which consists in passing the hot gases produced by the combustion of fuel over the iron, instead of steam, mixed with a proportion of air, which is increased or diminished according to whether an oxidising or reducing effect is desired to be produced. If the iron be rusty, a reducing flame converts the red oxide into the black or magnetic oxide. In the case of wrought iron that is not rusty, Mr. Bower prefers to produce in the first instance a little red oxide by increasing the quantity of air, as he finds that the black oxide finally produced is rendered thereby less liable to scale off. Barff's process is best adapted for polished steel or wrought iron; Bower's for cast iron and rusty iron. The two processes are now combined, and frequently articles are subjected first to the heated gases produced by combustion, and finished by superheated steam. There can be no question as to the success of the process as regards the smaller descriptions of iron goods, for when properly conducted, iron will bear exposure to the atmosphere under the most trying conditions without a particle of rust being produced, and if specks of rust should make their appearance on spots that may not have been thoroughly coated with the black oxide, the rust shows no tendency to spread. This process is specially adapted for intricate castings, as the gas penetrates the finest lines, producing a thoroughly protective coating. As a means of preparing articles for gilding, it has been of great assistance in overcoming the difficulty previously experienced in coating iron so as to prevent it from rusting, and as a necessary consequence throwing off the gilding. The unavoidable expense incurred in heating large masses of metal to the required temperature renders it difficult to apply a process of this kind to heavy castings, neither is it suitable for protecting wire, because the coating, being of a brittle character, breaks off when the wire is bent, unless the coating is too thin to afford efficient protection to the wire. There is a difficulty in applying it successfully to nuts and screws on account of the oxide filling up the threads to such an extent as to prevent their working satisfactorily, neither can it be considered a suitable process for chains, the links of which, by friction against each other, soon rub off the coating of black oxide. The necessity of raising the iron to a red heat is also a bar to the use of this process in many cases in which otherwise it would be invaluable as a preventive of rust. The process ordinarily adopted for preserving iron from rust, termed "galvanising," consists in immersing the iron in a bath of melted zinc, and thus covering the iron with a coating of zinc, which rapidly oxidises on the surface; but under ordinary circumstances the oxide formed remains firmly attached to the metal, and thus protects it from further corrosion. It has lately been proposed to deposit the zinc electrically upon the iron, a process which is said to be successfully carried out at a less cost than the ordinary galvanising process. The effects produced by carbonic acid are most strikingly exhibited in its solvent powers as regards the carbonate of lime, carbonate of magnesia, and protoxide of iron. Many natural waters contain ferrous carbonate in solution, more especially those known as chalybeate waters, and from such water, when exposed to the air, peroxide of iron is deposited by the oxidation of the ferrous carbonate. The hard waters obtained from the chalk contain lime held in solution by carbonic acid, and the softening of such water by what is known as Clark's process consists in adding just sufficient lime to neutralise the carbonic acid that holds the carbonate of lime in solution, when the whole of the lime existing as carbonate is precipitated, the water being softened down to about one-third of its original hardness, an immense advantage in water required for domestic purposes. It is the solvent action of carbonic acid upon carbonate of lime that gives rise to those magnificent incrustations that occur in the caverns of limestone rocks, such as are found at Clapham Cave in the north of Yorkshire, Castleton in Derbyshire, and the Kitcraft Quarry in the Isle of Portland. These incrustations frequently take the form of icicles hanging from the roof, when they are known as stalactites, which are sometimes several feet in length. The pillar-like masses rising from the floor are termed stalagmites. The incrustations are produced by the rain water, which, charged with carbonic acid, percolates the limestone beds, and dissolves in its progress the carbonate of lime. When the water saturated with carbonate of lime reaches the roof of a cavern and becomes exposed to the air, it loses some of its carbonic acid, and a particle of carbonate of lime is deposited, and when the drop reaches the floor, a further deposit of carbonate of lime takes place, owing to the escape of carbonic acid, until, after the lapse of time, large masses of these deposits are accumulated. A very remarkable example of the formation of incrustations of this description during a comparatively short period of time was discovered when widening the north bridge at Edinburgh connecting the old town with the new. Between the arches of the bridge and the roadway were a number of chambers or vaults, varying in height, and from 8ft. to 10ft. in breadth, which had not been opened since the building of the bridge, 100 years before. From the vaulted ceilings of these chambers (especially from the joints of the masonry) hung hundreds of delicate sparry crystals of snowy whiteness; many of these reached the floor, forming slender, thread-like pillars resembling a grove of brittle canes, some of these pillars being as much as 6ft. in length. A large number of little stalagmitic mounds, each surmounted by a short, slender stalk, were also observed, which were evidently the lower ends of what once had been continuous pillars. The bridge was built of sandstone, and this curious formation had been produced by water, which had trickled through the masonry, and had thus become saturated with carbonate of lime from the mortar in the joints. The solubility of carbonate of lime in water charged with carbonic acid not only gives rise to these very remarkable and curious incrustations, but exerts a very considerable influence upon geological limestone formations, the insoluble carbonate of lime being deposited as a sedimentary rock. The white concretionary limestone, known as travertin, of which both ancient and modern Rome are largely built, is an example of such a deposit which is taking place in some parts of Tuscany at the rate of six inches a year. Carbonate of lime being deposited from its solution in carbonic acid, serves to bind together other materials with which it comes in contact in the course of such deposition; it thus serves as the binding material of several varieties of building stone, and becomes an important agent in the formation of rocks. An excellent example of such formation is to be seen at Bermuda. The islands are surrounded by immense beds of calcareous sand to the extent of twenty miles, resulting from the disintegration and breaking up of the coral reefs which abound in that part of the world. This sand is washed up by the sea, caught by the prevailing winds, and blown up into hills 40ft. or 50ft. in height; the rain falling upon these calcareous deposits dissolves out from the

upper portions carbonate of lime, which is again deposited as the water percolates the drift, and binds together the particles of sand, as well as other *débris*, into a coherent mass, which gradually hardens into a rock. Under normal conditions of the atmosphere, the agents which tend to alter and decompose whatever is subjected to their influence are few in number and comparatively slow in their action, deriving the enormous power they exert from the persistency of such action through long periods of time ; but this can hardly be said to be the case as regards the atmosphere of our large towns, and especially of those in which extensive manufacturing operations of various kinds are carried on. The air of such towns becomes charged with substances of a much more deleterious and corrosive character than those which I have described as belonging to the atmosphere in its normal condition. In the neighbourhood of alkali works, potteries, and other manufactories where large quantities of common salt are decomposed, the air is liable to contain appreciable quantities of hydrochloric acid, although the amount of this highly corrosive mineral acid that is now allowed to escape into the air is very much less than was formerly the case before the Alkali Act was passed, which enforces the condensation of all acid fumes as far as practicable. The sulphuric acid, either in a free or combined state, existing in the air of towns, is of more serious consequence than the hydrochloric, not only on account of its existing in much larger quantities, but because it is derived, in a great measure, from the sulphur contained in the coal burnt for domestic as well as other ordinary purposes, so that no extension of the Alkali Act could relieve us from this impurity. The total consumption of coal in all large towns is enormous, and when we consider that the greater part of this coal contains from a half to two per cent. of sulphur, we must see what a vast quantity of sulphuric acid is likely to be produced from this source. Taking the average quantity of sulphur in coal as amounting to one per cent., we have one ton, or 2,240lb., yielding 22lb. of sulphur, which, by absorption of oxygen, is capable of producing 67lb. of oil of vitriol. The late Dr. Angus Smith, who for several years carried out a long series of investigations on the impurities existing in the air of large towns, found the air in some parts of Manchester to contain as much as from 800 to 1,200 grains of sulphuric acid (either in a free or combined state) in every 1,000,000 cubic feet, and from 100 to 150 grains of hydrochloric acid, either as such or as chlorides. The presence of this large amount of acid matter existing in the air was corroborated by the quantity found in rain water ; the mean result of a vast number of experiments, conducted through a whole year, gave an average of from three or four grains of these acids, either in a free or combined state, in an imperial gallon. In parts of London where coal is consumed chiefly for domestic purposes, 730 grains of sulphuric acid, either as such or in combination, were found in 1,000,000 cubic feet of air. To whatever extent these acids may be neutralised by combination with the ammonia, or other alkaline matter with which they come in contact, there can be no question but that the sulphuric acid (either in a free or combined state) existing in the air of towns is very detrimental to many descriptions of stone, and altogether precludes the use of such a material as Caen stone for the exterior of buildings which are so situated as to be liable to be exposed to its influence. On examining the crumbling surface of Caen stone from buildings in large towns it has been found that the decayed portions of this stone contain a considerable quantity of sulphate of lime. Dr. Angus Smith found mortar in Manchester in which the lime had been to a large extent converted into sulphate, and on examining the black deposit which collects in the hollow spaces between the stones on the walls of St. Paul's Cathedral, I found it to consist of particles of sand and other *débris* (which no doubt had greatly assisted in producing abrasion of the surface of the stone), soot, together with a very large quantity of sulphate of lime. When this crust remains firmly attached to the stone the policy of removing it may be questionable, as it probably serves to protect the surface of the stone from further action. The amount of acidity acquired by rain in large manufacturing towns is sufficient to cause it to act rapidly upon galvanised iron roofs unless protected by paint. The zinc oxide which under ordinary circumstances remains attached to the metal is readily attacked by weak acids, and if subjected to the action of acid rain, the zinc coating is rapidly destroyed, and the surface of the iron is exposed. It has been proposed to use iron covered with lead for corrugated roofs which are subjected to the influence of a smoky atmosphere, as being less easily attacked than the zinc. In galvanising, the iron simply requires to be immersed in a bath of melted zinc ; but lead will not attach itself to iron under similar stated circumstances. This difficulty is stated, however, to be overcome by mixing with the lead a small quantity of phosphorus and arsenic. This method of coating iron was made the subject of a patent in America and in this country three years ago. Having considered the nature of the influences to which stone is liable to be exposed which tend to promote its destruction, let us now turn our attention to the chemical composition and physical structure of the various descriptions of stones used for building purposes, and their relative capability of resisting exposure to such influences as have been described. Of these a block of hard and compact well-polished granite is unquestionably one of the most durable. To be hewn out of the solid rock has in every age been regarded as typical of endurance, and the word granite is so associated in our minds with all that is lasting and permanent, that to speak of any building as being constructed of granite is considered to be a guarantee of its strength and durability. The term granite is understood by geologists to indicate a rock consisting of quartz, felspar, and mica in a crystalline granular condition, which may be associated to a greater or less extent with other minerals, such as hornblende, talc, schorl, &c., which give rise to a number of rocks differing in their composition and character, and distinguished from each other by various names, derived either from that of the prevailing constituent or from the localities in which they were first known. Thus we have talcose granite, in which the quartz, felspar, and mica are associated with talc ; hornblende, or syenite-granite, in which the mica is more or less replaced by hornblende. The word syenite, derived from Syene in Egypt, whence was first obtained the beautiful material so largely used by the Egyptians for obelisks, and other architectural purposes, has been hitherto understood to represent a granite in which the mica has been replaced by hornblende ; but this term is now restricted by geologists to a rock consisting of a crystalline granular mixture of orthoclase and hornblende. Of the three constituents of typical granite, quartz offers the greatest resistance to any weathering action. When it exists in the form of hard colourless crystals (commonly known as rock crystal) it is pure silica. The crystals, however, frequently assume various shades of colour, according to which they have received appropriate names, such as rose quartz, milk quartz, the amber-coloured crystals being known as cairngorm stones, from having been found in the Cairngorm Mountains of Aberdeenshire. Silica in this highly crystalline condition resists the action of almost every chemical reagent with the exception of hydrofluoric acid, but it can be made to combine with an alkali by the assistance of heat. Felspar, as represented by the mineral orthoclase, consists of silica, alumina, and potash, and of silica, alumina, and soda, as represented by the lighter coloured mineral albite. Lime also enters into the composition of some felspars, such as oligoclase, which contains 2 per cent. of lime, and labradorite, which contains from 10 to 12 per cent., this last being an opalescent felspar, exhibiting a peculiar iridescent display of colours when the light falls upon it in certain directions. Mica, so named from its being easily divided into glistening scales, consists of silica and alumina, associated with magnesia, soda, and lime in varying proportions ; thus we have potash mica, consisting of silica, alumina, and potash ; and magnesia mica, in which the alumina is partially replaced by magnesia, passing (as the proportion of magnesia increases) into soft talc, which is chiefly composed of silica and magnesia. The term granite, as commonly employed, is used in a much more comprehensive sense than belongs to it legitimately as understood by geologists, for under this general term are included many hard crystalline rocks which differ in their composition from true granite, the so-called granites of Leicestershire, Guernsey, and Jersey, as well as that of the Malvern Hills, partaking more or less of the character of syenite. The several descriptions of granite differ materially from each other, both as regards their composition and physical structure ; while those which are well crystallised are extremely durable, there are some granite deposits which possess but little cohesion, and readily yield to the influence of atmospheric changes. In several districts examples of granite of this lalter description are to be found, but there are none so remarkable as those which exist in Cornwall, where some of these granitic deposits are in such a friable condition that a slight blow is sufficient to make the mass fall to pieces, forming the deposit known by the name of china stone, whilst in other parts the decomposition of the felspar of the granite has proceeded to such an extent that the deposits have become converted into china clay or kaolin, so named from two Chinese words signifying a high ridge. The natural china clay contains crystals of quartz and flakes of mica, with sometimes a little schorl and undecomposed felspar ; it is covered with a layer of sand, stones, and impure discoloured clay, varying from 30ft. to 40ft. in thickness, which it is necessary to remove before the clay can be worked. The broken-up clay is exposed to the action of a stream of water, which, carrying off the finer portions in suspension, is led through long channels (in which the sand and rougher particles are deposited) into large pits from 30ft. to 40ft. in diameter, and from 7ft. to 10ft. in depth, in which a further deposit of the heavier particles takes place ; it is finally conducted into tanks in which the fine clay held in suspension by the water is allowed to deposit, the effluent water being sometimes collected in reservoirs to be used over again. The clay, which is of the consistency of soft mud, is removed from the tanks to the drying floors, which are formed of fireclay tiles heated by flues. It is spread upon these floors to a thickness of from 6in. to 9in., and when dry constitutes the kaolin or china clay of commerce, as supplied for the manufacture of porcelain and other purposes. This china clay is prepared on an extensive scale, the larger works turning out as much as from 3,000 to 8,000 tons per annum. The first china or "hard" porcelain (by which is meant a porcelain capable of bearing a high temperature without fusion) made in Europe was that manufactured at Plymouth by Mr. Cookworthy, who discovered this clay at St. Stephen's, in Cornwall, in 1755. The clay is largely used as a dressing for calico, by paper-makers, to give body and weight to their goods, and in the manufacture of ultramarine blue. Extensive deposits of this clay exist in China, America, in the north of France, and in the island of Bornholm, which supplies the clay required by Sweden, Denmark, and the north of Germany. The constituent of granite that is generally the first to undergo decomposition is the felspar, although there are cases in which the felspar stands out in sharp well-defined crystals, exhibiting quite as little tendency to decay as the other portions of the rock. In decomposing, the crystals lose their lustre, and as the disintegration proceeds, the potash and soda are washed away as soluble salts (for the most part as carbonates), leaving a hydrated silicate of alumina constituting the kaolin that remains. Experiments have been made which show that under favourable circumstances carbonic acid exerts an appreciable amount of action upon a variety of minerals, such as hornblende, serpentine, or apatite, and that this action is augmented by increased pressure. With respect to the origin of the enormous deposits of crumbling granite, such as those found in Devonshire and Cornwall (covering as they do a large area of ground, and having in some places a depth of more than 100ft.), no very satisfactory explanation can be given. The clay in some cases rests upon granite of the hardest description, and it is the opinion of the best authorities that these deposits have either never been properly consolidated or that they are the results of surface de-

composition which have been swept by the action of water into the spots which they now occupy. In selecting stone for building purposes, too much attention cannot be paid to its physical structure, inasmuch as whatever may be its composition, stone which is of a hard, dense, crystalline character is not only capable of resisting more effectually the action of erosive agents when in actual contact with them, but is not exposed to the same amount of contact as is the case with stone of a more porous character, for when rain falls upon a close, polished surface it cannot sink into the stone, and, consequently, any matter of a corrosive nature with which it may be charged does not remain in contact with the stone for any length of time, but is carried off before it has had an opportunity of exercising an injurious effect. It is obvious that the more crystalline and compact is the character of the stone, the more capable is it likely to be of resisting the effects ordinarily produced by exposure to atmospheric influences, whether such may be of a normal description, or whether they may be of a more powerfully corrosive nature. It is to its physical structure alone that marble (which consists of carbonate of lime) owes its durability; its highly crystalline character rendering it sometimes capable of being favourably compared with granite, as is the case in some of the churches of Devonshire erected from 400 to 500 years ago, in which the marble shows fewer signs of alteration than the granite. The importance of crystalline structure, as affecting the durability of stone, appears to have been recognised from a very remote period. Whoever the constructors of the great Pyramid may have been, and whatever purpose they had in view in carrying on a work involving such an enormous amount of labour, it is quite certain that they must have been proficients in the art of building in stone. They appear to have exhibited much skill in its selection, and were acquainted with the best methods of dealing with large blocks, fully appreciating the advantages to be derived from fitting such blocks as closely together as possible with very thin joints. The celebrated red porphyry of Egypt, which derived its name from its purple colour, was hard enough to be capable of taking a fine polish, and was largely used by the Egyptians, and subsequently by the Romans, for statuary purposes. It was upon a circular slab of this material, now at St. Peter's at Rome, that the Roman Emperors were crowned. Columns of porphyry, after the lapse of 1,900 years, still exist which retain their freshness of colour. The term porphyry is now applied to any rock having distinct crystals embedded in a felspathic matrix, and is used to designate the crystalline character of a rock. We have thus quartz porphyry, porphyritic granite, porphyritic greenstone. Cornwall is especially rich in these porphyritic rocks, a very excellent material, capable of taking a high polish, being obtained from the neighbourhood of Bodmin. It was a schorlaceous variety of this description which is found on the surface in immense boulders near Luxullian, and hence known as luxullianite, that was selected for the sarcophagus of the late Duke of Wellington in St. Paul's Cathedral. The very perfect condition in which works of art of such great antiquity as those of Egypt have been found is no doubt mainly due to the dryness of the climate of Egypt; but still, in part, to the excellent quality of the material employed. The syenite granite of Egypt was extensively worked as far back as 1300 years B.C., the quarries whence it was obtained occupying an extensive tract of land between the first cataract of the Nile and the town of Assouan, which now stands near the site of the ancient Syene. The famous Egyptian obelisks, one of which, known as Cleopatra's Needle, originally erected at Heliopolis (the "On" mentioned in the book of Genesis) about 1800 B.C., and now standing on the Thames Embankment, were obtained from these quarries. The obelisk at Rome was one of those that stood in front of the Temple of the Sun, where it is said to have remained for 2,000 years before it was removed to Rome by Cæsar Augustus after the battle of Actium. It is somewhat remarkable that the neighbourhood of this ancient Syene, which for thousands of years had been the frontier town dividing Egypt from Nubia, should now in this 19th century be the site of explorations which are creating so much interest. On examining the sandstone hill on the west bank of the Nile, the removal of the sand led to the discovery, in 1885-6, of a series of tombs where the nobles and chiefs of ancient Syene had been buried, containing inscriptions which indicate that the hill had been used as a cemetery as far back as 3000 B.C. From these inscriptions much interesting information is to be gathered of the manners and customs prevailing at the remote period to which they allude, some of them being of great historical interest. The freshness of the paintings on some of the shrines is surprising, and the colours are wonderfully true to nature. The hieroglyphs for granite hills are good representations of granite, and that of an elephant is painted in a greyish sepia the exact colour of the animal. Of the granites used in this country for building purposes, the most important are those obtained from Devonshire and Cornwall, and the Scotch granites. The Scotch granites are too well known to require any lengthened description. We find examples of the grey granite of Aberdeenshire in nearly every cemetery, and columns of the celebrated red granite of Peterhead adorn the public buildings of almost every town of importance. The Cornish and Devonshire granites are of a more porphyritic character than the Scotch granites, the crystals being of a larger size. As regards their relative durability, they are both of them, when properly selected, of so permanent a character as to allow of the selection of either the one or the other for any engineering work being made upon other considerations than their relative liability to decay. The Devon and Cornish granites possess one advantage, inasmuch as blocks of a much larger size can be obtained of these granites than from the Scotch quarries. Granite obtained near the surface, and near the edges of the formation, is not unfrequently defective owing to imperfect crystallisation, and the use of such granite is considered to have been the cause of the unsatisfactory condition of some of the Cornish granite used in the erection of Waterloo Bridge, which has sometimes been referred to as a proof of the inferiority of the Cornish granite to the Aberdeen granite, although Cornish granite from the same district has been found to be perfectly satisfactory when used for the Thames Embankment and elsewhere. The Shap Fell granite of Cumberland is porphyritic in its character, and is easily recognised by the large crystals of red felspar which are too conspicuous to escape being noticed. There are two varieties of this granite, the dark and the light coloured. The dark variety has of late years been largely employed in many parts of London, and of this we have a good example in the posts at the western entrance of St. Paul's Cathedral. The so-called Leicestershire granites form a remarkable and very interesting series of crystalline rocks which are quarried within a radius of about twelve miles from the town of Leicester, known as the Charnwood Forest range. Of these, the Mountsorrel, is a syenite or hornblendic granite, of which there are two varieties, a grey and a red, the grey blocks being sometimes coloured red at their edges, from which it would appear that the colouring matter (consisting mainly of iron oxide) has been absorbed through the joints of the rock. Blocks are obtained of a sufficiently large size for building purposes; but it is more extensively used for paving setts and road metal. The rock is traversed by a basaltic dyke, running right through the hill, known locally as "blue stone," which is used for road metal only. The Groby and Markfield quarries are very much alike as regards the material they yield, but it is of a still more syenitic character than that obtained from Mountsorrel, and would formerly have come under the designation of syenite; it is largely used for kerbs, paving setts, and road metal. The Stoney Stanton quarries yield a material similar to that obtained from Groby and Markfield in its composition; but differing in structure, which is used for the same purposes. That obtained from the Barden Hill and Charnwood Sheepshed quarries partakes more of the character of greenstone. The Barden Hill has somewhat of a slaty cleavage, and as it will not break into cubes, can only be used for road metal. The granite yielded by the Sheepshed quarries possesses the highest specific gravity of the series; it can be made into paving setts, and is also used for road metal. The excellence of the Leicestershire granites, as well as those of Guernsey, for the purpose of making paving setts, or for road metal, does not depend so much upon their specific gravity or hardness, or upon the amount of resistance they offer to a crushing force, as upon their peculiar toughness, which is probably derived from the manner in which the crystals composing them are interlocked with each other. In the paving of the quadrangle of the India and Colonial Offices, both the red and the grey varieties of Mountsorrel granite have been employed. Granite is imported from Norway which finds a ready demand for kerb stones, for which it is particularly adapted on account of the length of the blocks in which it is supplied. Some of the indurated sandstones that have been converted by pressure and infiltration of silica into quartzite form an excellent material for road metal, of which we have an example in that quarried at Pontesbury, near Shrewsbury. Amongst granitic or metamorphic rocks may be classed that very beautiful material for decorative purposes known as serpentine. Varieties of this rock are found in various parts of the world, in the mountains of the Alps and the Vosges, at Portsoy in Scotland, where it is known as Portsoy marble, and in West Galway, where it is termed Connemara marble. The term marble is restricted by geologists to limestones which are capable of taking a fine polish; but the term is still employed (in what very probably was its original meaning, since the name is derived from the Greek word μάρμαρος, signifying gleaming or sparkling) to designate any kind of stone, irrespective of its composition, that is capable of being polished. In no part of the world is serpentine seen to greater advantage than in Cornwall, where it forms a large portion of the promontory of the Lizard; much of the beauty of the celebrated Kynance Cove being due to the variegated colours of the serpentine rocks by which it is surrounded. The value of serpentine depends upon the variety and beauty of the colours it displays, and on the fact that, although it is capable of being easily polished, it is a comparatively soft rock, and can be readily cut or turned in a lathe. It is a hydrated silicate of magnesia, and is liable to deterioration by exposure to the weather in this climate; it is, consequently, employed chiefly for interior decorative work.

ARCHITECTURAL ASSOCIATION EXCURSION, 1887, WILTS.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

ON Monday next, as announced in last Friday's BUILDING NEWS, the annual excursion of the Architectural Association will commence. To-day we begin our series of illustrations of places to be visited. Canon J. E. Jackson has written the following account of the Monastic Church of Edington, one of the principal churches which will be seen, and which is here shown by a plan to scale and western façade.

Few buildings in the county of Wilts are more deserving of being examined, whilst there is perhaps none so little known to the public in general, as this fine old church. Large churches are usually conspicuous enough; that of Edington does not proclaim itself, but has to be sought out. It stands about two miles east of the figure of the White Horse on the slope of Westbury Down.

Mr. Charles E. Ponting, architect and diocesan surveyor, is now "restoring" the building, not according to the scraping practice which often means changing every feature, but simply in making certain repairs that are absolutely essential to preserve it from ruin. Externally there is not much appearance of decay, the masonry being, upon the whole, in sound condition; but there are some very serious exceptions. Insidious mischief has been going on for so many years in the roof and walls, and their fall in some parts would have been certain unless timely steps had been taken.

Edington is the only perfect monastic church remaining in the county of Wilts. Of the rest, as Malmesbury, Wilton, Lacock, Bradenstoke, &c., we have one or two noble fragments, but fragments only, and in some cases not a stone

is left. At Edington, though the monastery itself and the cloister adjoining the church have disappeared, the church stands, in the main, as complete as when first built.

It occupies a unique position in English architecture, being (as described by the late Mr. J. H. Parker) "the earliest authenticated example of the Transition from the Decorated to the Perpendicular style. Its date being known fixes the period of the Transition," and it is of undoubted beauty and interest.

The whole church appears to have been built at the cost of one man. No mention at least of any coadjutors has been met with, though endowments for maintenance soon came in from other quarters. This man was William of Edington, a native of the place, who is commonly said to have been the son of very humble parents, but who raised himself by his abilities to the high dignities of Bishop of Winchester, Lord Treasurer, and Chancellor of England in the reign of King Edward III. He was also nominated Archbishop of Canterbury; but this was in the last year of his life, and he declined it, probably on account of infirmity.

The history of the foundation is briefly this:—

The manor and rectory of Edington belonged by an ancient royal gift to the Abbey of Romsey in Hampshire.* The rector was a prebendary of Romsey, resident there. Edington Church (the predecessor of the present one) was called a prebendal church, and a vicar was left in charge there. Soon after his appointment (A.D. 1345) to the see of Winchester, Bishop William, bent on improving the state of affairs in his native parish, arranged with the abbess of Romsey for the establishment of a collegiate body of three, and never to be more than six, secular priests under a warden. But very soon afterwards, at the special request of the Black Prince on his return from the war in France, he enlarged his design and converted his secular into a monastic society of Bonhommes (*Boni Homines*), a variety of the Augustine Order, of which there was in England at that time only one house, at Ashridge in Buckinghamshire. The first stone of the monastery was laid 3rd July, 1352; and the church was consecrated in 1361. It was dedicated to the Blessed Virgin Mary, St. Katharine, and All Saints. The founder died in 1366. His chantry and effigy are depicted in Britton's "Winchester Cathedral." It was Bishop William who began in Winchester Cathedral the alterations into the Perpendicular style, which were carried on by his successor, William of Wykeham. The west window there is attributed to Bishop Edington; but it is more stiff and much less imposing than the west front of the Wiltshire Church. At the Dissolution of Monasteries, this house, with all its property, was granted to Thomas Seymour, of Sudeley (brother to Protector Somerset), and on his execution to William Paulet, first Marquis of Winchester, whose descendants became Dukes of Bolton, by some one of whom the present priory house was built out of the ruins of the monastery.

The main dimensions of the church are as follows:—Total lenth inside, 153ft. 9in.; total length outside, 168ft. 6in.; total width inside, 71ft. 6in.; total width outside, 86ft. 10in.; height of tower from the nave floor at west end, 67ft. 6in; the chancel by itself, 54ft. long. The plan is cruciform. The rood-screen is still surmounted by the rood-loft. The parvise over the porch has two stories. The windows were once fitted in stained glass, and in one in the north transept the original glazing is nearly complete. In others are remains of beautiful figure-subjects.

There are some interesting monuments which would be ruined if the roof should fall in. Between two columns in the nave is a small oratory or chantry of about A.D. 1440, to one of the Cheney family of Brook House, near Westbury, which shows some delicate stonework. At the end of the north transept is a beautiful 15th century altar-tomb, with canopy and effigy of some benefactor, probably a Bayntun, a *rebus* carved on it being a *Tun*, out of which issues a spig of (perhaps) bay. The initials are I. B. In the chancel is a large 17th-century monument to Sir Edward Lewys, some time a lessee of Edington under the Paulets. Against the north wall is a beautiful group by Sir Francis Chantrey, representing the death-bed of Sir Simon R. B. Taylor, who died in 1815.

This grand old church has lately been thoroughly examined by Mr. C. E. Ponting, the diocesan surveyor. There could not be a more distressing report of destructive agency at work. Settlements are imperilling the fine west front and other portions. Imperfect drainage by gutters has long been letting water into the solid walls and loosening the masonry. The roof timbers are, in places, on the point of giving way. It is difficult to describe in few words the mischief that has unfortunately been allowed to go on for a great many years without any effective attempt to counteract the injuries of time. "It is always (says the architect in his report) a great misfortune that an object of such value should need the services of a repairer; but that need is so urgent in the present instance, that if nothing be done, parts of this exquisite architectural design will shortly be lost, and we of the present generation, who pride ourselves in the possession of such a relic of bygone ages, will be guilty of neglect of the plain duty imposed upon us of preserving and handling it over unimpaired to our successors. The structure has, in fact, gone beyond the stage at which it may be let alone with impunity."

According to Mr. Ponting's estimate, £2,077 is stated to be the cost of the structural repairs of the building, so that, including other necessary expenses, not less than £3,000 will be required to complete the work. The plan of the church, printed herewith, is from the architect's drawings. The view of the west front is from a photograph.

Our other illustrations are from South Wraxhall Manor, showing an interior of the celebrated and beautiful drawing-room; and a view of the ancient bridge at Bradford-on-Avon with its picturesque and stone-built "mass house," as the chapel is called, standing on the central pier over the stream. These sketches are from photographs taken by Mr. R. Wilkinson, of Trowbridge. We shall give further drawings of South Wraxhall Manor House with plans, and will then incorporate in our description of the excursion some particulars of the building. Mr. Charles E. Ponting has lately been repairing the fabric, but has added nothing to the house; his operations being confined to some important structural renovations, such as the insertion in the drawing-room of a new girder over the Elizabethan bay on the north side of the apartment. Here the lintel carrying the 15th-century roof had become rotted off at the ends, so that both the roof and rich plaster ceiling, seen in our view, were in danger of collapse. To render this safe without touching the ceiling the architect put in a rolled joist through the roof and laid it over the lintel, bolting the two together. Among other things Mr. Ponting removed the paint from the oak panelling in parts of the house with much effect. The remodelling of the drawing-room at the end of Elizabeth's reign is a most ingenious and interesting piece of work. The house belongs to Mr. W. H. Long, M.P. The buildings will be described by Mr. J. A. Gotch, when they are visited on Wednesday.

* Fuller accounts of Edington Church are to be found in the *Journal* of the British Archæological Association, Vol. XXXVII. p. 72; and in a paper by Rev. Canon J. E. Jackson, in *Wilts Archæological Magazine*, Vol. XX. p. 241. Mr. J. H. Parker has shown the west front in his "Introduction to Gothic Architecture," and double-page drawings of the exterior by the late F. C. Deshon are given in the BUILDING NEWS for July 12th, 1872.

MILAN CATHEDRAL COMPETITION.

THE following is a *résumé* of a rather lengthy report of the jurors appointed to select and report on the designs submitted in the recent competition for new façade of the Duomo of Milan. The competition in its various stages affords an apt illustration of the proverbial length of art and brevity of life. The first stage has occupied sixteen months; fourteen more are allotted to the second; and the successful party has to make or supervise a model of the entire new façade to a scale of about ¾in. to the foot:

"More than 120 competitors submit collectively 400 designs. It is not merely this unusual number, but the unsparing endeavours made by these artists, that render this almost the most remarkable and varied competition ever opened to international art.

"The subject presents considerable difficulties. We have here a most renowned monument, in which the spirit of local art feels strongly the influence of a foreign style. The edifice is absolutely unique in character, and in the abundance and variety of its details and parts, rendering careful discrimination needful among its varied features to derive an inspiration for its improvement and completion from so many other coeval or anterior similar works. Notwithstanding this, the sincere love for the consummation of the pride of Milan has inspired so many able artists—Italian, German, French, English, &c.—to undertake this formidable task. Many more than the fifteen would come well out of the contest if the limited selection made for the final trial could be augmented.

"Criticism and selection in this case were rendered the more easy, and judgment arrived at with unusual promptness, owing to the good feeling and unanimity influencing the jurors. Artists from so many divers countries, all of whom, equally with the Milanese, bring to the task their predilections and experiences of their various arts of painting, sculpture, and architecture, their decisions were made almost unanimously and most harmoniously.

"After ample examination, 50 designs were chosen, subsequently reduced to 26, and finally to 15, the last selection being made by ballot, the jury also arranging the conditions for the second or final competition.

"The selection was difficult, for the following reasons:—In the instructions of first programme, 'The utmost liberty is accorded to artists in artistic or archæological treatment,' qualified by the following second condition:—'That the new work must in all respects closely agree with the construction, style, and spirit of the existing work.'

"This agreement must depend upon the good sense that is justly allowed to regulate a circumscribed freedom; it is quite a relative condition.

"The jury should not examine in too niggardly a manner the 'motifs'; they deemed it best to examine one by one the designs, to judge if the principles were logically and artistically applied.

"They were not treating a work as if it were about to be carried out; but rather opening out the field again to those competitors who, with their designs, masters of their art, give proof of their capacity in a fresh and arduous labour to devise in a dignified way the new façade of the Duomo.

"From this liberal interpretation of the instructions it results that a great diversity is shown in the selected designs—façades with and without campaniles, with two gables only, with gables over each aisle, with parapets horizontal or gabled, with two campaniles to central nave or two to the side aisles, with acutely-pointed towers or flat ditto, traceried windows over centre door or rose windows ditto, five doors or three, &c.—a greatly and admirably varied result, and a good augury for the final result, in the different and opposing ideas of the competitors.

[Here follow the names and nationalities of the fifteen selected competitors, already published. Two of the architects submit each *two* designs, another submits *three*, and another *five!*]

"Of the 15, 8 are Italian, 2 German, 2 Austrian, 1 English, 1 French, and 1 Russian—a fine and noble co-operation of art in a monumental work, attesting the courtesy and good faith of an ancient Italian community, which invoked five centuries ago, as it does now with more effect, the aid of foreign art.

"Having completed their first function, the jury address themselves to the second—viz., the compilation of the new programme within the lines of which the fifteen competitors should conduct their work.

"Should the jury, after ransacking the history of the Duomo from all sources and studying its varied architecture, impose any definite arrangement or conditions?

"The jury would, in doing so, have contrived in a great part the design itself, and done it under the most unfavourable conditions—that is, with the criticisms and agreements of their collective labours. If there ever was a work of art that recorded the individual genius of its designers, it is assuredly the architecture of our Duomo. The true artist invents, contrives and designs, and solves the various difficult problems of his art by the light of his own inventive genius. To presume to diffuse among

fourteen or fifteen persons with the sole aid of reasoning the complex questions herein presented would be an absurdity. Each of the jury has doubtless a deep persuasion of what he would do as an artist individually; but, as judges, they feel it but just to leave to their colleagues, and also to the competitors, their own convictions.

"On the other hand, the true impartial critic has not said the last word as to the history or architecture of the Duomo. He may see in it the germs of entirely Italian art, or may recognise an origin entirely ultramontane; but no one can deny a co-operation more or less effective of diverse arts. Now, however, the conceptions of so many varied arts may in great measure accommodate themselves to produce a harmonious whole, provided that in transformation they seize the appropriate features of the old structure.

"It results that this competition is now restricted to architects, masters of their several schools, to those who, either resident in this city, or feeling it due to visit it with the view of studying its Duomo in every aspect—structural, artistic, or archæological. The jury are unanimous in following the freestone course, merely contenting themselves with the recommendation that the new façade shall have the most intimate connection with the constructive execution and architectural form of the original building, and with the decorative style of the same in its most ancient state.

"They are also unanimous in their requirements as to the delineation and graphic representation of the final designs. The jury deprecate the picturesque mania evidenced even in some of the best of the submitted designs; some conceal the forms of surfaces under a mass of chiaroscuro and colour; others invoke a manner quite independent of architectural appearance, not with a view of showing the projections and recesses of the features, but simply with a view to picturesque effects. The jury admit the principle of shading, but restrict it to the simple indication of relief and recession of the parts, 'excluding absolutely all pictorial effect.' The details to be drawn to a scale of 1-20th, merely in outline; the general elevation of façade to 1-50th (i.e., about ¼in. scale); the plans and sections to 1-100th; and, finally, a perspective view from a point and angle of view comprising the whole of the Duomo and part of the arcade of the Galleria V. Emanuel in the surrounding square.

"The jury confirm the conditions of the original programme in imposing no limitation whatever to the cost of work, as also the undertaking of the administrators to pay the agreed premiums to the 15 competitors—that is, 40,000 francs to the first competitor, and an equal amount in varied sums to the remaining 14. They assign fourteen months for the preparation and sending in designs, and, finally, they merely allude to a point perhaps as important as any, which they do not absolutely decide—viz., the right to send in more than one design apiece. They desire to lay down no specific law as to this, merely beyond the expression of a wish to avoid the excitement involved in the multiplication and examination of so many varied schemes, and specially desire that the artists should concentrate their proper talents and attention on one unique design, which they should study and consider in all its various bearings," &c.

ST. MARY-LE-STRAND.

EVERYONE who has walked through the Strand from the West must have noticed an imposing and narrow Classical structure with a lofty steeple near Somerset House, known as the Church of St. Mary-le-Strand, which has been surrounded by a hoarding, and is about to undergo repairs. Few have probably ever entered the church, or are aware that it is the first built of the fifty churches re-erected in Queen Anne's reign, after the Great Fire. It is generally supposed that it is one of Wren's churches, but it is not so, it having been designed by James Gibbs, a Scotchman, whose ability and taste as a Classical architect are well known. The church was erected in 1717, and consecrated in 1723. The site of this church is not without interest. It is said to stand on the site of St. Ursula, a very ancient church, and nearly upon that of the old Maypole. The existing edifice, in its west front, is distinguished for a lofty steeple of three stories, each of the two lower stories being set within the other in one direction, the set-offs being marked by two detached Corinthian columns, which form the flank elevation of the steeple. This steeple is not carried down, but appears to start from the roof, the western face being on the same plane as the façade. Viewed from the western end of the Strand, the steeple is a decidedly picturesque object, and the façade a stately elevation, the central portion below the tower being marked by a pediment supported by coupled columns of the Corinthian order above, and a semi-circular Ionic portico below, which is noted for its beauty, and has often been taken as an example of Classic detail. The body of the edifice, which is rectangular, is of two orders, Ionic below and Composite above; three alternate bays are pronounced by pediments, triangular and circular, and the other portions are surmounted by a balustrade and urns. The cornices and external stonework appear to have given some trouble. Timbs says that during the procession to proclaim peace in 1802 one of these urns was accidentally pushed down on the crowd below, and three persons were killed and several others hurt. A few years since, during some repairs, all the vases were removed from the several stages of the steeple, greatly to the injury of the skylines. Quite recently the church has been declared to be a dangerous structure by the Metropolitan Board. In 1883 the columns of the circular porch were found to be unsafe, and were restored under the superintendence of Mr. A. Vicars, the architect, who has been engaged in making a thorough examination of the fabric by the orders of the vestry. At a meeting of the vestry, held last week under the presidency of the vicar, the Rev. Canon Tugwell, to consider the notice received from the Metropolitan Board of Works, a report from the architect was read, in which that gentleman stated that a large piece of the cornice on the north side had fallen into the street about 9 o'clock in the evening of the 23rd of July. He also stated that the cause of the fracture of the stone columns of the portico was the decay of the joints, which admitted air to the iron dowels, causing them to oxidise and burst the stone. A similar reason was assigned to be the cause of the cornice breaking away: the iron cramps had become oxidised and had burst the stone; and Mr. Vicars pointed out that the process of oxidation was going on and might cause any portion of the projecting work to fall. The stonework of the parapet and cornices had much decayed, and the vases were unsafe and required immediate attention. Mr. Vicars, in his report, has recommended a thorough overhauling of the building, that a mason be employed to sound the whole of the exterior projecting work with a hammer, and to remove all unsound or defective stonework except the upper part of the spire. As the work was considered one for public safety, immediate steps were taken, and the church has since been surrounded with a hoarding. The district surveyor, Mr. F. W. Porter, had advised that the lower and defective portions of the stonework should be taken down, and that a scaffold be erected to examine the stonework generally. He gave a month for the work to be carried out. The work has already been commenced, the defective and loose stonework and vases are being taken down, and the examination of the fabric by the architect will be proceeded with. The chief danger resides in the projecting cornices and urns, and these are to be removed forthwith. The fall of a fractured stone from the cornice has awakened the authorities to the probable condition of other parts of the cornices and projecting stonework; but the accident ought to stir other custodians of churches in the City to take steps to place their buildings in a safe condition. The iron dowels and cramps used in many of the old stone churches are a perpetual source of danger, and there are few of the old City churches that do not show decayed cornices, balustrades, and weakly-poised vases in the parapets of the steeples. No one can tell what the solvent action of rain or the force of a gale may not do.

We should be sorry to see the removal of the Church of St. Mary-le-Strand, obstacle though it may be called in a busy part of the Strand; but we fear the casualties of falling stonework will lend a favourable excuse to those who have been advocating its demolition. The vestry, we are told, would offer no objection to the removal of the church, and the Metropolitan Board of Works have before them several suggestions for widening the Strand at this point, either by the removal of the south side of Holywell-street or by taking down the church. In the House of Commons on Monday, Mr. Egerton, in reply to Mr. Kimber, referred to the accident of the falling stone from cornice, and said the Board of Works had declared the church to be a dangerous structure. One thing had deterred a step being taken which archæologists and many architects and others would regret; this was the cost of pulling down and re-erection in some other part of the parish, which was estimated at £10,000. One of the schemes that had been proposed was that the Holywell-street block should be pulled down, and the site or space between St. Mary's and St. Clement Dane's inclosed and laid out as a garden or pavement. Another was to remove the church and Holywell-street block altogether; and a third plan was to take down and set back the houses on the north side of the church, so as to divide the traffic.—The interior of St. Mary-le-Strand is worth notice as a very florid example. Like the exterior, it is divided by two orders of pilasters, Corinthian below and Composite above, with panels between the lower pilasters and windows above; the former need filling by appropriate figure subjects. A very flat elliptical ceiling, with panels of square and diamond form, divided by ribs, and of lavish projection and ornament, spans the interior. At the east end is a semi-circular apse, with the symbol of the Trinity glorified with cherubim, boldly modelled in plaster in the panels of semi-dome—a very rich and effective design, with three painted glass windows, by Messrs. Heaton, Butler, and Bayne, representing the Birth, Presentation, and Crucifixion of the Saviour, above which are pedimented panels richly carved. The front of chancel arch consists of two orders and pediment, massively carved in stone, and enriched by colour and gilding. The ceiling is battened and pricked up *in situ*, and is certainly a fine example of decorative plasterwork. The panels are of light blue, with the ribs in white and gold, and a generally pleasing scheme of colour is adopted. A richly-carved pulpit, oak panelling, and seating are features. The work of repair and decoration is being carried out by Mr. T. Heath, of South Eaton-place.

THE FIRE AT WHITELEY'S.

THE terrible fire at Whiteley's affords some useful lessons with regard to fireproof construction, and the ruins are worth examination by architects for the sake of the contrast they afford between the results obtained from a well-tried method like the Dennett system and the ordinary builder's "fireproof" construction.

The work executed by Messrs. Dennett and Ingle on Mr. Whiteley's premises was done in the latter part of 1880. It consisted of the concrete arching of No. 159, Queen's-road, the premises at the corner of Queen's-road and Douglas-place, the floor of loading-shed in Douglas-place, the floors of two external courts between Nos. 159 and 157 and between 157 and 155 respectively, and sundry other floors near the stables, and lying westward and southward of the premises first-named. Generally speaking, the work is situated in those parts of the premises where the fire raged the most fiercely.

The results, so far as the fireproof qualities and strength of the "Dennett arching" are in question, are without doubt most satisfactory. The large block, No. 159, Queen's-road (provision department), is about 160ft. long and 35ft. wide; the whole of the ground floor is constructed with "Dennett arching." This building, except the basement story, is entirely burnt out, the upper floors not being of fireproof construction.

The ground floor is covered many feet deep with *débris* resulting from the destruction of the superstructure. The "Dennett" floor, however, is intact, and, so far as can be ascertained in the present dangerous condition of the building, not injured in any way by the severe ordeal to which it has been subjected by fire and falling weights. The storage in the basement under this floor has been damaged, but

the fire has evidently found access through the basement windows, lift-holes, and other openings. The floor itself is intact. The same remarks also apply to the loading-shed lying further westward in Douglas-place.

The internal court between Nos. 159 and 157 was formed with Dennett arching. In this case the flank walls of the adjacent warehouses have fallen bodily, and for the most part this area floor has been carried with them, the immense weight of falling brickwork having cut or sheared away to the depth of several feet the brickwork on which the girders supporting the arching took their bearing. The arching itself does not appear to have succumbed either to fire or falling weights. The same remarks apply to a small portion of the van-yard at western end of last-named area. The greater part of this floor is intact. This is close to the shop where the fire broke out.

The portion of the floor now standing is covered with *débris* of brickwork and fallen floors, roofs, &c. The immense strain to which it must have been subjected, without giving way, by the masses of br ckwork falling from a great height, is very remarkable. In the case where the floor is broken the girder ends seem to have sheared through their seatings, tearing away the brickwork as described in the case of the court between Nos. 159 and 157.

The most extraordinary instance, however, is that of a floor 70ft. long lying westward and southward of the van-yard last named. This is also constructed with Dennett's arching over the basement. It is covered by debris, and large masses of brickwork have fallen upon it. In one case a piece of unbroken brickwork is visible (and which must have fallen from a height of 30 or 40ft.) weighing at least three or four tons. The floor construction is still standing, and, so far as can at present be ascertained, is uninjured. A fireproof floor of a construction other than Dennett and Ingle's over the last named is entirely destroyed.

The fireproof floors and roofs of the large blocks of shops in Queen's-road, constructed subsequently to the year 1880, and by methods other than those of Dennett and Ingle, and which were the most severely attacked by the fire of the 6th inst., have in many cases collapsed.

HOT-WATER SUPPLY.*

A PRACTICAL treatise on the fitting of hot-water apparatus is what was wanted by architects and others engaged in heating buildings. Mr. F. Dye has to some extent supplied the want of a simple yet technical handbook, and has given the result of his experience. Boilers, cylinders, and tanks, pipes, circulation, different systems, directions for placing the pipes, testing, safety-valves, coils, and coil services are dealt with, the author explaining the best materials and forms of boiler and cylinder, the arrangement of the pipes, jointing, heads, and other details. The book, however, lacks system in the arrangement of the chapters. The student would like to know something about the theory of circulation in pipes before he troubled himself with the shape and thickness of boilers, which subject forms the opening chapter. If we were to suggest, we should say the remarks on the results noted in the chapter on experimental glass apparatus, and circulation, ought to precede rather than follow the remarks on cylinders, tanks, pipes, and apparatus. In preparing specifications and estimates, Mr. Dye's book will be of service. In the chapter on boilers useful information is given respecting the thickness of plate, which varies from ¼in. to ½in. A ⅜in. plate is sufficient for most purposes. The shapes and proportions of boilers, and those of copper, are treated, and useful particulars of the pressure to which they are subjected are to be found. The pressure of water in pipes is 11b. to every 2ft. 4in. in height, in a pipe with an internal area of one square inch. Of the quality of pipe, that known as "steam tube" or "galvanised steam" is recommended, though a number of firms use gas-pipe. For the flow and return pipes 1¼in. internal diameter is suitable; 1in. pipes for the service above cylinder or tank, and for branch draw-off services ¾in.; to lavatory basins ½in., and cold supply 1in. For baths 1in. service is necessary. Special directions are given as to the method of jointing up iron pipes. The screwed part is painted with a mixture of red and white lead and boiled oil, and hemp is wound round in the thread of screw carefully. Lead pipes are sometimes used in the North, but are, of course, condemned. Attention is drawn to properly hooking or securing the pipes to prevent sagging, especially vertical pipes. The author illustrates both the high or tank system and the cylinder system. In the first the flow and return services are carried between boiler and tank; in the latter there is a cylinder placed near to the boiler with a flow and return between. From the top of cylinder the rising main is taken to above the level of cold water. Draw-off services are taken from this pipe called the secondary flow. The author points out improved methods of connection, the position of pipes, which ought to be carried up inner walls to economise heat and the avoidance of encasing and covering up pipes in plaster. Other remarks are made as to explosions and their causes, safety valves, the fitting up of coils, and many common faults are pointed out. The author is thoroughly practical, and the remarks are illustrated by diagrams.

* Hot-Water Supply. By F. Dye. E. and F. N. Spon, 125, Strand.

BOYLE'S "C. C." VENTILATOR.

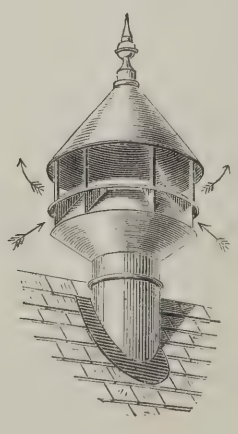
THIS ventilator is an adaptation of the well-known cowl made by Messrs. Robert Boyle and Son, Limited, which is a modification

No. 1.



of the Self-acting Air Pump Ventilator. The "C.C." Ventilator is designed to be applied to buildings where cost is often the first consideration, and though it is not pretended that it is

No. 2.



such a powerful exhaust as the latest improved form of the air-pump ventilator (1882 patent), it is confidently recommended as an efficient and reliable ventilator, specially useful for such buildings as steam laundries, engine-rooms, workshops, cowhouses, stables, &c.; it has also been applied with good results to schools and meeting houses. Diagram No. 1 shows the design most suitable for this class of building, whilst diagram No. 2 is the form usually employed for workshops, &c. The cost brings it within the reach of all, being from 8s. 6d. upwards.

CHIPS.

The death is announced of Dr. Andrew Fergus, of Glasgow, at the age of 65, well known as a scientist and sanitarian. His investigations into the action of sewer gases on water supplies have attracted much attention, and also his demonstrations of the actions of these gases on leaden pipes. Dr. Fergus served for three years as president of the Glasgow Philosophical Society, and for the past ten years had represented the Crown as representative for Scotland on the General Medical Council.

It is stated that M. Veresclagin, the well-known Russian historical painter, has taken the Grosvenor Gallery for an exhibition of his works during the coming winter.

Mr. Thomas Brock, A.R.A., is the sculptor of the statue of the Queen to be erected at Worcester. The statue will be of white marble, 10ft. in height, and will stand on a granite pedestal 12ft. high already erected opposite the Shire-hall.

An inquest was held on Friday on the body of a woman who was killed by the fall of a warehouse wall in Toronto-street, Kirkdale, near Liverpool, destroyed by fire on the previous Tuesday. The jury, in returning a verdict of "Accidental death," considered that some blame attached to the district building surveyor in not taking more immediate means for the removal of the wall or the security of it than directing the owners "to pull it down or secure it within 48 hours."

New Sunday-schools are in course of erection at Florence, near Longton, Staffs, in connection with St. Luke's Church. They are built of brick, and will accommodate 250 children. Mr. C. Lynam, of Stoke-on-Trent, is the architect, and Messrs. H. and R. Inskip, of Longton, are the contractors.

The tower of St. Martin's Church, Coney-street, York, is undergoing restoration. Mr. Keswick, of that city, is the builder.

Viscount Portman, now in his 89th year, laid last week the foundation-stone of a mansion at Childe Okeford, now in course of erection for his grandson, Mr. Claud B. Portman. Preparations for the ceremony were made under the supervision of Mr. Hunt, of London, the architect, and Mr. Green, of Blandford, the builder. The foundations of the mansion are completed. The building will be of brick, with Bath-stone dressings, iron girders being used as supports for the floorings.

The new south transept window at Chester Cathedral, which has been reconstructed at a cost of over £3,000 (the gift of Lord Egerton of Tatton), was dedicated on Saturday afternoon. The old window, which was a very plain one of the Perpendicular style, has been replaced by a richly-traceried window, designed by Mr. A. W. Blomfield, the cathedral arehitect. The subjects of the three central panels are the Ascension, the Crucifixion, and the Annunciation. The artists are Messrs. Heaton, Butler, and Bayne. There are 16 subsidiary subjects from the Scriptures occupying the side panels. There is a good deal of silvery white in the composition associated with various shades of green and yellow. The window is in memory of the late Lord Egerton.

Damage to the extent of £1,200 was caused by fire on Friday at the works of Mr. Peter McCormack, glass stainer, Hilltown, Dundee.

The Bodleian Library purchased at a sale at Messrs. Sotheby's last week, a small volume which has since been identified as the Evangelistarium, or portions of the Gospels recited during the Mass, which belonged to St. Margaret, Queen of Scotland (ob. A.D. 1093), the granddaughter of Edmund Ironsides and mother of Matilda, the wife of Henry I., and the foundress of Dunfermline Abbey. It is beautifully illuminated with four full-page pictures of the Evangelists, in the English style of the first part of the 11th century. The MS. was subsequently in the possession of Lord William Howard, of Naworth, who gave it its present binding.

The city council of Salisbury have appointed Mr. G. Cary inspector of nuisances in succession to Mr. J. White resigned.

The Worshipful Company of Carpenters will hold a second exhibition of works in wood at their hall, London Wall, London, in the early part of next year. Full particulars as to time and conditions will be advertised as early as possible in October.

CONTENTS.

Alleged Injuries to Westminster Abbey 235
The Vacation: Suggestions to Architectural Students 236
National Competition of Works of Schools of Art.—II... 236
Ancient Egyptian Textiles at the South Kensington Museum... 237
Building Materials... 237
Architectural Association Excursion, 1887, Wilts ... 240
Milan Cathedral Competition 241
St. Mary-le-Strand... 242
The Fire at Whiteley's... 242
Hot-Water Supply... 243
Boyle's "C. C." Ventilator... 243
Our Lithographic Illustrations 244
"The Mount."... 244
St. Paul's Church Schools, Heaton Chapel, near Stockport 244
Wayside Notes 265
Building Intelligence 265
Engineering Notes... 266
Architectural and Archæological Societies 267
Correspondence 268
Intercommunication 269
Legal Intelligence... 269
Water Supply and Sanitary Matters 270
Parliamentary Notes 270
Our Office Table 270
Meetings for the Ensuing Week 272
Trade News 272
Tenders 272

ILLUSTRATIONS.

STAIRCASE, GOSFORD HOUSE.—POOLE FREE LIBRARY.—SCULPTURE FROM THE ROYAL ACADEMY.—ART METAL WORK.—ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES, 1887.

OUR LITHOGRAPHIC ILLUSTRATIONS.

STAIRCASE, GOSFORD HOUSE.

THIS staircase is now in course of erection. Mr. William Young is the architect. The materials are veined marble, alabaster, and stone. The drawing was exhibited at the Royal Academy exhibition.

POOLE FREE LIBRARY.

IN giving a description of this building, of which this week we furnish an illustration, it might be well to say, first, that the main entrance is approached by ascending a few steps from the level of the footpath, and passing under an arch which leads to the porch or open vestibule. A framed wood screen fitted with leaded lights divides this space from the main hall, which is oblong in form and measuring about 26ft. long by 13ft. wide. At the farther end of this apartment to the left rises the public staircase, and on each side are ranged the doors leading to the several rooms on the ground floor, the lavatories, &c., being arranged at the back, partly under the stairs, and entered by different channels. The general reading-room on the right is the principal feature in the building, and measures 44ft. long by 24ft. wide and 15ft. high, with a coved wood ceiling springing from a wood cornice, 11ft. from floor, and divided into panels of appropriate character by moulded beams and ribs; Wenham burners depending from the centre of the three principal panels, and surrounded by a large fret centre flowers for top ventilation. This room has a south and west aspect, and is lighted with lofty mullioned windows, and of such proportions that a row of tables may be placed on each side with ample space in the centre for access to any part. It is heated, like the rest of the building, with hot-water coils, supplemented by open fires, the whole of the fireplace and chimneypieces being formed in local tiles, moulded, embossed, and plain, according to their position or purpose, supplied by Messrs. Carter and Co., of the Poole Pottery. The ladies' reading-room, being entered on the left of the hall, and similarly appointed, measures 32ft. by 20ft., but ends in an octagon bay, with windows of the same character overlooking the main street, and is provided with a small gallery in a recess on one side for additional accommodation in the event of the room being used for any other purpose than that for which it is mainly intended. The library proper consists of a room of 27ft. by 16ft., and the same height as the others, fitted with shelves, forming bays on one side, with a gallery over and shelves over this again up to the ceiling. Ascending the staircase, the caretaker's room is entered from the half-landing, forming a mezzanine floor, with windows overlooking the staircase, hall, and different openings. Reaching the first floor the reference library is entered on the left, and is of the same dimensions as the lending library below it. The School of Art is also situated on this floor, and consists of two large rooms immediately over the two reading-rooms just described below; the larger of the two, for male students, being ceiled in panels, with the principals showing half-way up the roof to admit of as much top-light as possible, and both being provided with separate lavatory accommodation. A third room is also provided over the hall, with an oriel window, for the use of committees or other business connected with the institution. A second and smaller staircase from this floor leads to the librarian's domestic apartments, consisting of kitchen and scullery, living-room, two bedrooms, and offices. A third attic staircase leads to the observatory turret over the octagonal roof at the north end of the building, and commands extensive and beautiful views of Poole Harbour. The style of architecture adopted may be classed as Queen Anne, suggested in the first instance by most of the best buildings in the town being contemporaneous with this reign, and also by its general adaptability to brick treatment with stone dressings—the materials most readily at hand. The foregoing is an outline of the general features of the building; but as the entire cost, with the exception of the fittings, has been generously borne by one private individual, no description, although chiefly for technical information, would appear fair and complete without mentioning the name of Mr. J. J. Norton as the donor of this important addition to the opportunities for instruction in the town of Poole; the expense of the library and fittings being all that is left to be subscribed for by the public. It only remains now, therefore, to add that the building has been erected from the drawings and under the entire superintendence of the architects, Messrs. Lawson and Donkin, of Bournemouth; Mr. J. W. Mannell, of the same town, having executed the stonework; Mr. Bacon, of Poole, having supplied, as well as defrayed the cost of, the hot-water fittings; as Mr. Bailey, in a similar way, the gas. The whole building has been completed in little over four months from the time of commencement, and will be ready for opening by the end of this month.

SCULPTURE FROM THE ROYAL ACADEMY EXHIBITION, 1887.

THE most important piece of statuary shown on this sheet of drawings from this year's Royal Academy Exhibition is that of General Gordon, to be erected by Mr. Hamo Thornycroft, A.R.A, in Trafalgar-square, as a national memorial to the great soldier. The monument is a truly dignified design, and in so able a sculptor's hands may safely be looked for as an unquestionable addition to the statues of London. The marble effigy of the late Bishop Ollivant, to be placed in Llandaff Cathedral, is by Mr. H. H. Armstead, R.A. The late Bishop is represented in his robes in an attitude of prayer, and the portrait is both truthful and sculpturesque. For the unmeaning and ugly costume adopted, the sculptor is not answerable, and the sofa cushion as well as sheet on which the Bishop reposes are only in harmony with the style of his dress. Mr. Armstead's second exhibit is the figure of "Ladas," designed for bronze. The subject thus selected is well fitted to remind workers that victory to be won requires no half-hearted, but the utmost efforts of any man, and this ideal of human effort is graphically expressed by this statue. The subject also has another meaning; but this is left by the author for our readers to guess. The Spartan runner is represented dying at the goal. Mr. W. Reynolds Stephens has a pleasing study in wax, a statuette called "Pigeons"; and Miss Henrietta Montalba shows a portrait of a girl in terracotta. Both illustrations are from the artists' own sketches.

ART METAL-WORK.

WE illustrate in this sheet some examples of art metal-work of good character by various architects, including Mr. Alfred Waterhouse, R.A., Messrs. Carpenter and Ingelow, Mr. Blomfield, and others, and made by Messrs. Singer and Co.

ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.

FOR description see page 240.

"THE MOUNT."

THIS house is built on the Westerham Hill Park Estate, Westerham, Kent, from designs by Mr. A. A. Higgins, architect, 28, Budge-row, E.C. It is of red brick, with York stone dressings, the external timbering being of pitch pine; the roofs are covered with red tiles made in the neighbourhood. It stands in seven acres of ground, artistically laid out with sunk and winding paths, tennis lawn, fruit, vegetable, and flower gardens, and is approached by a winding coach-road, through an avenue planted with very choice trees and shrubs.

The house, stables, and conservatory form a very picturesque group on the south side of the hill, from whence lovely and extensive views are obtained of the beautiful Homesdale Valley and the great Surrey and Sussex landscapes. The cost of the house and stables is about £10,000, and the work has been well carried out by Mr. W. Smithers, of Westerham.

The estate, which is within one mile of the town of Westerham, is laid out with pretty winding roads, for the development of choice and snug sites in sheltered positions, on which are now being built houses of a similar description.

Pure spring water is obtained from a deep well on the estate, and pumped by powerful engines into a reservoir on the top of the hill, from whence the houses are supplied by gravitation.

ST. PAUL'S CHURCH SCHOOLS, HEATON CHAPEL, NEAR STOCKPORT.

THE schools are to be built in connection with the church, which has been erected some 10 or 12 years, the architects being Messrs. Bird and Whittenbury, of Manchester. The site has been generously given by Lord Egerton of Tatton, together with a donation of £400. The building will be faced with white-pressed bricks and buff terracotta dressings. A large room will occupy the front portion of the building, with a class-room on either side for boys and girls. An infants' room is provided at the back, with a separate entrance leading to the playground. The estimated cost of the work is £1,500. Messrs. Darbyshire and Smith, of Manchester, are the architects.

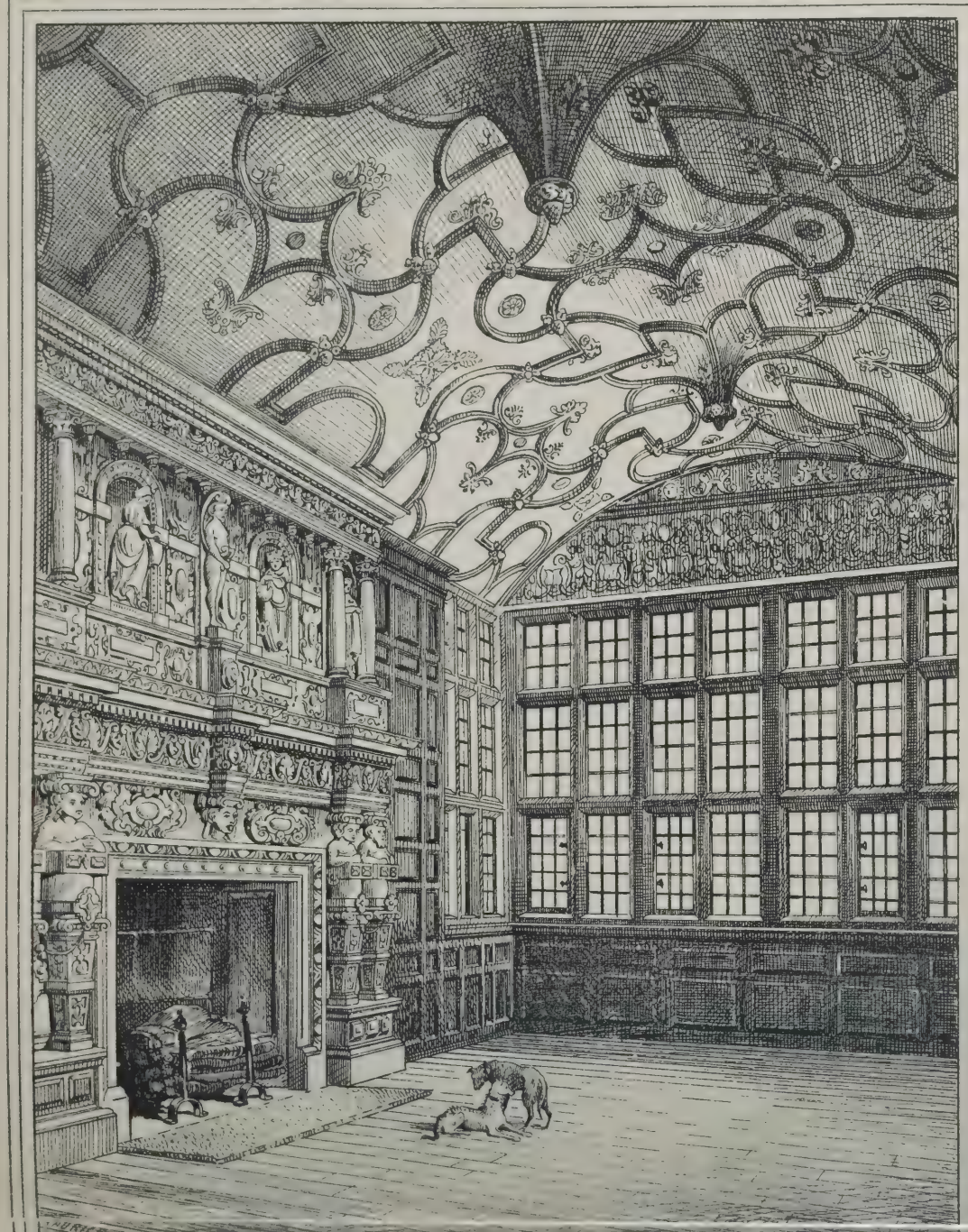
COMPETITIONS.

BRUSSELS.—The committee of the "International Exhibition of Sciences and Industry" invite competitive designs and plans for cafés and refreshment-rooms, also for waterclosets and urinals to be built on the grounds. Plans, elevations, and sections are asked for. Each competitor is to erect his buildings at his own cost on the ground with all accessories, and the plans and descriptive estimates are to be exhibited. Premiums in money, medals, and diplomas are offered, and each competitor may nominate two architects as members of the awarding jury. Offers to compete must be sent in to the offices, 22, Rue des Palais, Brussels, not later than Oct. 1st.

GRAVESEND BOARD SCHOOLS.—The Education Department have approved the proposal of the Gravesend School Board to purchase Baynard Castle and grounds for £1,450, in order to allow of a one-story, instead of a three-story school being built for the accommodation of 1,000 children. Accordingly instructions have been issued to the competing architects to proceed with the preparation of plans forthwith, the cost not to exceed £6,000, or £6 per head. The plans are to be in by the 31st inst.

OLDHAM CEMETERY.—The first premium for competitive designs for the new cemetery at Hollins, to be formed by the Oldham Corporation, has been awarded to Messrs. Potts, Pickup, and Dixon, architects, of Manchester and Oldham. It will be remembered that the conditions of the competition gave rise to a long correspondence in our columns in April and May last.

Referring to the notice in our issue of the 29th ult. respecting the opening of portions of Messrs. Lewis's new premises, Ranelagh-street, Liverpool, also of the consecration of St. Barnabas Church, Pendleton, in our issue of the 5th inst., it should be noted the floors of both buildings have been laid on Lowe's patent system of wood-block flooring.




W
E

THE DRAWING ROOM SOUTH WRAXHALL MANOR THE BRIDGE BRADFORD

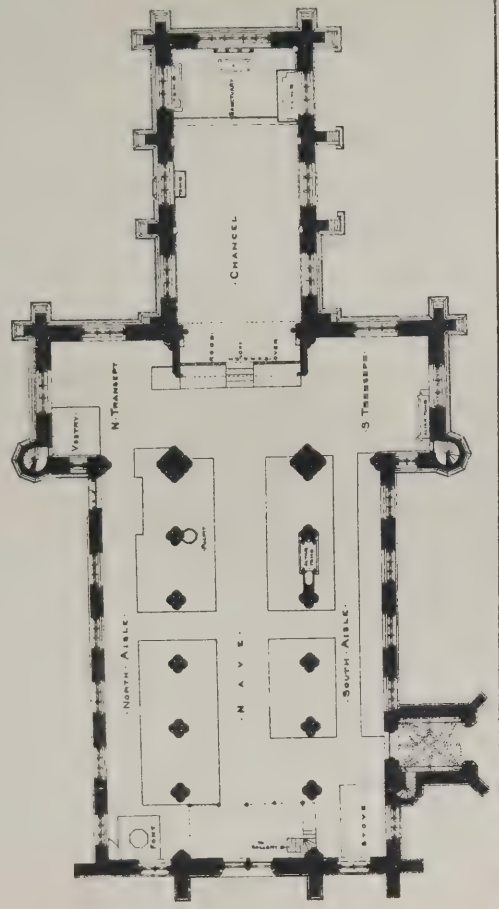
ARCHITECTURAL ASSOCIATION EXCURSION 1887

DRAWINGS BY MAURICE B. ADAMS

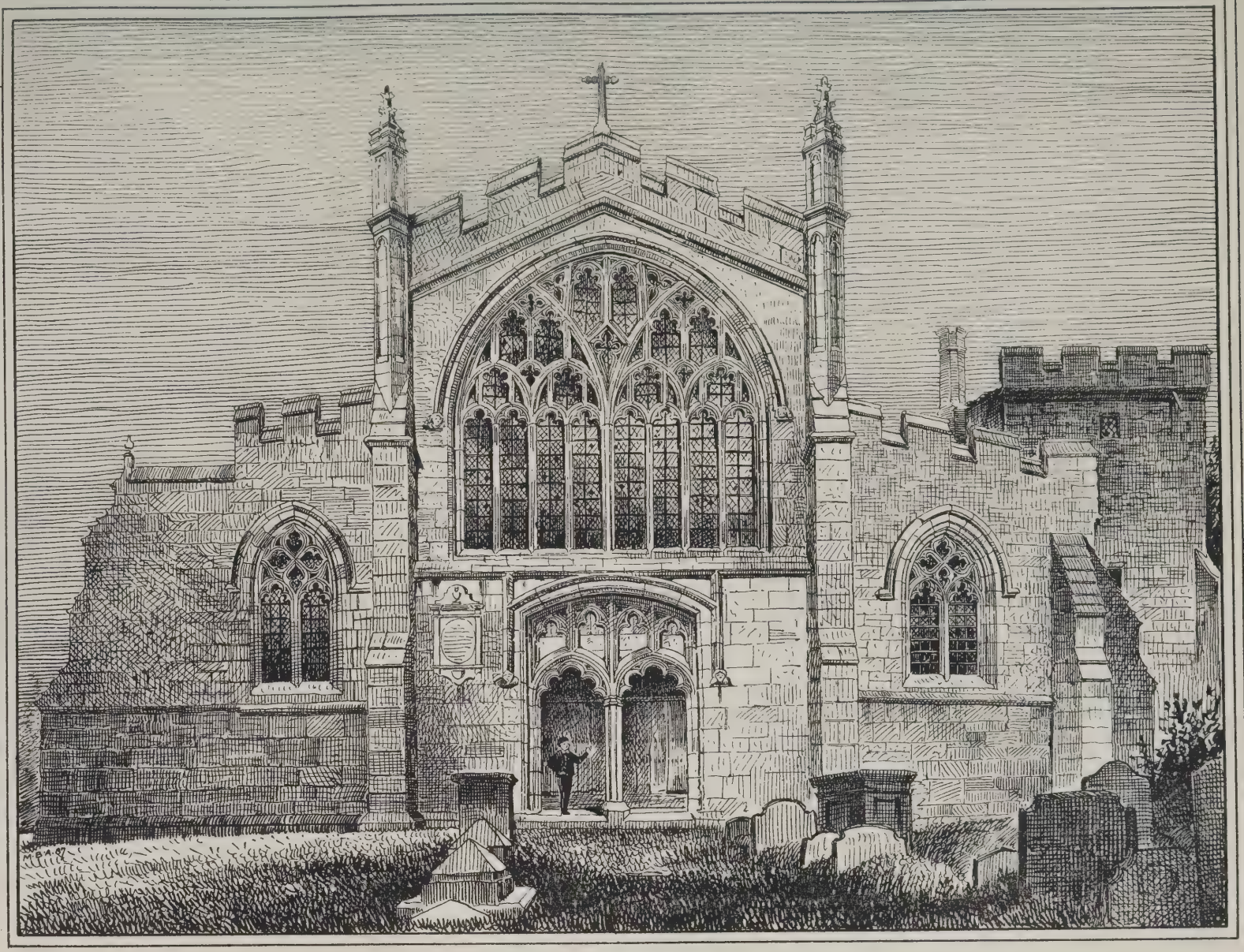
EDINGTON CHURCH WILTSHIRE.

GROUND PLAN

PLAN MEASURED FOR RESTORATIONS BY C.E. PONTING ARCHITECT 1887.



SCALE OF FEET

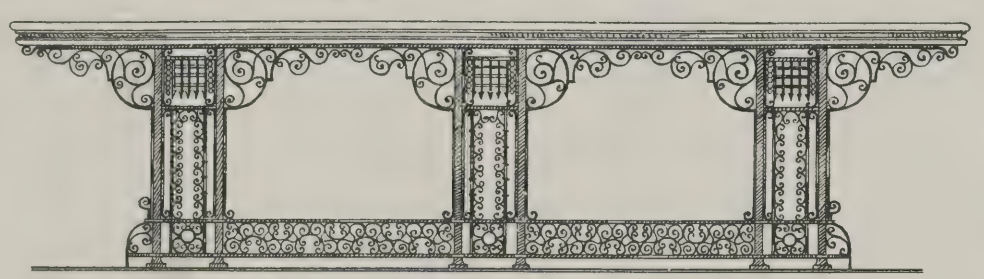


WEST FRONT

Photo-Lithographed & Printed by James Akerman, 6 Queen Square W.C.



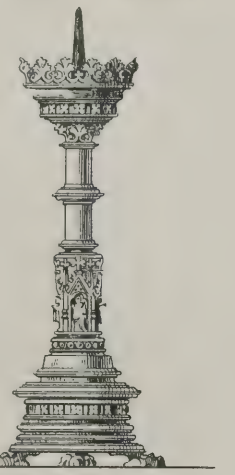
"THE MOUNT," WESTERHAM, KENT.—Mr. A. A. Higgins, *Architect*.



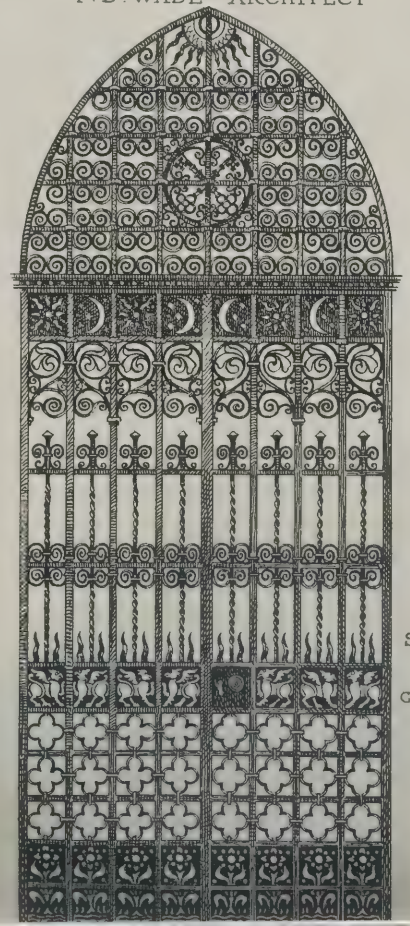
ALTAR RAIL HANDBRIDGE CHURCH CHESTER
F.B. WADE ARCHITECT

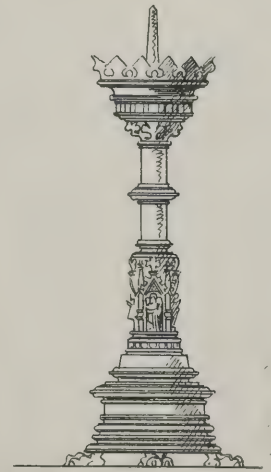


ALTAR CROSS GLOUCESTER CATHEDRAL DESIGN APPROVED BY T.C. CAMBIER PARRY F.S.A

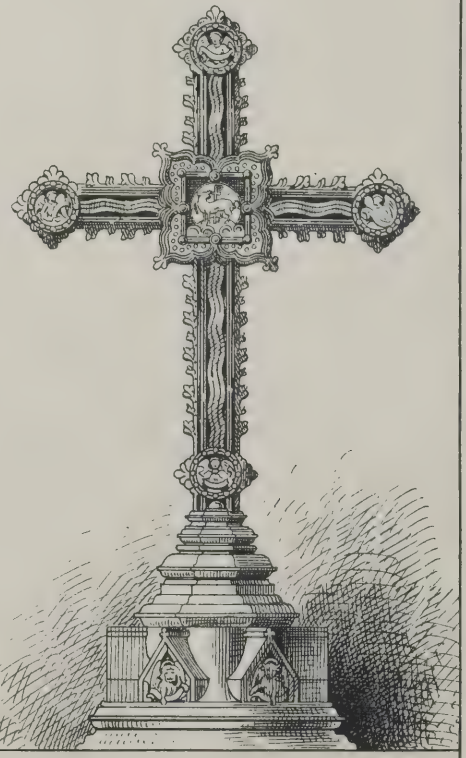


PAIR OF SILVER ALTAR CANDLESTICKS





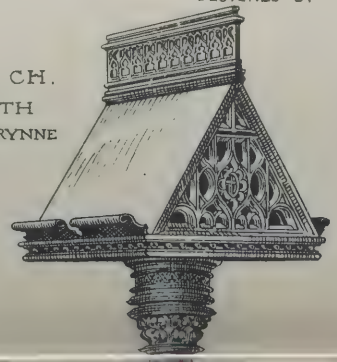
SALISBURY CATHEDRAL
DESIGN APPROVED BY ARTHUR W. BLOMFIELD M.A.





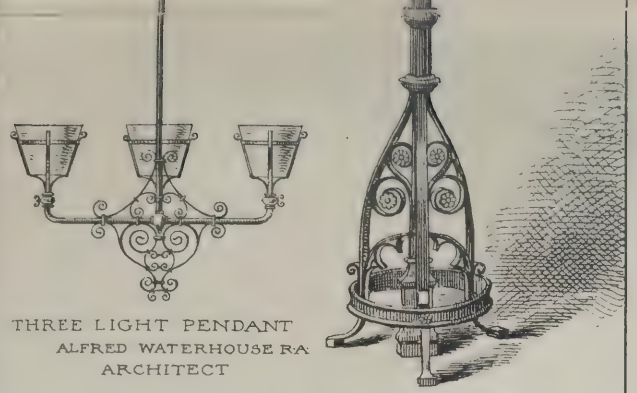
WROT IRON GATE SCREEN

S. PETERS CH. PLYMOUTH
G.E. FELLOWS PRYNNE ARCHITECT



ALTAR CROSS ELY CATHEDRAL
DESIGNED BY CARPENTER & INGELOW ARCHITECTS



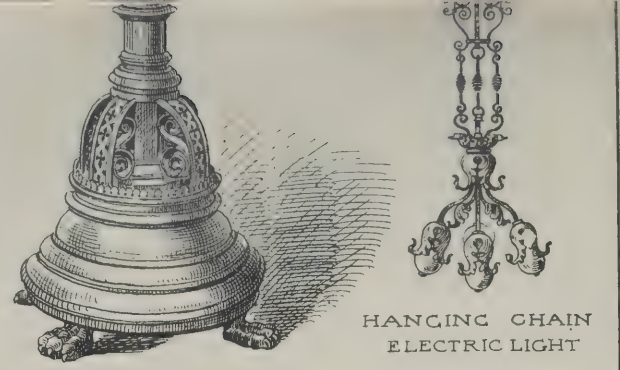


THREE LIGHT PENDANT
ALFRED WATERHOUSE R.A.
ARCHITECT

SANCTUARY STANDARD
A.W.BLOMFIELD M.A. ARCHT

Messrs CARPENTER & INCELOW ARCHITECTS



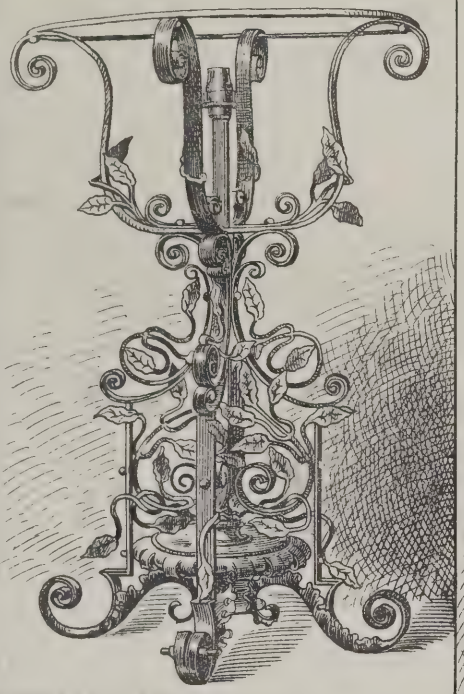


HANGING CHAIN
ELECTRIC LIGHT

LECTERN S.MARY MAGDALENE'S
MUNSTER SQUARE

DESIGNED BY
CARPENTER & INGELOW ARCHITECTS

ELECTRIC LIGHT TABLE LAMPS
MADE FOR HOWARD & SONS



MAURICE B ADAMS DELT

FIRE-DOGS BRAMALL HALL
DESIGNED BY Mr G.F. ARMITAGE



ART METAL WORK
EXECUTED BY

SINGER & SONS FROME
SOMERSET

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C

and at 3 Duke Street Adelphi London.

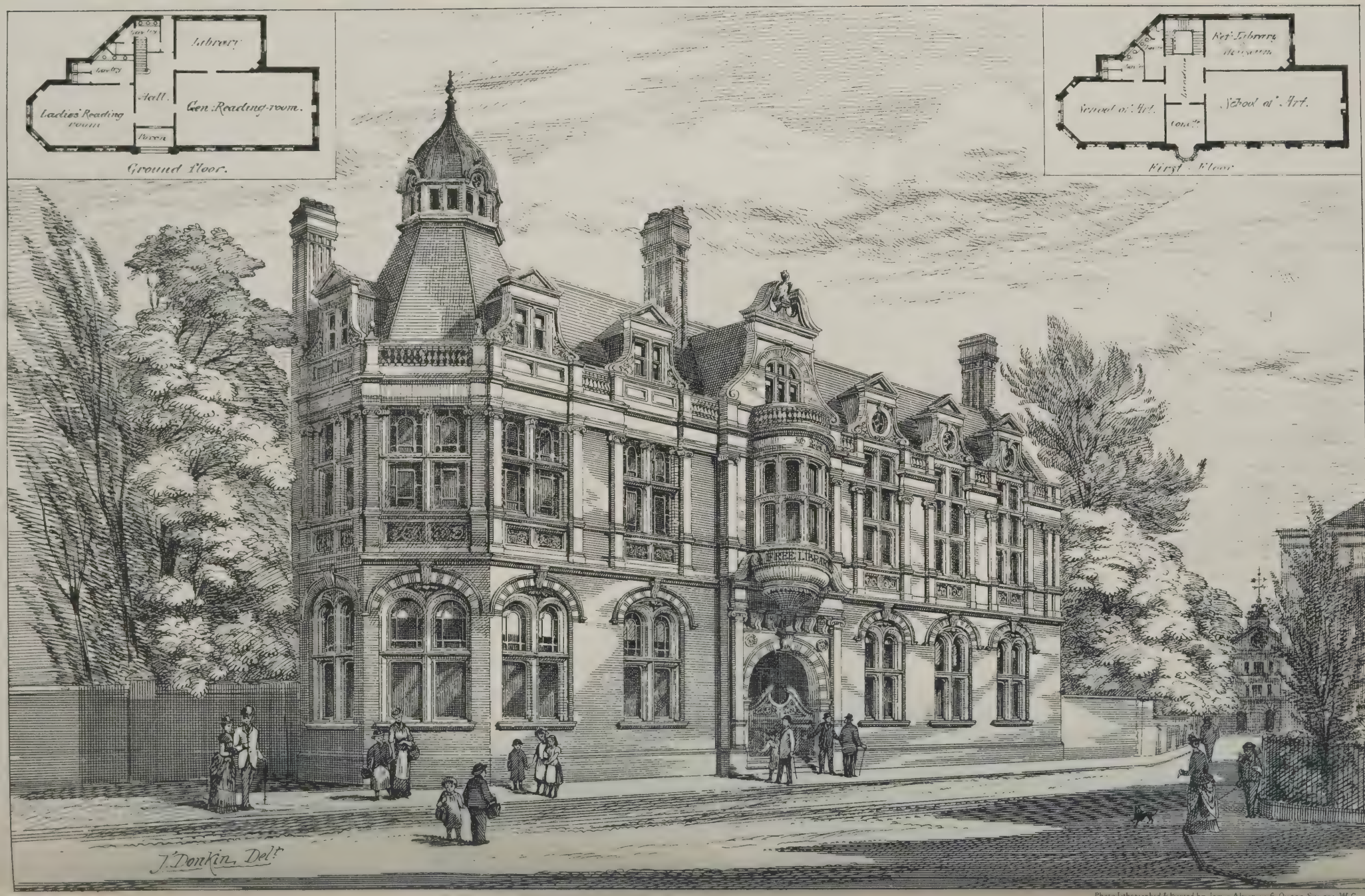


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Sculpture from the Royal Academy

Exhibition 1887



The General
Gordon Memorial
Trafalgar Square

Hamo Thornycroft A.R.A.
Sculptor



"Ladas"
by H.H. Armstead R.A.



"A Study" Henrietta Rintoul
Terra Cotta

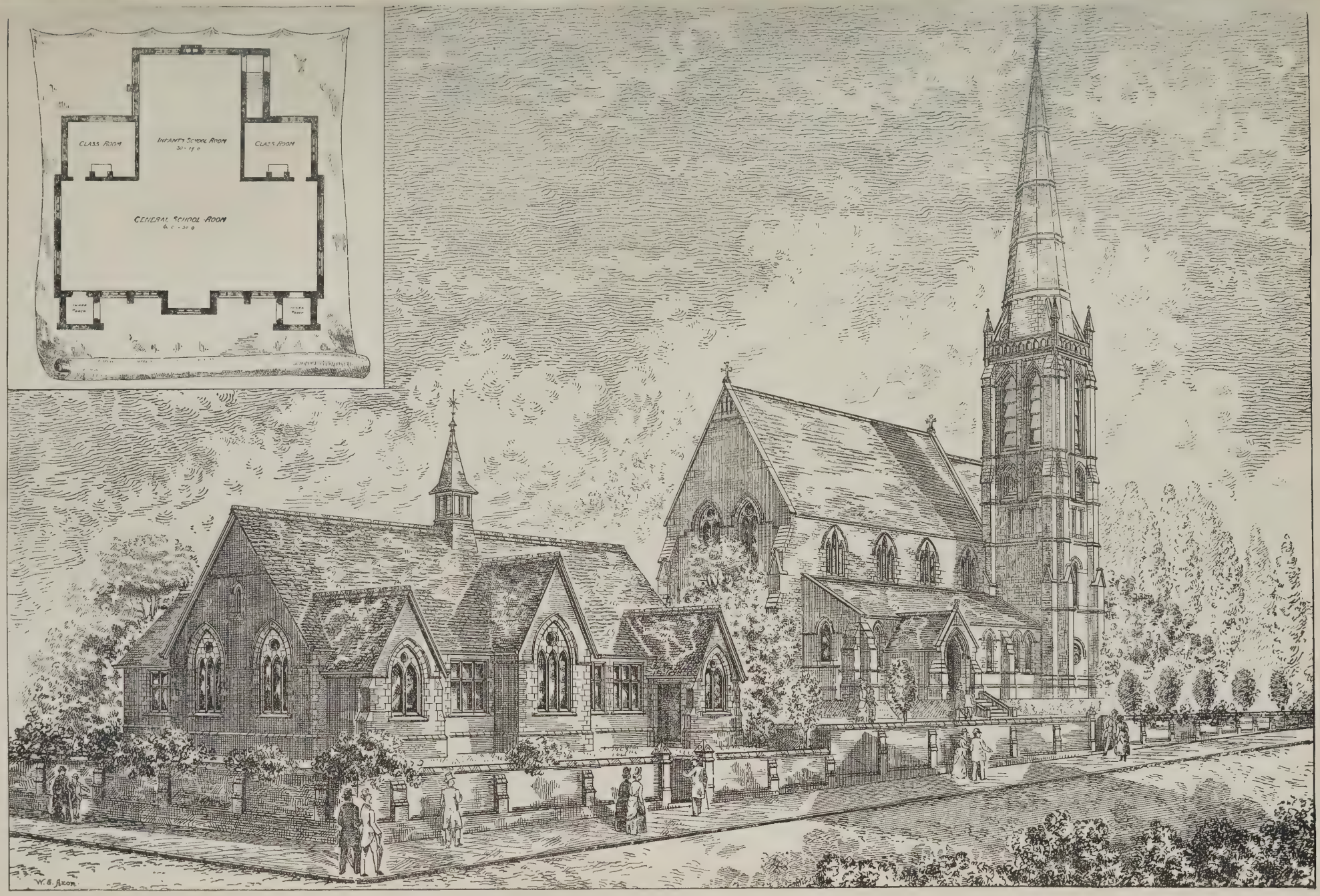


"Pigeons"
by W. Reynolds Stephens



Effigy of the late Right Rev. Bishop Ollivant Llandaff Cathedral
H.H. Armstead R.A. Sculptor

Photo Lithographed & Printed by James Akerman 6, Queen Square, W.



ST. PAUL'S CHURCH SCHOOLS, HEATON CHAPEL, NEAR STOCKPORT.—Messrs. Darbyshire and Smith, *Architects.*

WAYSIDE NOTES.

OF late we have had an abundance of fires of one kind or another — mountains, moors, and commons blazing, and houses and shops burnt to the ground, and now a really big affair at Westbourne-grove. Nothing so plainly indicates the ephemeral nature of our modern street architecture as an extensive conflagration. There are no elements of beauty or picturesque in the ruins of such buildings as shops and offices — no mobility in twisted girders and cracked stancheons and columns. Fire has, in past ages, tried the strength of faith of mankind, and has often been found powerless against the resolute will of many; gold may be tried by fire, and so, also, in a measure, may be a true public building. In a noble edifice the vital portions would suffer last. But observe the baseness of a construction whose very supports are the first to crack, twist, and bend, and thus let down the superimposed masses of brickwork and masonry.

However, as we are well in for a second Iron Age, we must make the best of the present state of affairs. It is useless to clamour for architectural piers when the builder demands flimsy-looking iron columns. The shopkeeper must have his vast sheets of plate-glass and the iron stancheon must be substituted for the enduring pillar of brickwork or masonry, to be in keeping with the new axiom for traders, that a man's business bears a direct ratio to the area of his plate-glass front. The capitalist, too, demands the greatest amount of space with the least possible area of support for his blocks of offices; and it is probable that if an architect, out of due regard for the claims of architecture, were to sacrifice the floor space to the area of support, he would run considerable danger of losing his client, who would look with favourable eyes on some of his more juggler-like brethren who can perform the feat of balancing a vast mass of building upon a few square inches of cast-iron. So it is necessary to move with the times; and as a matter of fact nothing is more valuable to the young architect of the present day than a thorough theoretical and practical knowledge of iron construction. They that run may read a lesson from the subjoined, which I take from the last issue of the late John Leech's excellent "Pictures of Life and Character."

"Jack Armstrong has painted a modern subject from real life, and painted it uncommonly well. Strange to say, he has sold his picture. Messrs. Feeble and Potter (*very high art men, who can't get on without Mediæval costume and all the rest of it*) think it a mistake. Curiously enough, *their* pictures are unsold!"

The particulars of the Gloucester Public Baths competition are well drawn up; but intending competitors will have to possess a thoroughly sound knowledge of baths and bath-fitting—swimming, private, and the so-called Turkish baths. It will be purely a matter of plan and arrangement, and knowledge will certainly be power in this competition. The Corporation say they require a simple, though effective, style of design for the elevations. They mean, in other words, a building whose appearance shall not depend on meretricious detail enrichment, but one whose unadorned composition shall be interesting and masterly.

A very peculiar set of particulars is that of the Denton Free Library competition. There are several objectionable features in the stipulations. The architect will not be required to superintend the erection of the building; £26 5s. will be paid to him as full compensation for the drawings and specifications; the building is not to cost more than £1,500, *and a tender to that effect must accompany the drawings.* I trust the committee of the D. and H. F. L. and S. C. will receive some good designs.

It is remarkable that so few towns or boroughs have so far availed themselves of the Free Libraries Act. The tax upon the ratepayers, which, I believe, cannot exceed one penny in the pound, is really very slight. A gradual awakening to the advantage of the Act may, however, be noted; and it behoves all architects, especially competing ones, to become thoroughly acquainted with the necessary features and details of such institutions.

Another peculiar class of buildings that are now frequently, and will probably in future be still more, in demand is the Technical School. We may expect many competitions for such edifices. I have not seen Mr. E. C. Robins's book, but should think it would be valuable to the architect. There has been lately a good deal of talk about technical education, both in and out of Parliament.

I note a question in the House touching the condition of the Church of St. Mary-le-Strand. The building is reported to be in such a state that it had been declared by the Metropolitan Board of Works to be a dangerous structure. Rather a surprise this to many of us, though the stone that was employed in the construction of the church appears to be very untrustworthy. Some time back, it will be remembered, one of the stones in a column of the semi-circular west porch cracked, and had to be replaced. The building may be said to be constantly in fear of being swept away by the ever-increasing traffic, through the medium of the Board of Works. The Board, it appears, have before them suggestions for the widening of the Strand, hereabouts, "either by the removal of the south side of Holywell-street or by the removal of the church." We may be prepared, before long, for the wholesale disappearance of this thoroughfare, and also the two Classic churches that guard either entrance to the street. It would be absurd to take away the block of buildings at the end of Arundel, Norfolk, and Surrey-streets, without the churches, as by so doing a regular *cul de sac* would be formed for vehicular traffic.

The Sanitary Institute of Great Britain holds its tenth Autumn Congress this year at Bolton, from September 20th to 24th, under the presidency of Lord Basing. Let us hope the S.I. will turn their attention to the ventilation of public sewers. It is not easy to see what benefit those who dwell in towns can derive from "sanitating" their houses, if the effluvia from the street ventilators be unluckily near their abodes.

There has been a good deal of talk lately about the insanitary state of Margate. To those who know this breezy watering-place, it would appear that there is a good deal of imagination called in to exaggerate the evils complained of, although, certainly, some startling facts were disclosed with regard to the town. But I sympathise with the place in its troubles, and must confess that, be its sanitary condition what it may, it seems to me pleasanter to stroll along its sea-shores than to walk down a London street with one's weather eye open to enable one to steer clear of the pestiferous breath of the sewer ventilators!

The gondoliers of Venice have followed the lead of the Midland Railway drivers, and gone out "on strike." Their grievance is said to be the establishment of a night service on the Grand Canal. Further, the journeyman bakers have struck, and there is a threatened strike of waiters at hotels and cafés. How pleasant! The travelling architect who may be engaged in sketching in the glorious old city will bless the gondoliers. Touching the old architecture of Venice, I can only conclude that it is absolutely necessary to *see* St. Mark's and the adjoining Palace in the Piazza, in order to be able to appreciate their wonderful beauty; as, with all my admiration of Mr. Ruskin, I cannot, by the aid of paintings or photographs, grasp the principles that should lead one to understand the good points in the composition of St. Mark's or the skyline of the Palace. Perhaps it is that in the sunny South colour and detail are of infinitely more moment than that effect of mass and outline which is so necessary in our duller Northern climate. GOTH.

A stained-glass window in the side chapel of Helmsley Church was unveiled on Sunday week. It has been executed by Mr. M. Milner, of London, from designs by Mr. R. Temple Moore, of Hampstead.

A new organ built by Messrs. Duncan and Son, of York, was opened at Airmyn parish church, near Goole, on the 4th inst.

Building Intelligence.

CARDIFF.—The first Unitarian church erected in Cardiff was opened on the 3rd inst. It is situate in West-street, Tredegarville, is Free Classic in character, and has been erected from designs by Mr. Bruton, of Cardiff, at a cost of £2,700. It seats 160 worshippers, but extra seats affixed to hinges on the walls increase the accommodation to 212. The materials used are red pressed brick, with dressings of Hamhill stone. The schoolroom below the church accommodates 180 children. The floor of the upper vestibule is of fireproof construction, carried by rolled iron joists supplied by Messrs. Homan and Rodgers, of London and Manchester. The seats are of pitch-pine. The contractors were Messrs. D. C. Jones and Co., of Gloucester.

DODDISCOMBSLEIGH. — Doddiscombsleigh Church, which was restored about nine years ago, at a cost of £1,000, possesses features of much interest. Its chief attractions are the fine old glass windows in the north aisle. The work just completed consists of reseating the whole of the interior from plans by Mr. Harbottle, of Exeter. The rough forms have been removed and appropriate wainscot oak seats have taken their place. On each side of the chancel aisle are choir seats and carved oak reading-desks, and on the north side of the chancel there is a carved oak parclose screen. Some of the very old seat ends have been restored and refixed by the contractor, Mr. John Periam, of Topsham. The organ, which is at the west end of the south aisle, has been much improved and new pedals added by Mr. Guest, of Exeter.

EXMOUTH.—The scaffolding is being removed from the new Public Hall, which is rapidly approaching completion. It is being built from designs by Mr. John Johnson, of Queen Victoria-street, E.C., selected in competition, and fronts the Strand Public Gardens at the corner of Rolle-street. The style is a French type of Renaissance freely treated. The hall is faced with Exmouth red bricks, with dressings of Beer-stone, from the old quarries near Seaton. The frontage towards Rolle-street is 66ft. wide, and is three stories high, with hipped mansard roofs at each end. These roofs are covered with Welsh blue slates, and have metal crestings, by Messrs. Downey and Co., of London, and in the centre is a timber and lead turret containing a clock. The great hall is 50ft. by 80ft. by 40ft. high. Its windows are circular-headed, and it has a stage. There is also a lesser hall adjoining the bigger one, measuring 44ft. by 23ft. The main staircase and landings are of Portland stone. The lower set of rooms will be used as general offices, and above will be the Local Board offices, and offices for the town clerk and surveyor. There are also a school of art, measuring 23ft. by 21ft., and other rooms. The general contractor is Mr. W. H. Perry, builder, of Exmouth; Mr. Henry Passmore, of 63, Victoria-road, Exeter, is the clerk of works; and Mr. Harry Hems, of Exeter, executed the carvings. The entire cost will be about £5,000.

FAZACKERLEY.—The foundation stone of new cottage homes for children, about to be erected in Long Moor-lane, Fazackerley, by the guardians of West Derby Union, was laid on Tuesday. The land covers 38½ acres, and cost £5,555. The plans were prepared by Mr. C. H. Lancaster, of Liverpool, and tenders were obtained from about 50 contractors, with the result that that of Messrs. Kelly Brothers for the building has been accepted, amounting to £53,550, and that of Messrs. Catterall and Co. for the road making and drains, amounting to £6,744, making a total of £60,299; the architect's estimate being £61,000. The various buildings, leaving out the Probationary Homes and the Infirmary, will accommodate 570 children, equal to about £105 per child for structural cost. The scheme has been arranged to represent a small village. A main road, 80ft. wide, runs off at right angles to Long Moor-lane. On the left of entrance gates will be the entrance lodge, and also clothes stores; and on the right will be the probationary homes, capable of holding forty children. On either side of the main road will be the cottage homes —one side for boys and the other side for girls,

each under a father and mother. Each home will accommodate 30 children, and contain sitting and bedrooms for foster parents, dining and day rooms, entrance hall, kitchen, scullery, pantry, lavatories, bathroom, and three large dormitories on the first floor. There will be a laundry and a wash-house attached to each girls' home, in an outbuilding. Centrally situated are the workshops, stables, coach-house, office, small laundry, and a swimming bath, 60ft. by 25ft.; the infirmary, superintendent's residence and committee room, the Kindergarten school, and the central hall. The building will be carried out in red pressed brick, with Storeton stone dressings.

Hanley.—The theatre was reopened last week, after remodelling from plans by Messrs. C. J. Phipps, F.S.A., and F. Matcham, of London. Mr. J. Turner, of Hanley, was the builder. The pit, which is paved with wooden blocks, will accommodate 1,100 people, its dimensions being 56ft. by 52ft. There will be, in connection with it, a refreshment bar and ladies' cloak-room. The circle will contain four rows of easy chairs, and behind these is a promenade and upper circle, each seating about 250 persons. Refreshment rooms are provided at each of the tiers. The gallery will hold 1,000 people. The old entrances will be used at present; but when the building is completed the entrances from the pit and boxes will be from Pall Mall. In the case of a crush, all the doors can be at once thrown open. The stage contains ample accommodation for actors and actresses, there being 12 new dressing-rooms. The depth of the cellar containing the appliances for the lifting of heavy scenery, &c., is 18ft., and the stage, which is laid in 20 sections, is 92ft. in width and 46ft. deep.

Pimlico.—The foundation-stone of St. Philip's Church, Buckingham Palace-road, was laid on Wednesday last by Lady Grosvenor, as proxy for her Grace the Duchess of Westminster, who was prevented by illness. The parish is to be formed out of St. Michael's, Chester-square. The Duke of Westminster has given the site and £3,000, and it is expected that the Ecclesiastical Commissioners will augment the endowment. The church will consist of nave and chancel, north and south aisles, transepts, and morning chapel, and will accommodate 750 persons. Clergy and choir vestries, to be used also together as a parish room, with organ chamber over, are arranged on the north side of chancel. The materials used are Gainsbro' bricks for outside facing, with Lawrence's brick strings, &c., and Doulting stone for sills. The core of the walls is of concrete, inside Corsham stone is used for dressings, and the walls are plastered, the roofs are of pitch pine, with boarded ceilings and covered with Broseley tiles, and there is a flèche 100ft. high above the nave floor, covered with copper, at the crossing. The cost of the fabric, exclusive of fittings, is about £6,000. Messrs. Demaine and Brierley, of York, are the architects; Messrs. Macey and Sons, Strand, are the contractors; and Mr. T. W. Creed is clerk of works.

Preston.—A new chancel, reredos, and additions to the carved altar at St. Ignatius' Roman Catholic Church, Preston, were inaugurated on Sunday week. The old altar, which is richly carved and panelled with statuettes of our Lord and the Apostles, was designed by Scoles when the church was completed over half a century ago, and is a work of considerable merit. It has been added to by the construction of a carved retable and tabernacle of polished Hopton Wood and Derbyshire fossil marbles, and a canopy of Caen stone, rising to a height of 10ft. The reredos, completed last year, except the return compartments next the side chapels, which have just been erected, is designed on the model of the Mediæval works seen in the Oxford College Chapels, St. Alban's and Winchester Cathedrals, having a series of niches for statues, and being a portion of the architectural construction of the church. The works have been carried out partly by Mr. Tory and Mr. Webster, of Sheffield, and Mr. Wall, of Cheltenham, from the drawings, and under the supervision, of the architect, Mr. Hadfield, of Sheffield. The tabernacle door, richly chased, gilded, enamelled, and jewelled, is in hand from the designs of Mr. Bentley.

Shah Jehan Mosque.—It is proposed to erect a mosque at the Oriental University, Woking, and the designs of Mr. W. I. Chambers have been selected and approved, and he has been instructed to proceed with the building forthwith. The design is in the Saracenic style, comprising the usual courtyard, sacred tank, and pavilions. The building is crowned by a magnificent dome surrounded by minarets. The interior will be panelled in marbles. The site adjoins the Indian Memorial House to Sala Jung, in course of execution from the designs of the same architect. This building is in a refined type of Northern Indian architecture.

Warminster. — The parish church of St. Denis was originally built about the time of Edward III.; but the main body and aisles were rebuilt upon the old foundations in 1724. It is contemplated to again rebuild all the work of last century, and designs have been prepared for this purpose by Mr. Arthur W. Blomfield, M.A., of London. The first section of this work has just been completed, and consists in the renovation of the chancel. The old walls still remain, but an organ chamber and a vestry have been added on the north side. The Norman remains in the east side of the north transept, and in the eastern end of the south aisle, have been preserved. The stone used in rebuilding the walling is from Frome, and the dressings are of Box Ground stone. The roofs are of oak, supported by carved corbels, the intersections of the ribs and purlins being stopped by bosses, and the wall plates have carved pateræ. The internal walls are stuccoed. The stalls are carved in oak. There are dwarf parclose and chancel screens in wrought iron by Messrs. Singer and Sons, of Frome. The steps are of Purbeck, and Godwin's tiles are used. The reredos is of stone, and has a double super-altar. This has five recessed panels, and contains much canopied and pinnacled work. It is surmounted by a pierced cresting, and statuettes of angels are carved at either end of the centre part. The general contractor for the restoration is Mr. W. Strong, of Warminster, and Mr. T. Simpson is the clerk of works. Mr. J. Gaisford, of the same town, has executed the wood-work, which is all in oak. The carving in wood and stone and all the sculpture is the handiwork of Mr. Harry Hems, of Exeter.

CHIPS.

A memorial of the late Mr. Thomas Dudley Ryder, first registrar of the diocese, was placed on Wednesday in the south aisle of the chancel of the Manchester Cathedral. The memorial, which has been raised by Mr. Dudley Ryder's younger brother, Admiral Sir A. P. Ryder, consists of a bordered brass, mounted on an enamelled black marble slab, and has been executed by Mr. Thomas J. Gawthorp, of Long Acre, London. It has been placed on the wall of the south-east bay of the chancel aisle, in immediate proximity to the chapel just raised in memory of Bishop Fraser.

Extensive additions to the Oakbank school of the Glasgow School Board were opened on Friday. The new building accommodates on the ground and first floors 600 scholars. On the second floor are the science, art, and cookery rooms, together accommodating 150 pupils. The accommodation of the old school was 930, and with the addition of 600, there will now be places for 1,530 scholars in the ordinary branches, and for 150 in drawing, science, and cookery. The cost of the additional new ground was £2,500, and the building cost £9,000.

A new Wesleyan chapel is about to be built at the corner of the Parade and Newhall-street, Sutton Coldfield. It will be seated for 400 persons, and in the basement will be school and classrooms. Mr. T. Guest, of Corporation-street, Birmingham, is the architect.

The foundation-stone of new Salvation Army barracks was laid at Kettering last week. The building will be erected in brickwork with stone dressings, and will measure 100ft. by 46ft., and 36ft. in height. Messrs. Saunders and Gotch, Kettering, are the architects, and Mr. F. Barlow, of Rothwell, is the contractor.

A Congregational church, erected at a cost of £2,200, was opened in Langate, Beverley, on Wednesday week. Mr. R. Potts, of Beverley, was the contractor.

The Dundee Police Commissioners adopted on Monday a modified scheme prepared by the burgh engineer for the erection of a fever hospital, and instructed the engineer to prepare plans for the first section, consisting of two pavilions, each for 18 patients, and half the administrative department, the cost of this portion not to exceed £9,000.

Engineering Notes.

Aberdeen.—At a meeting on Monday of the Aberdeen Harbour Board, Mr. William Smith, the engineer, submitted an additional report on the damage caused by chemical action of the sea water on the concrete entrance works of the graving dock, in which he suggested the appointment of a consulting engineer in connection with the matter. Mr. Philip Messent, engineer to the Tyne Commissioners, to whom it was remitted to examine and report on the condition of the graving dock, also had an interview with the Commissioners on the same day. The engineer said there was about one-third of the work completed, and there was immediate danger to the pier. The board decided to allow the work to proceed.

The Inventors' Institute.—A large party of members made an excursion down the Thames on Monday. The Thames Subway was examined under the direction of Mr. Greathead. Both tunnels are completed the whole way across for a distance of 1,500ft., and are proceeding rapidly towards the Borough. The cantilever bridge for the passage of the Indus at Sukkur, intrusted to Messrs. Baillie and Westwood, of Poplar, was also seen. The torrential character of the stream necessitates the whole span of 790ft. being accomplished without support. The first section is a heavy erection at Sukkur. A second is finished, and now stands erected at Poplar. Every piece is numbered and stamped, and the portions variously painted so that each may be selected and put in place in the permanent erection. The ascent was made to the top, 180ft., whence a fine view of the Thames and of this structure was obtained. The Victoria Docks, under permission from Colonel Martindale, were visited, the resident engineer, Mr. Thomas, drawing special attention to the new pumping station for supplying from the river the loss of water by the locking of vessels. The pumps throw into the Docks 125,000 gallons per minute, and raise the whole 180 acres of water 1½in. per hour. Some interesting experiments were afterwards made with the respirators in use in the German Navy, a man remaining in a closed building for ten minutes enveloped in dense smoke, and being able to endure this for even a longer period, the air being perfectly filtered by the apparatus.

The Crystal Palace School of Practical Engineering.—The annual presentation of certificates to the successful students took place on Saturday, being made by Mr. William Shelford, M.Inst.C.E. Mr. F. K. Shenton, superintendent of the school, read the examiners' reports. The examiners, Mr. W. W. Colman, A.M.I.C.E., and Mr. Henry Law, M.I.C.E., stated that in the mechanical engineering section of the school the results of the examination had been very satisfactory, and in the drawing office and fitting shops surprisingly good. It was to be regretted, however, that the students had not properly appreciated the necessity of working harder in the pattern shop, a department of great importance. In the civil engineering section undoubted progress had been made. The manner of work among the students was very satisfactory. There were in the first and second years' course over 70 students who received awards of merit. The first places were secured respectively by H. G. Lloyd for the lecture examination on Railway Work, A. W. Pearson in the Drawing-office, E. A. Glover in the Pattern Shop, H. P. Miles in the Fitting Shop, and E. J. Bowman, W. E. Underwood, E. J. Prew, and W. Bosman in the several sections of the Civil Engineering Division. To the latter student, who is the scholar of the Government School of Hongkong, the bronze medal of the school has been awarded, he having obtained during his course of study the necessary nine certificates, the largest number obtainable. Mr. Shelford observed that in the engineering profession many young men, no doubt, wished for permanent appointments at fixed salaries; but in the higher branches of the profession these positions were scarce, and though in the lower branches they were probably as common as in most other professions, the young man with ambition and a consciousness of power would avoid permanent appointments as being less independent and

ss remunerative on the whole. The profession of engineering had a great future before it, e necessity for development of the means of mmunication at home and abroad and the neral expansion of England being sure arantees of employment to the engineer. He uld urge the students to continue to do their st, and then they would find how true was e maxim that there was a square hole for ery square man.

The Mersey Subway.—Consequent on the ccess of the Mersey Tunnel Railway, which s now been in operation for a year, steps are ing taken to construct a subway between verpool and Birkenhead under the powers of Act obtained some time since. Operations ve just been commenced. The subway comny have purchased a piece of land in Johneet, Birkenhead, from Messrs. David Roberts, n, and Company, timber merchants, close to e Hamilton-street Station of the Mersey railay. This ground (which is about 30ft. from e Mersey Tunnel works) has been inclosed, d already a number of men are employed in king a shaft through the red sandstone, hich is taken up in large blocks. These blocks e carted away and used for building purses. The shaft, which is eight yards square, s been already sunk to a depth of about 60ft., t the intention is to carry it to a depth of 0ft. The contractors for sinking this preliinary shaft are Messrs. William Maddocks d Company, Corporation-road, Birkenhead. ie main shaft, through which the heavy affic will pass by means of a lift or lifts, will contiguous to the small shaft, and will be 0ft. long by 30ft. wide. On the Liverpool le the shafts will be at the Goree Piazzas. It expected that the undertaking will be cometed in about three years.

CHIPS.

The first stone has been laid at Storrington of a ilding which is to serve temporarily as a Priory the Sons of St. Norbert. The future building ill comprise cellars in the basement, and on the ound floor, flanked by a long corridor, kitchen, fectory, and three reception rooms; on the first or the rooms of the religious and four bedrooms guests; on the second floor store-rooms, &c. e material will be red brick with white brick ings; with the exception of the Gothic arched orways the style will be plain; under the centre ple facing the old parish church will be a niche ntaining a statue of the Blessed Virgin holding e Divine Infant.

It has been resolved that the memorial to the e Bishop of Sodor and Man at Sheffield shall e the form of a "Rowley Hill Chapel" and a ained-glass window in the parish church.

At the recent congress of the British Medical sociation in Dublin, Dr. T. Churton, of Leeds, ad a paper on "The Registration of Plumbers ad of Plumbing Work," showing the evil result of fective work, and as a result of the subsequent scussions, a resolution was adopted expressing a ong opinion that an organised efficient system of gistration of plumbers and plumbers' work ould be put into force in all parts of the United ingdom.

A lecture-hall in connection with and contiguous the Hamilton Presbyterian Church, Lairdset, Birkenhead, was opened at the end of July st. The size of hall is 40ft. by 24ft., with waggonhaded ceiling, finished in pitch-pine, and has ating accommodation for nearly 200. Mr. W. H. rde was the contractor, and the cost about £450. r. James N. Crofts, of Liverpool, was the archit t, who also designed and carried out the church a ew years ago.

A copy of the design for the Imperial Institute Messrs. Deane and Son, as produced in photolio. by the Building News, has been introduced into the Museum of Science and Art in Dublin. The authorities may have been in doubt as to where to classify and locate a novel form of exhibit in a museum, but for the present it is to be found among "Ornaments of Savage Tribes" in the Quadrant Gallery.

A new reredos, Perpendicular in style, is being placed in Welby Church, Lincolnshire. It is entirely of oak, and has been carved and constructed by Mr. Harry Hems, of Exeter, from designs by H. Withers, F.R.I.B.A., of Adam-street, Adelphi, WC.

The Nantwich Local Board have received a report from Mr. Balwin Latham, M.I.C.E., of Westminster, on the improvement of the water-supply, in which he suggests the immediate execution of new works estimated to cost £1,100.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Association of Municipal Engineers.—A Northern Counties district meeting will be held at Newcastle-on-Tyne to-morrow (Saturday). The members will assemble in the Council Chamber at the Town-hall at 11.30 a.m., when a paper on "The Floating Hospital of the Tyne Port Sanitary Authority" will be read by Mr. W. G. Laws, city engineer, Newcastle. The members will afterwards adjourn to the Exhibition, where the rest of the day will be spent.

Bristol and Gloucester Archæological Society.—The twelfth annual meeting of this society was opened on Monday, and will close to-day (Friday). The party, over 100 in number, arrived by Midland train, and the opening meeting was held under the chairmanship of Sir Henry Barkly, K.C.B., who introduced the new president, Lord Sherborne. The annual report, which was read by the general secretary (the Rev. W. Bazeley), dealt with a variety of topics connected with old Gloucestershire. Lord Sherborne then delivered his presidential address, which had reference chiefly to manuscripts and antiquities of the Manor of Sherborne, and of the cartulary of Winchcombe Abbey, recently discovered after being mislaid for many years. The members afterwards went to the parish church, where the Rev. F. Smith gave an account of the ancient collegiate foundation, and showed the tombs of the Shakespeare family, the old register, monuments, &c. Thence the party went to the Guildhall, the Grammar School, and the Chapel of the Holy Cross, which were described by the Rev. R. S. de C. Laffan, who, in the latter place, gave an account of the frescoes and allegorical paintings discovered many years ago. At New Place, the last residence of Shakespeare, Mr. Sam. Timmins took charge of the party, and under the same guidance they inspected the poet's birthplace and the collection of books and relics in the museum. The annual dinner took place in the Town Hall in the evening, and subsequently a meeting was held for the reading of papers. The members made an excursion on Tuesday to Warwick, where the castle, museum, St. Mary's Church, and Leycester Hospital were seen under the guidance of Messrs. F. H. Moore and T. Lloyd, and on Wednesday they visited Compton Wyngates, the Early 17th-century seat of the Marquis of Northampton.

Bristol Master Builders' Association.—The members of the Bristol Master Builders' Association had their usual outing on Tuesday, when they visited Frome and Longleat. At Frome they visited the parish church, under the guidance of Mr. W. Singer, who next invited the members to see the art-metal works of his firm, in which about 100 men are employed. Among the works in progress in the shops are iron gates for St. Mary Redcliff, Bristol, fittings for St. Mary's, Tyndall's Park, and a reredos for a church in London. The members were then conveyed in breaks to Longleat, the seat of the Marquis of Bath, about four and a half miles from Frome. Both the exterior and interior of the reservoir were examined. In the evening the party dined at the George Hotel, Frome, under the presidency of Mr. W. Brock, the vice-chairs being taken by Mr. T. R. Lewis and Mr. G. Humphries. Among those present were Messrs. J. Yalland, A. Krauss, W. Singer (Frome), J. Bastow, A. Barratt, R. Bancroft (Bancroft and Harris), Bradshaw, Jabez Eastabrook, Church, J. Cox, Geary (A. Gardiner and Sons), J. Hill, E. T. Hatherly, C. A. Hayes, Johnson (Jones and Wainwright), Kepple (John Hall and Sons), J. Perkins, G. H. Perrin (Taylor and Low Brothers), B. Price, Bryant, H. J. Rossiter, G. Bessell, A. Scull, P. Triggs, G. F. Jones, J. Wilkins, E. Walters, G. Wilkins, and A. Beacham (King Brothers). After dinner "The Mayor and Corporation of Bristol" was proposed by Mr. P. Triggs, and acknowledged by Mr. J. Bastow. Mr. J. Yalland gave "The National Association of the Master Builders of Great Britain." Mr. A. Krauss responded. Mr. G. H. Perrin proposed "Success to the Bristol Master Builders' Association." Mr. W. Brock (the president) responded. Mr. T. R. Lewis submitted "The Merchant Traders connected with the Building Trades." Mr. Bancroft responded.

National Association of Master Builders of Great Britain.—The half-yearly meeting of this association was held last week at the Grand Hotel, Glasgow, when representatives from the following local associations were present:—London, Liverpool, Manchester, Birmingham, Leeds, Bolton, Bradford, Lancaster, Glasgow, Edinburgh, and Greenock. The report and accounts for the past half-year were approved and adopted, and other business relating to the building trade was discussed. The representatives attending the meeting accepted an invitation from the master painters of Scotland to a trip through the Kyles of Bute, and on their return in the evening were entertained at a banquet at the Grand Hotel.

Northern Antiquarian and Scientific Societies at Elgin.—A joint meeting of the above societies took place on Friday and Saturday at Elgin. On the former day the visitors inspected the Museum and the Bishop's Palace, which Colonel Culbard described. A meeting was afterwards held in the Gordon Arms hotel, under the presidency of Dr. Duff, Elgin. Mr. Wallace, rector, High School, Inverness, gave an interesting address on the archæological remains to be found in the basin of the Beauly Firth. Regarding vitrified forts, he pointed out that there was no doubt they were used for military purposes. Aided by drawings of a number of these forts in the parish of Kirkhill, and also near Beauly, Mr. Wilson described them at considerable length, pointing out that at points where they were easily accessible to the enemy special pains had been taken to make the fortifications safe and complete. Mr. Mathieson, head master, Elgin Institution, read a paper on "Celtic Place names in Morayshire." Subsequently a supper was held, at which Dr. Duff, president of Elgin Association, presided. On Saturday, the party drove by Cutties Hillock quarries to the old castle at Duffus, and from thence to Burghead and along the coast to Lossiemouth.

CHIPS.

At the Birmingham Assizes on Friday, before Mr. Justice Wills, an action was brought by Harriet Timmins, a single woman, living at Leicester, against Thos. Croft Furnace, builder, of Tipton, to recover £5,000 damages for breach of promise to marry. The Jury returned a verdict for the plaintiff—damages £500.

The local board of Swanage have adopted plans and a scheme prepared by Mr. Heward, C.E., for the sewerage of the district.

Mr. Edwin Richardson, the Mayor of Sunderland, has presented to the Art Gallery of that town Mr. C. Pettafer's picture, "Fishing Boats leaving Harbour, Polperro, Cornwall," which was exhibited at the Royal Academy.

The framework of the Glasgow Exhibition Buildings is being rapidly put together on the ground at Overnewton, and on Monday the first arch was raised into position. The contractors for the stand, pavilion, outer and inner palings, gates, and all other wood and iron work are Messrs. F. Braby and Co. (Limited), of Glasgow.

A font has been presented to St. Anne's R.C. Church, Rock Ferry, Liverpool. It is constructed of Derbyshire alabaster, supported by Rouge Royale and Irish green marble columns and brown Belgian marble base, the whole resting on a Mansfield plinth. The cover is of dark English oak, ornamented with Gothic ironwork. There are four carved panels. The font is the work of Mr. J. Currie, London.

To a new parish church dedicated to St. Lawrence, at Burwarton, Salop, built at the expense of Viscount Boyne some years ago, close by the remains of the original Norman edifice, an addition has just been made through the generosity of the same donor. The organ has been enlarged by Messrs. Nicholson and Co., Worcester, and during the past week a front of carved oak in the Decorated style of Gothic art has been erected by Mr. Harry Hems, of Exeter. The lower part of the case is of tracery panelling with sliding doors, flanked at either end by buttresses. These are gabled and carved, and are carried up the full height of the pipes, terminating in crocketed pinnacles. The pipes show through the woodwork, whilst the upper work is supported by brackets carrying an embattled cornice, the whole being surmounted by a pierced cresting.

At Eastleigh, Hants, last week memorial stones were laid of a new Bible Christian hall. Mr. Harris, of West End, Southampton, is the builder of the hall, which will seat 200 persons.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

RECEIVED.—J. and Co.—C. and G.—T. N. D. and Son.—W. G.—M. R. Co.—W. G. B.—M. C. and Co.

HUDSON EARLE. (Yes.)

Correspondence.

THE CARPENTERS' COMPANY AND CLERKS OF WORKS.

To the Editor of the BUILDING NEWS.

SIR,—I notice that Mr. Potter, in that portion of the paper on Clerks of Works which appeared in your issue for 5th August, supports the desirability of examinations for those useful members of the building craft.

Permit me to draw the attention of your readers—especially such of them as are Clerks of Works—to the examinations and certificates in carpentry and joinery just instituted by the Worshipful Company of Carpenters, of which I have the honour to be a member and an officer. We did at one time entertain the idea of constituting this an examination with a wider scope; but it has been thought prudent to limit it to the trades with which we are specially connected. But within these limits no pains will be spared to make the examination very searching, so that the certificate shall be a valuable testimonial to the skill, knowledge, and experience of the holder, as far as work in wood goes. As you have already pointed out, copies of the programme and of the specimen questions can be had by applying at Carpenters' Hall, and I hope any person obtaining them and making himself familiar with their contents will be satisfied that the Carpenters' Company's certificate will be a most valuable testimonial for every Clerk of Works who can obtain it.—I am, &c.,

T. ROGER SMITH.

POST-OFFICE, KNUTSFORD.

SIR,—How far the concession that the "upper portion of façade was suggested by an old house at Ipswich," and the admission of "the slight similarity" to the New Zealand Chambers will content those who have compared the designs in question, I cannot, of course, judge. To me there is no similarity between the Post Office at Knutsford and the Chambers in Leadenhall-street. The one is a translation from the other, point by point, from the ground to the sky line, so far as it was applicable. Of resemblance, there is truly none.

Mr. Owen claims that his building was "designed to harmonise with the surroundings, the style selected being somewhat typical of the various examples to be found in the neighbourhood"; and going for a *motif* to Ipswich to secure this local feeling, he has naturally to prune away what was Suffolk in character and spirit. But was he serious in describing his clarified design as being in a style selectedly typical of Cheshire houses, or is it only his fun?—I am, &c.,

HALSEY RICARDO.

13, Bedford-square, Bloomsbury, W.C.,
Aug. 10.

EAST GRINSTEAD COMPETITION.

SIR,—Some three weeks ago the East Grinstead Local Board invited competitive drawings for their proposed new offices, &c., and I applied for particulars, which I received (and which are worthy of your perusal as being a fairly good specimen of the very vague and uncertain—and, if I may be allowed the expression—"empty" set of particulars now and then issued for the guidance of competitors).

My drawings were accordingly prepared, duly packed in a case—not having the time at my disposal to mount them on stretchers—and forwarded the Saturday preceding the Monday, at which time they were to be in (Aug. 1st).

They were returned to me on August 6th, having been sent by book post; but the Post-office, in the transmission, sent them on by parcel post (the rubber stamp on them telling me they were too long for book post), for which I had to pay 2d., and have my drawings written on with blue pencil, and with the prints of an indiarubber stamp, the postage stamps, date stamps, and other official markings—the board not taking the trouble to place them in a cover or protection of any description, or even to return them in my own case, or to trouble themselves to find out whether or not they would go "book post" or "parcel post," or what not, or even to protect them in the slightest degree; and I need hardly say there was no sign of even the ordinary letter of thanks in returning my crumpled and crushed drawings, or the least sign of where on earth they came from. I leave your readers to form their own opinion of this, I hope, unusual treatment received from a public body, such as the East Grinstead Local Board.—I am, &c.,

London, E.C., Aug. 9. F. W. F., M.S.A.

FIRE!

SIR,—The tremendous destruction wrought last Saturday upon Whiteley's gigantic premises is surely sufficient, without the other conflagrations round London, to create much matter for consideration—whether we are erecting the enormous buildings that the present condition of trade seems to require in a safe manner, and whether we have any means of stopping the spread of fire if it once takes hold of these great buildings.

The buildings which were consumed last Saturday were for the most part of the most approved construction; nothing that is called combustible entered into their composition—bricks, stone, iron, and cement are not generally supposed to "burn"; but what was the result? That the place was almost as readily consumed as if it had been the work of the jerry builder!

But the worst of it is, that although this great fire transcends in its magnitude any calamity that has taken place in London for many years, it only repeats on a large scale that which takes place daily on a smaller scale. I can find no instance, when the structure has become what the firemen call "well alight," where they have been able to stay or put out the fire. The firemen, with their beautifully-constructed engines, and the men, agile as cats and brave as seamen always are, direct their hoses in the midst of the burning building, apparently valuing their lives as nothing, and doing their duty as brave men, but with what result? They can certainly shower water upon those adjacent buildings that are not already on fire, and thus prevent the spread of the conflagration; but in no instance do they grapple successfully with a building in which the contents, heated like a furnace seven times, give out so much caloric that the streams of water turn to steam before reaching the blazing structure, being utterly incompetent to cope with the great heat evolved.

The true meaning of this utter insufficiency on the part of our fire brigades appears to me to lie for the most part in the false security that is given by the term "fire-proof." We know that when iron, bricks, plaster, or cement are subjected to ordinary heat they do not burn so we hastily call them incombustible, and call any buildings composed of them fire-proof. We then fill these buildings with wood, paper, grain, jute, and other inflammable substances which, when "well alight," produce a heat which no ordinary building is calculated to defend, and the whole place burns down together. Not satisfied with which, we also permeate these said "fire-proof" structures with gas-piping, which constantly feeds the flames with a steady flow of inflammable gas.

Let us acknowledge at once that no building that contains inflammable matter can be fire-proof. All sublunary substances will burn if they are submitted to a sufficient heat, and, therefore, a carefully constructed building is only less combustible than one constructed without any regard to such disasters, and, indeed, can only be considered to be so when none of its contents will readily burn.

If we are quite ready to face the truisms, which I only venture to have inflicted upon the readers of the BUILDING NEWS because they do not seem to be generally appreciated or grasped, we shall be more in the humour to face the problem that still lies before us, which is this: As all buildings, without exception, are in danger of burning, what is the best means of extinguishment when their contents become alight? Water will not put it out; chemicals cannot be used, because any chemical that will utterly destroy fire will also destroy any life that may be waiting for rescue in the burning building. Has steam been tried on a large scale? Surely, with the means and appliances at hand, steam, even super-heated steam, which by its own force could be ejected to great distances, would be more effectual that streams of cold water.

Please accept these crude remarks, the importance of the subject being my best apology for them, and I hope that they will call forth the attention of some of your readers who have already given attention to the subject, and who can give the world the benefit of their experience through your columns.—I am, &c.,

FREDK. ROGERS.

STONE THE WRONG WAY OF ITS NATURAL BED.

SIR,—It seems to me that the case referred to in your last issue by Mr. Stevenson is not exactly similar to that mentioned by Mr. Percival, but is capable of easy explanation.

I should imagine that the corner stone is laid having the natural bed facing the south, and the section through the layers facing the west, and if this should be the case, would not the casting of the layers off the south face be quite accounted for by the action of the frost? Probably perpendicular "furrows" might be found on the west face.—I am, &c.,

F. R. OGLESBY.

Mablethorpe, Aug. 6.

SIR,—Mr. T. Gilbert Stevenson, LL.D., architect, referring to stones not set on their natural bed, instances a quoin stone in St. Jude's Church, Southsea, improperly set, and wonders why only one face is "peeling off." Can he not easily see that only one "natural bed" has been made a face? The other is a joint, and consequently not exposed.

The south, in my experience, has always been the exposed side for stone.—I am, &c.,

JOHN FERGUSON.

SIR,—The case of the stone in St. Jude's Church, Southsea, as reported by Mr. T. Gilbert Stevenson, LL.D., in your issue of to-day's date, surely differs from those mentioned in yours of 22nd ult.

As I take it, the stones in the Langham-place Church are *both* on their wrong bed, one showing signs of decay, the other not. The reason for this peculiar action of the weather on one, while the other escapes, has yet to be given. But in the case of the Southsea stone the reason is not far to seek, seeing that the side which shows no sign of decay is *end grain* to the weather, and will (unless enough weight come upon it to split it) show none for some time yet. Though a stone is not as strong so

laced (being to one placed as in the quarry s ¢ : 1), yet Dr. T. G. Stevenson should be, and o doubt is, aware that the practice of putting hem end-on to the weather is often resorted to n the case of cornices with deeply undercut nouldings, and when so placed show no more igns of weathering badly than those beside hem placed with strata horizontally.—I m, &c.,

Portsea, Aug. 5. VECTIS.

SIR,—I am surprised at Mr. Stevenson's etter on this subject in your issue of the 5th nst. To me there does not seem to be anything extraordinary in the example he quotes.

There are two ways to set a stone—(1) "tooth ut," or on its natural bed, which is the correct ray; or "bed out." When a stone of which wo faces (an end and side) are seen is set in he latter manner, one side (the west, in your orrespondent's case) must be "tooth out," lthough it is at the same time laid on edge.

When a stone decays from the above-named ause, it is invariably on the side of the natural ed (the south side in the example under dis-ussion).—I am, &c., SALTARIES.

ARCHÆOLOGICAL SOCIETIES AND THEIR USELESSNESS.

SIR,—I can truly sympathise with Mr. ands in the difficulty he labours under in not eceiving the right stand of fellowship from he learned societies in Scotland, to further his esearch in studying Scottish archæology; but uch is unfortunately the case from my ex-eriences as a Scotchman.

I would advise Mr. Sands, however, to consult Rev. Dr. Gordon, of St. Andrew's Episcopal Church, Glasgow, in whom he would find a friend and scholar in Scottish archæology.—I m, &c., J. REID.

Late Student of Royal Institution and College of Arts, Edinburgh.

8, Berners-street, London, W.

BY ORDER OF THE CHURCHWARDENS.

SIR,—May I call your attention to the fact hat sketching in St. Bartholomew the Great s now only allowed, by order of the church-vardens, on payment of a "moderate charge f from 5s. to a guinea," to be paid by the ap-licant "in the form of a subscription," commensurate with the position of the ap-licant"?

London students of architecture are not so well off for subjects to sketch that they can afford to have such national memorials taken from them without expostulating, and I think it is very hard on us that such rules should be imposed by churchwardens just because a fine specimen of architecture happens to be in a poor parish.—I am, &c.,

STUDENT.

THE NUISANCE FROM SEWER VENTILATORS.

SIR,—Mr. Buchan, on page 230, has denied my statement, without giving any proof that his denial is correct. To prevent wasting your space in writing *what we think*, will Mr. Buchan say what additional pressure per square foot could be obtained by adding 10ft. of extra pipe to shaft and fixing *any ventilator* on the top, as he suggests?

Also, what is the motive power that causes air to flow up shafts when the inlets and outlets are at different levels? If it is not the difference in the height of air as registered by the barometer and thermometer, what is it?

If additional lifting power is gained by any other source, give proof of it.—I am, &c.,

R. H. REEVES.

Cedardale, Putney, August 9th.

A WONDERFUL FALL.

SIR,—In your current issue you quote in a paragraph a wonderful fall of a man from a chimney shaft of over 70ft. I do not know whether it may interest your readers to know that a foreman in the employ of Messrs. Howell and Son, of Bristol and London, when they were building the new Wesleyan chapel, fell from the spire, a height of 25ft. In his fall he broke a scaffold pole which measured 6in. through, and also went through a board-and-felt roof of the engine shed. He is now quite well, and apparently none the worse for his flight through the air. I am not writing this for the sake of competition, but for the sake of those who may intend to equal the feat.—I am, &c.,

JOSEPH WHITE.

Lincoln-avenue, Bournemouth, Aug. 6.

Intercommunication.

QUESTIONS.

[9363.]—**Alphabets.**—Can any reader kindly recommend me a suitable work upon alphabets for letter-cutting on monumental work, and oblige?—APPRENTICE.

[9364.]—**Main Drainage.**—What are considered to be the best textbooks on this subject in relation to the sewerage of towns of, say, 10,000 inhabitants and upwards?—SANITAS.

[9365.]—**Adjustable W.C.s.**—Should be pleased if any of your readers could recommend a form of seat to be used by adults, and at the same time to have some convenient mechanical arrangement so as to enable the seat to be adjusted for the use of infants.—T.

[9366.]—**Cement on Tiles.**—Will any of your correspondents kindly inform me how I can best remove from some encaustic tiles I have recently taken up the cement adhering to the sides, in order that they may be relaid? I have tried soaking them in water, but this appears to have no effect.—W. C. HAYES.

LEGAL INTELLIGENCE.

IN RE ESDAILE AND PEATY.—The bankrupts, who had traded as machine sawyers and timber merchants, in Nicholas-lane and Wenlock-road, under the firm of Esdaile and Co., applied to Mr. Registrar Brougham on Friday for their discharge. They filed their petition in January last, and their accounts showed joint liabilities amounting to £38,932, and assets estimated at £10,446. The Official Receiver reported that the business was originally established about 1810, and the bankrupts joined the firm without introducing capital. They stated that the business was profitable down to 1878, but that in the following years the trading profits were swallowed up by the payment of heavy interest, annuities to partners, and bad debts, the result being that in 1884 there was a deficiency shown of about £16,000. The Official Receiver submitted that the financial position of the firm was not sufficiently disclosed by the books since June, 1884, although they contained the materials from which the same could with some clerical labour be ascertained. The failure was attributed in a great measure to the decadence of the veneer and other branches of the mill trades which had set in prior to 1884. The Official Receiver was, however, of opinion that if the bankrupts had looked sufficiently into their affairs and made due allowance for bad debts and other losses it would have necessitated their stopping at an earlier period. The Registrar granted a discharge subject to a suspension for six months.

EAST AND WEST INDIA DOCKS COMPANY V. KIRK AND OTHERS.—(Before the Lord Chancellor and Lords Watson, Bramwell, Fitzgerald, and Macnaghten).—This was an appeal to the House of Lords from an order of the Court of Appeal affirming a judgment of the Divisional Court. It appeared that Messrs. Kirk and Randall, contractors, had, in June, 1882, entered into a contract to construct new docks at Tilbury, which involved a vast amount of excavation. The soil turned out to be different from what was expected, and the cost of executing the works was enormously increased. The sum now in question was said to amount to £335,000. A dispute having subsequently arisen between the parties, the matter was referred to an arbitrator, Sir Frederick Bramwell, who decided that as the excavating work under the contract had turned out to be wholly different from that for which the schedule of prices had been agreed upon, he had power to say what was the proper price to be allowed for it. An application was made to the Divisional Court to revoke the submission to arbitration on the ground that the arbitrator had received evidence which was not admissible, and had exceeded his jurisdiction; but the application was refused, and that decision was upheld by the Court of Appeal. The Lord Chancellor said their lordships were of opinion that the arbitrator should state, as part and on the face of his award, all the purposes for which he had received, and the effect of any which he had given, to five different classes of evidence specified in the paper handed in by Sir Henry James. If, therefore, before Tuesday morning Messrs. Kirk and Randall consented to an order being made to that effect, the rule would be discharged, without costs on either side. If such consent were not given within the above time, the rule for leave to revoke the submissions to arbitration herein would be made absolute. The Lord Chancellor announced on Tuesday that there had been forwarded to him the consent of Messrs. Kirk and Randall to the course proposed. The rule would be discharged without costs on either side.

IN RE ROBERT A. AND J. STEWART.—(Sittings in Bankruptcy, August 9, before Mr. Registrar Linklater.)—The debtors, who were timber merchants carrying on business in Fenn-court, City, as Stewart Brothers, and at St. John and Bathurst, New Brunswick, as R. and J. Stewart, applied to pass their examination. The statement of the joint affairs showed liabilities £389,817, of which £158,102 were entitled to rank against the estate, with assets estimated to realise £119,977. Mr. R. A. Stewart, the senior partner, who has arrived in this country from Canada, was examined, and stated that he was prepared to swear to the accuracy of the statements filed by his partner. The failure was attributable to losses on the trading during the last two years. A surplus of £46,400 had been lost, and there was a deficiency of £138,000. The debtors passed their examination.

EMPLOYERS' LIABILITY ACT.—On Friday, before a jury at the Clerkenwell County Court, a trial was concluded, in which Samuel Fairall, a carpenter, sued the American Exhibition Company, West Brompton, for damages for personal injuries sustained while in the employment of the defendants. The evidence for plaintiff was that on March 27 he was working with a number of other men constructing a bridge between the American Exhibition and Buffalo Bill's show. The work had to be done on a Sunday and at night, so as not to interfere with the traffic on the Metropolitan District Railway, whose line the bridge spanned. The plaintiff was acting under the orders of the two head carpenters of the defendants (Wingate and Evans). While standing upon the end of a 12in. plank he was struck by a beam which swerved on being hoisted, thrown on to the railway metals beneath, and received such injuries as to incapacitate him from further work as a carpenter. The defence was (1) that the plaintiff jumped off the plank; and (2) that he had received £5 in settlement of all claims he might have upon the defendants. The plaintiff alleged that the receipt for this £5 was obtained from him by a device. For defendants it was argued that the plaintiff could not claim, because, under the Lord's Day Observance Act, no contract to work on Sunday was valid. The Judge overruled this objection, and the jury gave the plaintiff £300 damages and costs.

GRINDING MONEY.—At the Hampstead Petty Sessions on Wednesday, Messrs. M'Cormick and Sons, builders, of Redington-road, Hampstead, were summoned by George Kirby, carpenter, for 1s. 6d. for two hours' "grinding money." Complainant deposed that he was a non-society man, and was in the employ of the defendants as a carpenter at 9d. an hour for ten days up to and including July 28. No complaint was made to him until that day, when at forty-five minutes past five p.m. defendants' foreman gave him notice that he should not require him after half-past six p.m. that night. He worked till half-past six, and was paid up to that time, but the foreman refused to pay him "grinding money." It had been the custon of the trade for twenty years to allow "grinding money," and he produced a copy of the rules upon the subject, agreed upon between the men and the Masters' Association. Charles Cross, builder, of Allcroft-road, Kentish Town, gave evidence that it was the custom of the trade to allow two hours' "grinding money" alike to society and non-society men. Defendant said his firm did not recognise these rules. They did not employ society people. These rules were made during a strike in the trade when they did not stop their works. All they did was to give a man one hour's notice; but if he was a good workman, and had done them justice, they did not object to pay "grinding money." Thomas Morgan, defendant's foreman, having given evidence, the Bench ordered payment of the 1s. 6d. claimed, with 12s. costs.

IN RE J. B. AXFORD.—The bankrupt, who was a builder carrying on business in Henry-street, Gray's Inn-road, and at Crouch-hill, applied for an order of discharge. The receiving order was made in March last, the liabilities being given at £3,546, and the trustee certified that the assets had produced the sum of £1,641. The bankrupt commenced business about 20 years since, and in 1874 he presented a petition for liquidation, and paid a composition of 5s. in the pound on liabilities amounting to £7,004. Again in 1879 he presented a petition when they amounted to £7,986, and a composition of 5s. in the pound was paid. He attributed his present failure mainly to losses on contracts, stated in the deficiency account at £1,100, and to depreciation in the value of plant and effects £1,025. The Official Receiver reported that the books did not sufficiently disclose the bankrupt's financial position from time to time, and the bankrupt stated in his examination that he took stock once only—namely, about three or four years before his present failure, and from that time he did not know how he was going on. Mr. Registrar Linklater on Wednesday suspended the bankrupt's order of discharge for twelve months.

Messrs. William Ramsey, jun., and Co., Argyll-street, Glasgow, have been awarded the gasfittings contract for the new municipal buildings, Glasgow. The contract is probably the largest of the kind ever yet placed in Scotland, as over eleven miles of piping will require to be laid.

WATER SUPPLY AND SANITARY MATTERS.

Deodorisation Works at the Metropolitan Sewage Outfalls.—In consequence of increasing complaints relative to the condition of the Thames, Sir Joseph Bazalgette, engineer of the Metropolitan Board of Works, has prepared a report upon the remedial works now in progress. It states that the process of precipitation experimentally tried at the sewage outfall for South London at Crossness will be put into full operation at the northern outfall, near Barking Creek, in August, 1888; Messrs. Mowlem and Co., contractors, having, in February last, undertaken the works for £406,000, and agreed, subject to a penalty of £300 per week, to complete them in eighteen months. The works consist of precipitation reservoirs or tanks, sludge-settling channels, engine and boiler houses, superintendent's house, and twelve workmen's cottages, pier and jetty for shipping the sludge, &c. There will be thirteeen precipitating tanks, into which the sewage will be conveyed in succession, and allowed to remain quiescent until the solids are deposited, when the effluent water will be run off into the river if the tide is favourable, or into the existing reservoir until the tide permits. The sludge will then be conducted into settling tanks and more of the liquid removed, to be mixed with lime-water to form the precipitating agent for future use, and the settled sludge will then pass through pipes to the pier-head, falling into ships and being carried away to sea. The works already executed are valued at £54,000, and the men now employed upon them number 1,500.

Hamilton Water Supply.—The Town Council of Hamiltcn, N.B., met on Thursday, the 4th inst., to consider reports submitted by Mr. W. R. Copland, C.E., to whom the question of the extension of the present waterworks had been referred, recommending the raising of the reservoir embankment 6ft., which, at an outlay of £3,800, would give additional storage capacity for 25,000,000 gallons of water. As an alternative scheme, he recommended the construction of a reservoir on Kype Water, Avondale, to be connected with the present works by means of a conduit. At an outlay of £22,000 it would afford a supply of 70,000,000 gallons; but Parliamentary powers would be required. The committee recommended that the heightening of the embankment of the reservoir be at once proceeded with.—The report was adopted.

Peterhead, N.B.—At a meeting of the Peterhead Police Commissioners on Monday a scheme for a new water supply was submitted. This is rendered necessary in consequence of the present supply having to be given to the harbour of refuge works and the convict prison. Messrs. Leslie and Reid, Edinburgh, submitted a report proposing to take water from the South Ugie, near Mill of Fedderat, some sixteen miles distant from Peterhead, at a level of about 285ft. The pipes would be laid alongside of the public road to Richmond, where there would be a reservoir at a level of 150ft. A main of 8in. diameter would deliver 300,000gals. in 24 hours. The cost of the scheme would be, for an 8in. main, £17,500; for a 9in. main, £19,000; and for a 12in. main £27,150, and the last would give 800,000gals. in 24 hours. The Commissioners remitted the report to the Water Committee for further consideration.

St. Helen's Water Supply.—At the meeting of the St. Helen's Town Council, held on the 3rd inst., the tender of R. Daglish and Co., of St. Helen's, was accepted for the erection of a compound rotative beam pumping engine, with boilers, pumps, &c. The engine is to be erected at their Kirkby pumping station. The works there consist of two 11ft. wells 150ft. deep, and a 24in. and 18in. bore-hole, which is at present a depth of 400ft. from the surface of the ground. The yield at this depth is so large that the whole of the plant of the well contractor (Mr. J. Villiers, of Beverley), pumping at the rate of 2,100,000 gallons per 24 hours, is unable to reduce the column of water in the well under 105ft.; there can scarcely be any doubt that the yield at present is at least from 3 to 3½ million gallons per 24 hours. The strata in which the work is being carried on is that of the pebble beds of the new red sandstone, and it is proposed to continue the boring to a depth of 500ft. from the surface. The engineer for the works is Mr. D. M. F. Gaskin, M.Inst.C.E., water engineer to the corporation.

Stafford Waterworks.—The town council of Stafford have met with an unexpected check in obtaining a supply from their deep boring on Enson Moor. As the boring proceeded to a depth of 900ft. the quantity of water gradually increased so as to yield 500,000 gallons per day of good water. Upon going a few feet deeper the quantity of water suddenly increased to nearly double the former yield, but on examination it was found that it was impregnated with salt. Inasmuch as the salt measures in the upper strata had been effectually excluded, the discovery of water being impregnated with salt at a depth of 900ft. occasioned the greatest surprise. The boring had been made through 430ft. of sandstone, and all geologists and engineers who had been consulted were of opinion that when the Bunter beds of the sandstone were reached an abundant supply of excellent water would be obtained for Stafford, as at other places, from the Bunter sandstone. The committee at once decided to consult Mr. de Rance, of the Geological Survey Department, before whom the matter was brought by the Local Government Board many months since, and he reports that the salt now met with in the lowest strata can easily be dealt with.

PARLIAMENTARY NOTES.

Northern Outfall Sewer.—Colonel Makins last week asked the Secretary of State for the Home Department whether it was true that the sluices of the northern outfall sewer had been opened daily from the 11th to the 28th of July inclusive for two or three hours before the tide turned; whether the effect of such premature opening of the sluices was that the sewage was sent up the stream and polluted the water at Woolwich and other places higher up; whether such pollution had caused much complaint as being dangerous to the health of the residents; and whether he would take steps to induce the Metropolitan Board of Works to discontinue the practice of opening the sluices before high water. Mr. Matthews: Yes, Sir, it is a fact that these sluices are being opened before the tide ceases to flow, and that accordingly a certain quantity of sewage goes up the river, thus causing much complaint. I am informed by the Metropolitan Board of Works that extensive works are being carried on at the northern outfall for the purpose of purifying the sewage, and in order to carry on this work with safety it is necessary to keep one of the four compartments of the reservoir empty, and to maintain the sewage in the other three compartments at a lower level. The reservoir space being thus restricted the sluices have for the present to be opened before the tide has ceased to flow. I am assured that the works are being actively pressed forward in order that the necessity for thus opening the sluices may terminate as soon as possible. I regret, on behalf of the inhabitants of the bank, that the necessity entailing such consequences should have arisen.

Compensation for Messrs. Leeming and Leeming.—Included in the Supplementary Estimate in connection with the Civil Services and Revenue Departments, issued on Monday, appears the item of £8,000 to Messrs. Leeming and Leeming "in full satisfaction of their claims upon Her Majesty's Government in connection with the preparations of plans for the erection of new offices for the Admiralty and War Departments."

The Salary of the Receiver of Crown Rents.—Mr. Molloy called attention on Monday to the sums paid to Mr. Clutton for the collection of Crown rents. As receiver of Crown rents, Mr. Clutton was paid £5 per cent., by which he obtained as much as £8,000 to £9,000 a year, whereas the whole of the work could be performed by an intelligent clerk at £200 or £300 a year. In addition to these emoluments Mr. Clutton was paid considerable sums for work done for the Ecclesiastical Commissioners, which never appeared in the votes at all. Mr. Jackson explained that the estates which Mr. Clutton managed represented 52,500 acres of land, scattered over 18 counties, many of them situated at a considerable distance from each other. They represented something like 1,850 holdings, exclusive of garden allotments and manorial tenants. It was Mr. Clutton's duty to visit the estates several times a year, and to advise as to the drainage and the management of the estates generally. For this service Mr. Clutton received a commission of 4 per cent. The rental on which Mr. Clutton received a commission amounted to about £80,000 a year. The hon. member spoke as though this commission was all net money to Mr. Clutton, whereas that gentleman, in order to discharge the duties which devolved upon him, had to keep up a large establishment and to employ a considerable number of clerks. Mr. Beadel said he had an intimate knowledge of Mr. Clutton's business, which rendered it necessary to keep a very superior staff of clerks. Mr. Jackson explained that when new buildings were erected Mr. Clutton received a fee for making the plans and superintending the progress of the works. Mr. Conybeare inquired whether it was not possible to get the work done for considerably less than £6,000 a year. Mr. Isaacs said the surveyor to the Woods and Forests had to maintain a very large establishment. He had to keep in his employment between 30 and 40 clerks, whose salaries were paid out of the £6,000. On a division, a motion to reduce the vote by £5,000 was rejected by 150 votes to 78.

The name of the architect appearing in connection with tenders for new Wesleyan Sunday-school, Newbury, last week was not Ball, but Bell.

Our Office Table.

We regret to announce the death of Mr. John Roddis, of Aston, which took place at his residence, at Aston-road North, on Wednesday week. Mr. Roddis was 48 years of age, and had been in a hopeless state of health for some months. It is stated that Mr. Roddis, whose work as a sculptor was largely in connection with church decoration, suffered considerable pecuniary loss in consequence of the ardour of his attachment to Liberal principles and his enthusiasm in their advocacy. The whole of the carving on the exterior of the Birmingham Art Gallery, with the exception of the pavement, was the work of Mr. Roddis. Much of the carving in the Goulburn Cathedral in South Australia is his, and at the time of his death he was executing a commission for the Christchurch Cathedral in New Zealand. He was the sculptor of the reredos in Wretham-road Church, of the carving in St. Augustine's Church, Edgbaston, and of the pulpit and font in St. Martin's. There are many other churches in Birmingham which are decorated with Mr. Roddis's work. Mr. Roddis executed the St. Augustine memorial erected by Lord Granville in the Isle of Thanet. Among the many monuments which were executed by him was the Earl of Derby's tomb at Knowsley. Mr. Roddis was one of the founders of the Midland Arts Club, and was its president in 1885. He was an occasional contributor to our own columns.

The firm of Wilcock and Co., Burmantofts, Leeds, manufacturers of faïence, pottery, glazed bricks, terracotta, &c., has been reconstituted under the Companies Acts, and will in future be carried on as Wilcock and Co., Limited. The share capital of the company is £100,000, and the debenture capital £50,000. Those interested in the business have taken up the whole of the present issue of share capital, and no shares will be issued to the public. The business, as heretofore, will be under the direction and management of Mr. Jas. Holroyd, and the other directors are Mr. Thos. Holroyd, Mr. E. E. Holroyd, and Mr. J. H. Hustler. As there is no break in the management of the business, no doubt that in the future, as in the past, the specialties of the firm will maintain the high artistic and technical excellence for which they deservedly have so high a reputation. Mr. Holroyd may be congratulated on the success which has so far attended his spirited efforts to establish and develop a higher standard of excellence in ceramic productions, making them not only utilitarian and practical, as they undoubtedly are, but also applicable to the highest and widest artistic expression of form and colour. No one has worked harder at this ideal than Mr. Holroyd, and it must be a satisfaction to him to know that his efforts are appreciated by the profession and by those of the public who understand that artistic expression and decoration does not consist in elaboration of ornament or a complication of "pretty colours," two common faults which have done much to condemn ceramic decoration as often carried out, and from which the Burmantofts productions are conspicuously free.

Two months ago we referred to the extraordinary decision made by the local board of Ventnor, to give the whole of their officers three months' notice to terminate their engagements, reduce the wages of all workmen and labourers by some shillings a week, and suspend the flushing of the sewers. They followed this so-called economy up by offering the offices to the clerk at £20 less per annum and the surveyor at £50 less; but the latter officer, Mr. R. S. Scott, who had served the board faithfully for eight years, obtained a better engagement at Bishop Stortford out of 114 candidates. The board then advertised the surveyorship, offering no less than £75 a-year—nearly 30s. a week—as salary, and obtained several replies. Three of the candidates were invited to come down to Ventnor, payment of expenses being promised, and a local man was also included in the short leet, and the four duly appeared before the board. The selected candidates were Mr. Robert Coates, Birmingham; Mr. Thomas C. Softhouse, Stroud; Mr. C. J. Howe, Barnstaple; Mr. G. E. Horton, Birmingham; and Mr. E. J. Harvey, Ventnor. As might have been anticipated, the local candi-

e was elected by a majority of 7 to 3, and the nywise members of the board then had the sfaction of voting from the money they re scrimpingly saved the ratepayers £15 as velling expenses to the gentlemen they had dlessly brought down for a few hours at the side from Birmingham, Stroud, and Barnple. It is unfortunate that the economists not be personally saddled with the money s thrown away.

THE tenth congress of the Sanitary Institute l be held at Bolton from the 20th to the 24th next month, under the presidency of Lord ing, better known as Mr. Sclater-Booth, sident of the Local Government Board in six years of the Beaconsfield Administra-. The Congress is divided into three tions—viz., Section I., Sanitary Science and ventive Medicine; Section II., Engineering Architecture; Section III., Chemistry, teorology, and Geology. Each section comnces on a separate day. The inaugural ress will be given by the president at the bert Hall at 8 p.m. on the first day, Tuesday, 20th inst., and on the following day the tings of the first section will be held in the wn Hall, being opened at 10.30 by an address Professor J. Russell Reynolds, F.R.S., the ers and discussions being continued on the lowing day. On Tuesday, the 22nd, Proor T. Hayter Lewis, F.S.A., will open the nd section with an address, and papers to followed by discussions will be read on ious subjects connected with engineering architecture on that and the following day. third section will meet on Friday, Dr. gust Dupré, F.R.S., in the chair; and on urday addresses will be delivered to the rking classes in the Albert Hall by Major nrock Flower, Dr. A. Wynter Blyth, and Henry Law, M.Inst.C.E. A health exhibiwill be held in connection with the conss in the Drill Hall, Silverwell-street, and l remain open from September 20 to ober 15.

THE Right Hon. Sir W. H. Gregory writes ngly protesting against the utter neglect the National Portrait Gallery by the vernment. This invaluable collection of traits was avowedly temporarily removed to hnal Green Museum from the sheds at South nsington until a new and safe permanent lding could be provided for them; but no ps have thus far been taken towards housing m in a safe gallery. The portraits are not preciated by visitors to Bethnal Green seum, which does not even afford them quate protection from snow and rain, and, Sir William points out the plea for delay on ground of economy is not now available, as re is no costly public building in progress present. The new Admiralty and War Office ns have been rejected; the National Gal- is finished. "It is not," he justly remarks, onomy to leave public buildings during a g period unfinished and unsightly, and to d into banishment and to a place where they ig unappreciated these national portraits lected with such unremitting care and outg. It would be just as rational and more nomical to lock them up in chests and osit them in some fireproof establishment. re would then be room at Bethnal-green for more popular exhibition of works of art." ing his long experience as a member of liament, Sir W. H. Gregory never remembers utcry being raised against the erection of lic buildings which were shown to be essary, although the House has expressed pproval of sites and of crude unsatisfactory hs. He doubts, indeed, whether a Governnt is likely to gain popularity or respect by ble parsimony.

THE report of the City and Guilds of London titute for the Advancement of Technical cation states that the ninth annual examions in technology were held in May and ne. A special feature of this year's examion is that 48 candidates were examined in e subjects, under the direction of the Inute, in New South Wales. Examinations e held in Sydney, Bathurst, and Newcastle. question papers were sent out to Sydney, the answers of these colonial candidates e forwarded to London, where they were mined, together with those of other candis, the date of the examination having been imed as to render the arrangement possible. The increase in the total number of candidates examined and of those who have passed is satisfactory. In 1886, 4,764 candidates were examined, of whom 2,627 passed; in 1887, 5,508 were examined, of whom 3,090 passed. The increase in the number of candidates in 1887 is 744, as against 796 in 1886. The chief increase was seen in the engineering and textile trades, plumbers' work, and carriage building. Mr. John Slater, in his report as Examiner in Brickwork and Masonry, states that the general average of the papers shows a decided improvement; and in the class of Mechanical Engineering Professor Hele-Shaw speaks in similar terms, while as to tools Mr. J. J. Holtzapffel says that the papers are superior to any hitherto sent in, and the drawings in some are to be commended.

A SMALL selection from the antiquities found by M. Naville when working for the Egypt Exploration Committee at Tel Basta, the site of Bubastis, and Tel-el-Yahudiyeh, the city of Onias, is now on view in the rooms of the Archæological Institute, Oxford Mansions, W. The exhibition will be open to subscribers to the fund and to members of the Institute and their friends on presentation of card, each Monday, Wednesday, and Friday, for the next fortnight. The exhibits in the collection on view include objects in porcelain and bronze, scarabs, sacred cats, and the like; a Canopic vase of a priest of Bast; a sculptured group fragment of a statue of Haker, a king of the 29th Egyptian dynasty, who was defeated by Artaxerxes, B.C. 393; all from Tel Basta. From Tel-el-Yahudiyeh, besides rosettes and tiles of well-known type, there are beads, objects in glass and porcelain, flint implements, scarabs, pottery, and some curious coffin heads of terracotta. Various prototypes of Greek pottery from Tel-el-Yahudiyeh, such as amphoræ, food-vessels, and bottles, are also shown.

ONE of the more generally interesting papers read before the British Medical Association at their Dublin meeting was that by Dr. Charles Moore Jessop on "Ancient Dress Compared with Modern in Relation to Disease." He remarked that the use of the "strophium," or broad breastband, by Roman ladies, the precursor of stays, introduced by the Normans, was condemned by writers in the Middle Ages as "a custom fertile in diseases and death," and stays were designated "whalebone prisons." In the time of the Georges, the evil effect of high-heeled shoes was altering the centre of gravity, which increased the strain upon the muscles, which could not without fatigue maintain the body erect, thus gradually reverting to the habit of tailless apes who walk on their toes. The fault of the present system was unequal distribution of clothing. The shoulders were the portion of the body to bear weight, and not the hips. The influence of stays on pulmonary diseases was not well made out; still, as there was a decrease of vital capacity, the way was paved for the inception of more serious disease. But of more consequence was the limitation of the heart's action. He showed its injurious effects also upon the liver, and its tendency to promote other diseases. By wearing stays the girl was not placed in the most favourable condition for maintaining healthy life. Much good would result, he thought, by adopting with modification the ancient dress, and the advantages would be most marked in the case of the working classes.

THE award of prizes and scholarships in connection with the permanent Educational Institution of the Crystal Palace (for ladies) has just been completed. The Committee of Artists, Mr. J. B. Burgess, A.R.A., and Mr. J. Seymour Lucas, A.R.A., bestow the silver medal for painting in oils on Miss Rosa Tapp, of Shortlands, and the certificate on Miss Frances Stevens, of Beckenham, both Mr. Goodall's pupils; as was also Miss Florence Wilson, of Alford, Lincolnshire, who took the certificate for painting (landscape) in water-colours. Miss Harriett M. Bennett, of Forest-hill, gained the silver medal for painting in water-colours from the living model, and her sister Miss Kate Bennett, the certificate, both pupils of Mr. John Parker, R.W.S. The medal for drawing from the life was adjudged to Miss Mary Leveson, of Anerley, and the certificate for drawing from the antique to Miss Ilma Chadwick, of Sydenham, both pupils of Mr. Wensley Russell. The judges awarded the scholarship in art to Miss Kate Bennett.

A MEETING of the Darlaston Local Board was held on Friday for the purpose of accepting one of the thirteen tenders sent in for the erection of the Public Buildings. The lowest tender of all was not dealt with, and the two before the meeting for choice were Mr. J. Guest, Brettle-lane, £5,268 7s. 4d., and Mr. T. Tildesley, Willenhall, £5,296. Ultimately the latter was accepted. £2,046 was in respect of the Town Hall, and £3,250 in respect of the public offices, free library, caretaker's house, and boundary walls. The *Staffordshire Advertiser* remarks that "the tenders furnish a striking proof both of the accuracy of the architect's estimate of cost and of the closeness with which the matter has been gone into by the competing builders. Mr. Cossins' estimate was that the cost would not exceed £5,500, and out of 13 tenders sent in seven were below the amount, the figures ranging from £5,235 to £5,474, and six were above it. One of these was wide of the mark—viz, £6,301 (more than £1,000 above the three lowest), and the other five ranged from £5,559 to £5,844. The difference between the highest and lowest of the 12 was, therefore, only £609."

A COLLECTION of Babylonian antiquities of considerable interest is at the present time in the hands of a private collector in this country. The collection, says the *Times*, consists of a series of about 300 inscribed terracotta tablets relating to the revenues and tithes of one of the most ancient of the Babylonian temples. In 1880, Mr. Hormuzd Rassam, when engaged on the works of exploration in Babylonia on behalf of the trustees of the British Museum, discovered, about thirty miles from Bagdad, the site of the ancient city of Sippara, one of the chief centres of the religious life of Chaldea, in which was a great temple dedicated to the Sun-god. On the return of Mr. Rassam to England, native overseers were retained on the site for a short time, but were last year removed. No sooner were these men withdrawn than Arab antiquity-hunters from Bagdad commenced their irregular diggings on the site, and the collection which has just reached this country was thus obtained. The majority of the tablets relate to the collection of the revenues of the temple, which were derived from tithes and dues imposed on corn and dates, as well as contributions from pious donors. The new collection of tablets affords very clear indications of the wealth of the land of Chaldea in the seventh and sixth centuries before the Christian era. The names of the payers are entered in full, and sometimes the name of the father and the trade are given. The amount is entered in ruled columns, and separate payments in other columns, the total being given at the foot, and the whole sometimes countersigned by witnesses. Some of these tablets are of great historical value as connecting links in the chain of documents on which Babylonian and Assyrian chronology are based, for every one of them is dated in the month, day, and regnal year of the king's reign when the transaction took place.

The Rev. J. F. Kitto, in a further letter on the proposal to set back the steps of St. Martin-in-the-Fields Church, urges that the discussion has shown that no necessity can be shown to exist on the ground of public convenience, so far as the present is concerned, and that if anything is needed to be done the improvement can wait until the National Gallery is dealt with. If, however, it is thought that something ought to be done at once, he suggests that by carrying down the steps in one continuous flight on the east, on St. Martin's side, and by the sacrifice of the unused steps on the National Gallery side, as much space will be gained as by the alteration which the Board proposes. It seems to Mr. Kitto, therefore, that it would be impossible, until a very much stronger case had been made out, for the vicar and churchwardens to give their approval to the present proposal.

A substantial improvement is being made to the external appearance of St. Silas' Church, Lozells, Birmingham, an edifice erected in 1852, by the rebuilding of the boundary wall and the addition of porches. Mr. C. J. Dunn, of Birmingham, is the architect for the work, of which a memorial stone was laid on Monday.

Herr Heinrich Hartmann, architect, formerly of Bremer, died on Tuesday at his residence, Bremer Lodge, Blackheath Park, S.E., aged 73.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Architectural Association. Visit to the seat of Mr. B. W. Currie, near Farnborough, the late Mr. G. Devey, and Mr. Jas. Williams, architects.

CHIPS.

Two memorial-stones of a new Wesleyan chapel were laid at Queensbury, near Halifax, on Saturday. The building is being erected from the designs of Messrs. Utley and Grey, of Halifax, at the cost of £1,200.

The memorial-stone of the new building for the Ladies' College in Jersey was laid at Rouge Bouillon last week. It will contain on ground floor a dining hall and assembly room, together 100ft. in length, and capable of being thrown into one, and classrooms; and on the first floor are sitting rooms and bedrooms, with thirty cubicles for boarders in the second story. Mr. Curry, of Halkett-place, Jersey, is the architect, and the contractors are Messrs. Cuzner, Woodsford, and Harris. The cost will be £5,000.

At present workmen are busy putting a new roof on the transept of the Abbey Church at Hexham, and an axe, probably of the 15th century, has been found in one of the gutters of the roof of the north transept. The handle, which is of iron, has a crook at the end, while the head has been welded into the handle. The Scots under Sir William Wallace in 1296 destroyed the nave of the church and some of the monastic buildings, and left the transepts roofless. They remained some two centuries in that condition, until Prior Leschman in the 15th century repaired the buildings and put on new roofs, and it is believed that this axe had been left where found by a workman engaged in that work.

The completion of Sir John Coode's scheme for the protection of the foreshore at Hastings by means of two stone groynes and an extended breastwork at the east end of the town, was celebrated on Wednesday. The acting mayor laid the final stone, and so practically ended the undertaking. The total cost of the work thus terminated has been some £30,000. The total length of the breastwork and larger groyne is close upon 1,000ft. The beneficial effect of the new structure is already, it is said, being realised. Sir John Coode remarked that the beach was accumulating at the rate of some 40,000 to 50,000 tons per annum.

At a meeting on Tuesday of the Aberdeen Royal Infirmary directors, it was reported that Messrs. Snell and Son and Messrs. Smith and Kelly, the architects, were making steady progress with the plans of the hospital extension.

A correspondent complains that permission to sketch in the recently-restored church of St. Bartholomew, Smithfield, is refused by the churchwardens except on payment to the restoration fund of the prohibitory charge of one guinea by each sketcher. The churchwardens have written, admitting that they have agreed to make "a modest charge, commensurate with the position of the applicant and in the form of a subscription to our funds, to persons desirous of sketching," the moderate charge being given, it seems, a range of from five shillings to a guinea, according to the apparent squeezability of the would-be sketcher.

Memorial stones of a new Baptist schoolroom were laid at Orpington, Kent, last week. The building is being erected at a cost of £1,000, from plans by Mr. G. St. Pierre Harris, of London and Orpington. Mr. Knight is the contractor.

A memorial stone was laid at North Mymms, Herts, on Monday week, of a new Church boys' school. Mr. John Bates, of Walham-green, was the architect, and Mr. J. Curnow the contractor.

Holy Trinity Church, Southampton, was re-opened on the 4th inst., after having been redecorated and renovated internally—a work carried out by Mr. C. Vaughan, of that town.

The Teddington Local Board have accepted a tender for the construction of a bridge over the river Thames within their district, and it is expected that the work will be proceeded with immediately. The sanction of the Thames Conservators has been obtained to the erection of a bridge, and the plans have been approved by the Local Government Board.

A new highway bridge is in course of construction at Thurso, for the Police Commissioners of that town. Messrs. Gordon and McBey are the engineers, and the cost will be about £4,000.

The foundation-stone of the new parish church of St. Mary, Kingston, Portsmouth, was laid by the Crown Princess of Germany, on Tuesday. The new fabric, of which Mr. A. W. Blomfield is the architect, will occupy the site of the old church of St. Mary's. The total expenditure will not fall short of £40,000, of which three-fourths are in hand.

Trade News.

WAGES MOVEMENTS.

EDINBURGH JOINERS.—A largely-attended meeting of the Edinburgh joiner trade was held on Monday night in the Good Templar Hall Buildings, High-street, "to hear employers' reply to circular of 13th July, and decide as to further action." At a recent meeting the men resolved to request from the employers an advance of ½d. per hour on the present rate of wages, which is 6½d. an hour. Some of the employers were favourable to granting the advance; others would do so if the movement were general. The following motion was unanimously agreed to:—"That this meeting, having heard with satisfaction a favourable reply from a number of employers, resolves to push the demand, and to request an immediate answer from those who have not already replied." It was further resolved "that said increase should come into force on Friday, the 12th curt." It is expected that an amicable settlement will be made.

The Free Church at Newington, Edinburgh, is about to be restored and renovated from plans by Messrs. Shiells and Thomson, of George-street, Edinburgh. The works will include re-seating, reglazing, and decoration.

At the half-yearly meeting of the Forth Bridge Railway Company, held in Edinbugh on Tuesday, the report stated that the piers and girders of the north and south viaducts were completed, and that at South Queensferry and Fife the steel columns, with their connections and bracing had been carried to their full height of 370ft., while at Inchgarvie, the columns were up 283ft. above the ea level.

The guardians of the Strand Union were informed on Tuesday that the Duke of Bedford, being about to carry out important improvements at the Fruit Market, Covent-garden, would require the Board's offices on the side of Bow-street adjoining the Floral Hall, for the purpose of the construction of a new street. The matter was referred to the Board's surveyor.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Shop Fitter, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

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HYATT'S LENS and "SEMI-PRISM" LIGHTS for PAVEMENTS, STALLBOARDS, ROOFS, &c. TILE and GLASS LIGHTS in beautiful designs.—THADDEUS HYATT, Manufacturer, 9, Farringdon-road, London, E.C.

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FARLEIGH DOWN, CORSHAM DOWN, BOX GROUND, COMBE DOWN, WESTWOOD GROUND. STOKE GROUND.
RANDELL, SAUNDERS, & CO., LD.,
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PICTOR'S MONKS' PARK. CORSHAM DOWN. BOX GROUND. FARLEIGH DOWN. COMBE DOWN. STOKE GROUND. WINSLEY GROUND. WESTWOOD
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THE CHELYNCH STONE.—This Stone from these Quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable Stones in England.
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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ASTON, BIRMINGHAM.—For additions to the workhouse buildings, including the erection of new laundry, alteration to the bakehouse, and two new pavilions; also for alterations and additions to the present relief office at Vauxhall; according to plans and specifications prepared by Messrs. Dunn and Hipkiss, Waterloo-street, Birmingham:—

Moffatt, J., Camp Hill	£16,291 0 0
Surman, S.	16,180 0 0
Webb, W. J.	15,776 0 0
Mallin, J., West Bromwich ...	15,743 0 0
Sapcote, W., and Sons	15,352 0 0
Bloore, W., Aston	15,280 0 0
Bissell, W., and Sons	14,985 0 0
Harley, J., and Son, Smethwick...	14,975 0 0
Wilson and Son, Handsworth ...	14,971 0 0
Smith, J., and Son...	14,958 0 0
Jeffrey and Son	14,890 0 0
Robinson, W...	14,763 0 0
Taylor, S.	14,705 0 0
Rowbotham, T.	14,695 0 0
Garlick, J., London	14,490 0 0
Barnsley, J., and Sons	14,314 0 0
Barker and Son, Handsworth ...	14,200 0 0
Hughes, T., Handsworth	13,955 0 0
Willcock, H., Wolverhampton*...	13,477 0 0

* Accepted. Rest of Birmingham.

ASHFORD, KENT.—For new shop-front and repairs, 34 High-street, for Mr. N. Hayward. Mr. H. J. Jeffery architect. By invitation:—

Knock, H.	£110 0 0
Baker, W.	98 10 0
Howland Bros. (accepted)	95 0 0

For plumbing, painting, and glazing:—

Everest, F.	132 16 0
Bowles, W.	71 5 0
Masters, W. (accepted)	62 0 0

All of Ashford.

BARTON, LANCS.—For the decoration of the interior of the Town Hall, for the local board:—

Lomax and Sons (accepted)	£70 0 0

ASHTON-UNDER-LYNE.—For alterations to warehouse, for Mr. W. Brown. Mr. J. H. Burton, Ashton-under-Lyne architect:—

Booth, R. H., Stalybridge	£385 8 10
Marland and Myles	377 12 7
Robinson, J.	333 15 0
Holmes, A.	313 19 6
Castle Hall Saw Mills Co., Stalybridge	313 15 0
Suddaby, T.	309 19 6
Marsden, A.	304 10 0
Williamson, J. W. (accepted) ...	301 14 6
Dean, T.	294 11 9

Rest of Ashton-under-Lyne.

AUDENSHAW.—For laying a 24in. by 16in. brick culvert and 12in. earthenware pipe sewer in Audenshaw-road, from near the L. and N.W. Railway bridge to Trail Dog bridge, for the Audenshaw Local Board. Mr. J. H. Burton, Ashton-under-Lyne, surveyor:—

Mountain, W., Salford	£816 12 8
Marland and Myles	555 12 6
Worthington & Pownall, Manchester	546 16 0
Charlesworth, J.	490 0 0
Walmsley, C., Audenshaw	475 15 4
Irwin, R. (accepted)	395 10 0

(Surveyor's estimate £454 18s. 4d.)

For laying 12in. earthenware pipe from Cross Gate to the L. and N.W. Railway Bridge:—

Mountain, W., Salford	270 0 0
Charlesworth, J.	242 10 0
Marland and Myles	222 12 9
Worthington & Pownall Manchester	191 3 0
Walmsley, C Audenshaw	170 0 6
Irwin, R. (accepted)	150 0 0

(Surveyor's estimate £208 15s. 0d.)

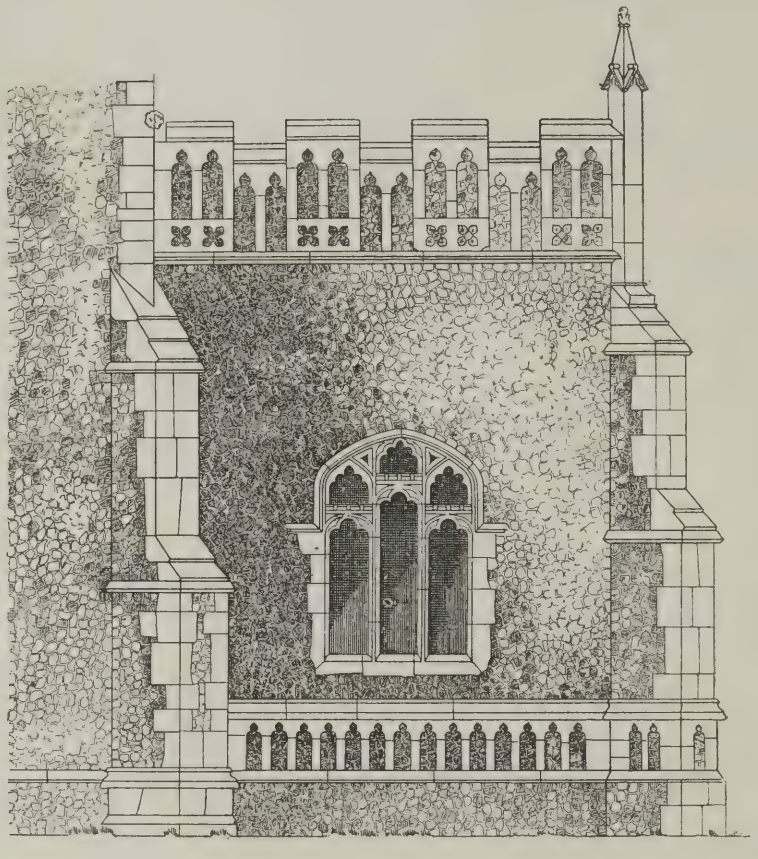
Rest of Ashton-under-Lyne.

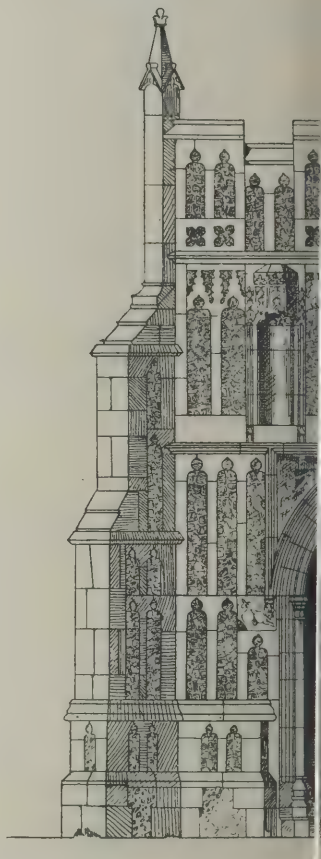
BOURNEMOUTH.—For alterations and extensions to the Central Hotel, Bournemouth, for the proprietor. Messrs. Lawson and Donkin, Bournemouth, architects:—

Howell and Son, Bristol	£1,890 0 0
Hoare, W.	1,877 0 0
Jenkins and Son	1,825 0 0
McWilliam and Son...	1,755 0 0
Barrow and Entwisle	1,648 0 0
Walden, F.	1 550 0 0
Brown, S.	1,536 0 0
Lucas and Cosser (accepted) ...	1,480 0 0

Saint Margarets Church Ips

Details of The Porch

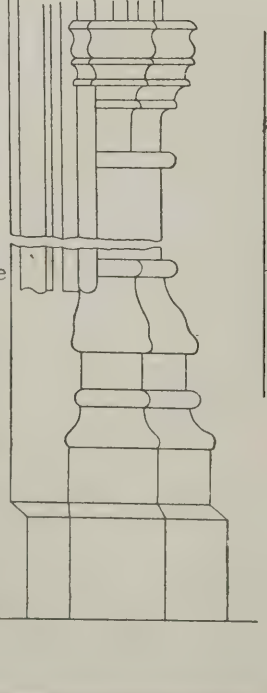


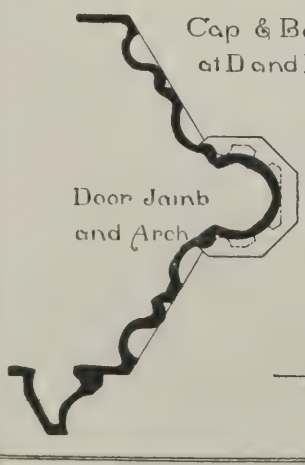


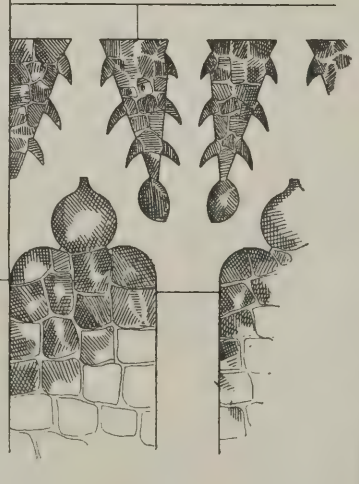
Side Elevation

Fron

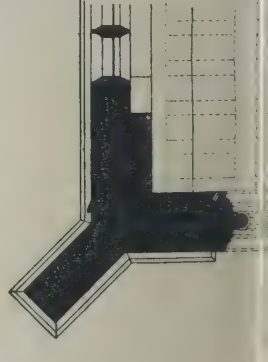








Flint Panelling
between Niches





Gargoy

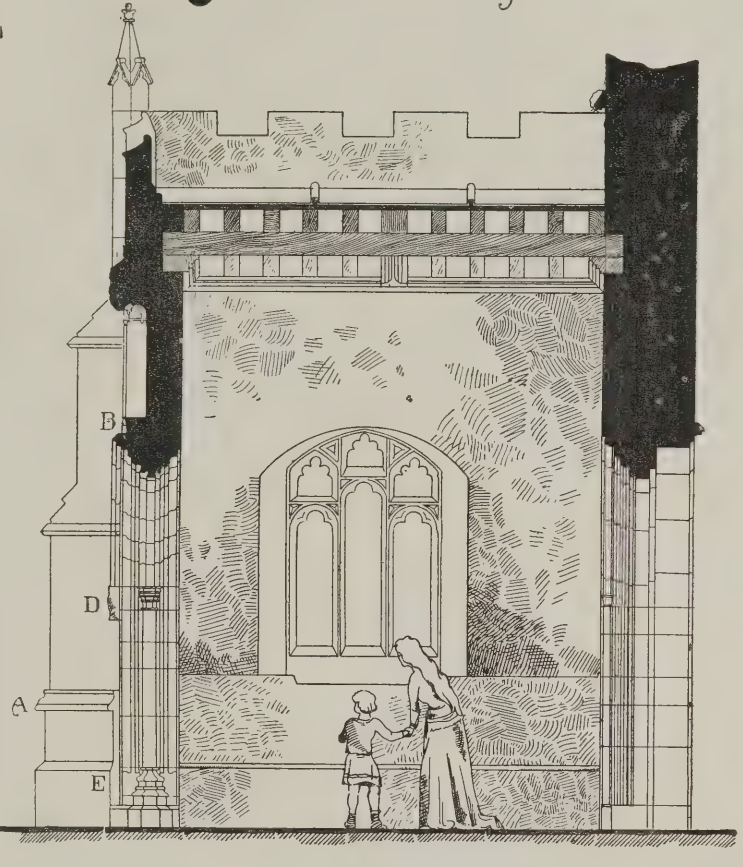
ICH

All stone joints are taken from actual measurement



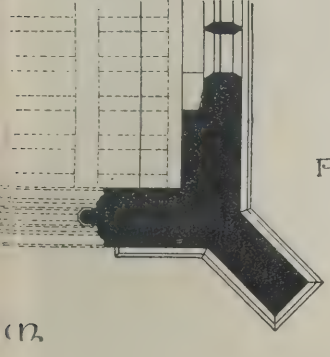
Wood mouldings to Roof





Section

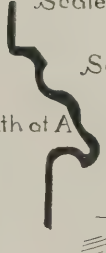
Elevation



Scale of ——— feet

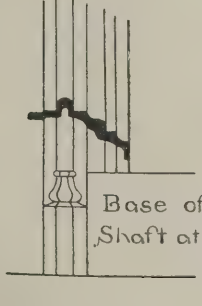
Scale of ——— feet

Scale for Mouldings and Carvings

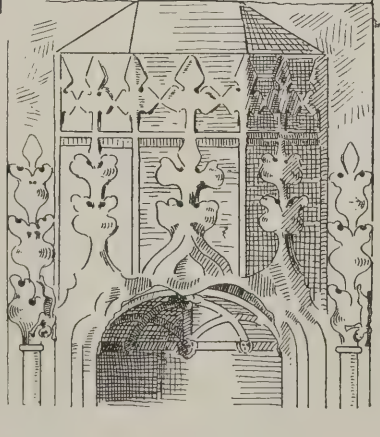


Plinth at A

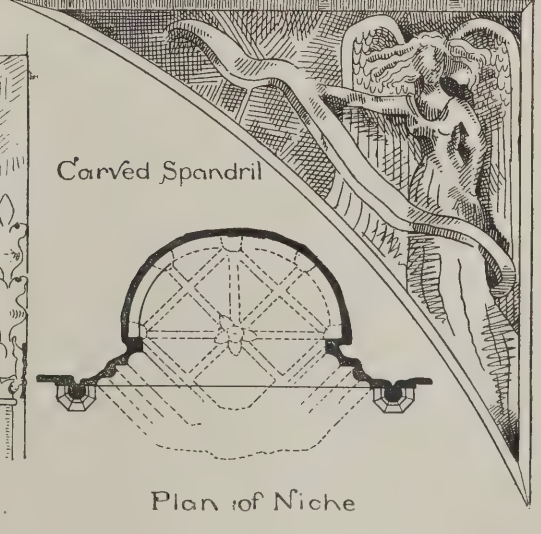




Base of Shaft at B



Canopy



Carved Spandril

Plan of Niche

SILVER MEDAL · DRAWINGS · BY · PERCY · ADAMS

THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1702.
FRIDAY, AUGUST 19, 1887.

MASS AND DETAIL.

[N the eyes of the lay public a work of architecture is regarded in different ways, ccording to the faculty for observation or he cultivation and taste of the beholder. A erson with very little taste and knowledge f architecture and buildings looks at the nagnitude and general mass of a building; utline and grouping of the parts do not ffect him very much, though we find in this lass of persons a strange weakness to admire ny elaborate ornament and detail of whatver kind it may be, or however good or bad. he artistic qualities go for nothing. An xecrable house with a porch, perhaps with an rnamental barge-board gable, supported on orinthian columns—a suburban hybrid not t all uncommon—"goes down" with such one. It is "tasty," "pretty,"—that is nough; style, the laws or rules of design, re disregarded simply because they are not nderstood. Ill-placed and fulsome ornaent is a popular accompaniment, and the ore of it the better it pleases. We do not say ll uneducated people judge of a building in is way, for they are not all so entirely bereft f discrimination or taste, which is to a certin degree natural; but it will be found enerally that magnitude, balanced exteriors, id ornament invariably attract the crowd. façade with a portico, wings, and dome ill overawe, even if the proportions are bad; church with a lofty spire will do the same, owever poor the disposition and details. is wonderful, too, how strong the force association goes with people of this sort. here are many within our knowledge who nnot admire a church unless it has a spire: ne with a tower and simple lantern or low oof, or saddle-back termination, is thought achurch-like, and is not admired. So, too, ere are people who think all fine buildings ust be of stone, and they cannot bring themlves to admire a brick church, however good may be. This power of associating buildgs of certain kinds with distinct features id materials has, by a process of hereditary w, become so strong that everybody, ltivated or not, but chiefly the uncultivated, s a tendency to judge of works according an ideal acquired in his own limited here of observation. The dome, the urch spire, stone walls have been impressed om infancy on the mind, and with them also rtain forms associated buildings and proporons, from which it is impossible for the class are speaking of to tear themselves. Any parture from the conventional form, or e employment of a new material is looked on with disfavour. A new style is popular till the public have learned to see good points and to acquire a taste for it. becomes fashionable by being repeated.

Much in the same manner the mass of a ilding strikes the uninitiated eye before it comprehend detail and ornament. The o things are hopelessly related in the mind the ordinary spectator—that is, he cannot cover any relation between the two, and at he admires may be egregiously faulty. S in music: in a great performance the oruses are first appreciated by the general blic; the finer parts of the composition or strumentation can only be estimated by th few. As the chorus in the operas of yerbeer or Wagner represents a simultaeous movement of a multitude, or the otorio chorus that of the sentiment of a ultitude, so mass in architecture represents th simultaneous expression of the several rts of the building. The finer vocal and instrumental portions of a great concert, the emotional qualities of touch, cadence, and timbre perform the part of the details of a work of architecture, and their delicacy and technical execution can only be estimated by the musician.

The relation between mass and detail or ornament is one of the points which can be only fully appreciated by the competent artist. An ordinary observer looks at both indifferently. If the ornament pleases him by its lavishness, the building is beautiful; if by its absence or severity, it is declared dull and heavy. One French writer observes: "The masses hold the same place in the arts as general ideas in literature." So true is this that a book or an essay without an idea is unsuccessful. But as the mass grows out of the plan, the plan is the leading idea in architecture. It controls the distribution of mass and the outline—two things of the utmost importance in good architecture. Under the "Lamp of Power," Mr. Ruskin divides buildings into those whose interest is in their *walls*, and those whose interest is in the *lines* dividing their walls. In Romanesque and Egyptian works the wall is a confessed and honoured member; in the Perpendicular Gothic, called "our detestable Perpendicular," the eye is kept altogether on the lines. Ruskin's admonitions on the subject are so full of value that we may refer to them further. He says, speaking of positive shade as a sublime thing in an architect's hands, "So that Rembrandtism is a noble manner in architecture, though a false one in painting, and I do not believe that ever any building was truly great unless it had mighty masses, vigorous and deep, of shadow mingled with its surface. And among the first habits that a young architect should learn is that of thinking in shadow, not looking at a design in its miserable liny skeleton." Never were truer words uttered when we find the surface and shadow both reduced or sought to be minimised, and when architects are so fond of producing liny designs. Partly the fault is due to the practice of designing in lines or expressing form in this manner, instead of in solids or by tint. The architect cannot do better than follow the injunction of Ruskin: "Do but design with the owl's eyes first, and you will gain the falcon's afterwards."

No sounder advice to the architect than to sketch out his plan and arrange his masses in the rough. Is it not the mass of Peterborough, of Ely, and of the west front of Wells that makes these cathedrals even more striking as we approach them than other edifices in which the masses are less marked? The great western towers of Durham, of Wells, and Lincoln, present more power than the more frittered fronts of Winchester, Lichfield, and Salisbury, fine though they are. It was the value of mass that prompted the Norman and Mediæval architect to pronounce his building by three towers, the central being greater and higher. The imposing mass of the great western fronts like those of Peterborough and Wells—French in their idea—has rendered them objects of interest; they are not mere screens filled with sculpture, like the west front of Salisbury. To be truly massive there must be three dimensions—breadth and depth, as well as height, though the latter is least important of the three. St. Paul's Cathedral and the Houses of Parliament are other examples of grandeur in masses. Take the view of St. Paul's from Ludgate or Cannon-street, and the Houses of Parliament from any point bringing into view the Victoria Tower, and its greater sub-divisions of the river front. There is the mass in its entirety and in its sub-divisions; there may be mass without subdivision—then we call the effect lumpy. What would Peterborough front be without its grand arcade and recessed part in shadow, or Wells without its angle buttresses, its sculpture, and lancet arches? The Romanesque and Norman architects, in fact, had a greater sense of mass and proportion than those of any subsequent periods, when detail began to usurp its place.

Detail may be excessive; it may be weak, inappropriate, or coarse and vulgar. In the hands of an incompetent architect it generally fails from all of these. In the first place, like the literary critics of whom Pope writes the couplet—

> "Most critics, fond of some subservient art,
> Still make the whole depend upon a part,"

they think it looks learned to fill every wall space with details or windows. They indulge in panelling and tracery, shafts, and other ornamentation, not for the sake of relieving a blank wall here and there, but for the avowed purpose of getting rid of every piece of wall surface and plainness in the building. These designers have not the moderation or courage of the true artist in discerning that it is plainness and breadth that gives value to the detail, or that "modest plainness sets off sprightly wit." They must have ornament at any cost, and the effect is crowded or overloaded. Many of our architects fall victims to this prevailing habit; it is an oft-repeated offence of literary men, of orators, and artists. Whatever is excessive becomes weak, and weakness is the prevalent fault of excessive ornamentation. Excess begets mechanical repetition. Ruskin says, "Wherever you can rest, there decorate." The maxim is logical, though it may be carried out so far as to sacrifice breadth in wall surfaces. An arch, on the contrary, is hardly a place of rest, yet it is here the old architect showed his exuberance of ornament; the Mediæval porch, for example, was full of sculptural decoration. The eye rests certainly more at a porch than a wall. We pass by a wall, the attention is drawn to windows and doors, to the reredos, and altar, and pulpit; hence we can explain appropriateness of decoration by asserting that at every salient feature or object that arrests the eye we can decorate. The practice of the best architects has followed this principle. The mistake seems to be in confounding relief and rest. Relief is relative; there can be no relief in a blank wall, neither is there in one covered with ornament. The eye requires a relief in plainness after scanning a large expanse of elaborate ornament, as it seeks relief in ornament after blankness. There must be plainness to create ornament, and *vice versâ*; it is quite a relative thing in art; but it seems to be one of the hardest things to understand by most people—decorators included. They think that decoration is not complete if every foot of plain surface is not covered with some kind of ornament. If it is a room with pilasters at intervals, they are not spared; the owner or decorative artist thinks they ought to be covered with stencilled ornament or otherwise. If there is a moulding or cornice above decorated panelling, it too must have enrichments, the idea being that every inch of plain surface ought to be decorated—a mistake into which architects and ornamentists have fallen. What is appropriate and what not, is a question that can only be solved by the practised artist. Only a cultivated taste, a careful study of treatment of materials, and of the anatomy and structure of ornament can suffice to answer the question. Principles and textbooks are numerous enough, if only thought were given to place ornament in the right places and select the kind most suitable for the purpose. The greatest bane of those who use ornament for the purpose of captivating the fancy is the choice of natural types. Who can imagine anything more repugnant to common sense and good taste than to the florid scrolls and stem-like ornament indicating growth, incised or carved up pillars, or along window lintels of houses? Yet this sort of thing is tolerated

under the sanction of architects. The last fault of those who delight in detail is coarseness and vulgarity. It affects not only ornament, but tracery, mouldings, carving, glass painting, and metal-work. We notice it in heavy cornices, with clumsy mouldings, crowded enrichments, large, heavily carved capitals, keystones and strings, exuberant trusses and bosses. Details of this kind with some architects are a question of labour and price. The contract price is low, but the work has to be done, and the architect has to cut his details accordingly. Coarse mouldings of twice the size and boldness they ought to be are introduced in stonework or wood carving where small delicate members are required to give scale to the other details. Thus we may see in scores of churches erected under contract, heavy mouldings to woodwork and arcades, and clumsy capitals where we look for delicate carving. The furniture, pulpits, and fonts are coarse, the mouldings and carving clumsy.

Looking at the old work and at the modern by masters of design, we notice one principle which runs through the details, and that is proportion and gradation. The height and position of every feature is considered in the general proportions and mouldings; the higher they are, the less minute the detail; the closer to the eye, the more elaborate and numerous the members. One other distinction is found in good work: the details and mouldings are designed with reference to structural or decorative requirements, by which rule the smaller and more delicate mouldings are reserved for features of an ornamental character. These distinctions and gradations are peculiar only to the work of our leading architects. In the larger number of buildings we see they are unobserved; details are regarded as such, and thought unworthy of serious attention and study. They are "only details," and are left to the contractor or clerk of works. But it is in the finer lineaments as well as in the greater mass that the true artist is found. He works from the plan and great masses downwards to the smallest detail of the structure, and the least has as much attention bestowed upon it as the larger feature. And nowhere is this attention seen more than in the mouldings: the uncultivated builder sees little in them, the scholarly artist makes them a subtle and expressive language of his own.

SAFEGUARD AGAINST FIRE.

THE two disastrous fires which have occurred in London—one at Whiteley's, in Queen's-road, Bayswater, and the other in Gerard-street, Soho—have come as dearly-bought experiences of the necessity of attending to methods of construction that, till comparatively recent years, found little favour among architects. The iron and fireproof craze was of short duration. Capt. Shaw and others experienced in fires have condemned the construction in which iron plays an important part. As an exposed skeleton of metal, nothing has been proved more dangerous than girders and columns in large interiors, and yet builders, and architects, too, are still found employing iron, as being lighter and more economical than timber in warehouses and factories. At the great block of buildings destroyed in Queen's-road, it appears that the ordinary "fireproof" construction was used in the upper floors, but without any appreciable effect in saving the building, and that only in the basements at the corner of Queen's-road and Douglas-place and the floors of certain external courts where the "Dennett" arching was introduced, was the fire to a great extent controlled or cut off. The fire is reported to have raged fiercely in this part of the premises. Thus the provision department, forming a large block, 160ft. long by 35ft. wide, which had its ground-floor constructed of the "Dennett arching," was completely destroyed, except the basement, the upper floor of which was strong and impregnable enough to resist the shock of falling masonry, and was covered over several feet in depth with the fallen superstructure and *débris*.

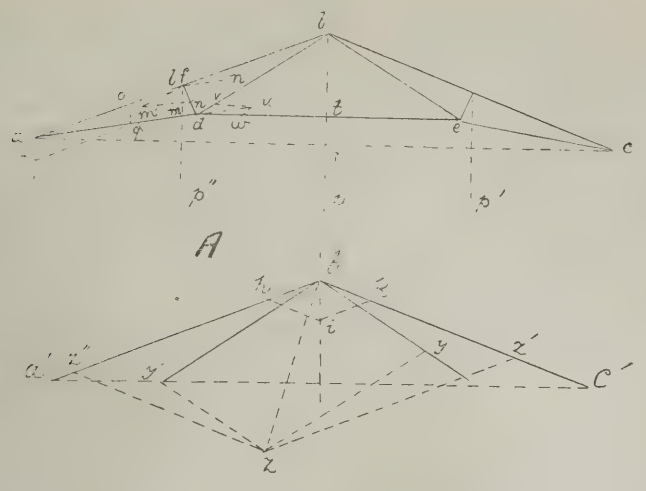
We refer the reader to the description of the ruins which appeared in our last issue, in which the writer records another instance of the strength of this arched system to resist not only fire, but falling brickwork of many tons in weight. We know what has happened above these floors: the whole of the interior is burnt out, though ordinary fireproof floors and roofs existed in the large blocks of shops; girders are twisted into inconceivable shapes where visible. We have here, therefore, conclusive evidence of the unreliability of ordinary iron construction when unprotected from the flames. Stronger proof also cannot be wanted of the value of solid as against hollow construction. The solution of the whole problem of fire-resisting construction appears to be simply to subdivide the building horizontally and vertically with materials and construction that will resist intense heat and flame as well as water, and that will form solid, impervious barriers to the flames. There is only one kind of material and construction that has been proved to answer the purpose—namely, concrete strengthened by iron; and the "Dennett arch" seems to satisfy the conditions very efficiently.

An equally important and closely-allied question has been raised by the disaster in Soho, which the architect is specially called upon to consider. An awful loss of life has been narrowly escaped by sheer promptness of action on the part of the constable who, discovering that the premises were on fire, raised the alarm, and actually dragged the sleeping inmates from the burning tenements. It was a case of speedy deliverance through mere accident. Thirty people were fast asleep in the upper part of the premises, every one of whom would have fallen a victim to the fire, had not a constable's attention been directed to the glaring light through one of the doorways of the houses in the nick of time. A few minutes later, and they must have all perished. What was averted happily at Macclesfield House is likely to happen to hundreds of houses similarly constructed and occupied. The said house is described as having originally consisted of two separate dwellings. The lower portion was occupied by a maker of lamps, a quantity of oil having been stored in the ground floor; the upper floors were let to tenants, no less than twenty-six rooms being so let, but without efficient means of escape. How many premises, may we inquire, occupied as shops below, are not let out in precisely the same manner, with often more than one tenant to a single room, perhaps a whole family? In such houses there is usually found only one side entrance, when it is not through the shop itself. There are three or four stories above the shop, and if each floor contains three rooms, there might be accommodated in each house eight or nine single persons or as many families. Taking one of the average houses in the class of neighbourhood to which we refer, the side passage, often dark and narrow, traverses the full depth of the shop, and a single flight of stairs is taken up behind it at right angles to the passage till it clears the shop ceiling, to a landing or second staircase on the first floor, which is partitioned off by wooden partitions from the several upper floors. If we imagine fire to break out in the shop, the back stairs, if not the side passage, may be involved, directly cutting off escape from the floors above, while there is imminent danger to the upper stairs and landings, which are necessarily constructed of wood. Very few ordinary shop premises have better provision, and what makes matters worse, the partitio
are generally of wood. We have here
source of great danger in towns. There
no legislation to prevent the occupier
premises from letting the upper part of h
house to tenants, though the house has be
planned as a single dwelling-house, wi
only one means of entrance and exit. Th
Metropolitan Building Acts do not pr
vide against parcelling off the interior in
any number of rooms; the only section bea
ing on the subject is Section XXII. of th
Metropolis Management and Building Ac
Amendment Act, 1882, which states: "I
every public building, and in every oth
building containing more than 125,000 cub
feet, and used as a dwelling-house for sep
rate families, the floors of the lobbies, co
ridors, passages, and landings, and also th
flights of stairs, shall be of stone or oth
fireproof material." This section was clear
framed to meet the class of premises
which we refer, but is practically a dea
letter for houses of the ordinary kind let
shops: very few of such premises would co
tain so large a cubic capacity as 125,000f
An ordinary four-storied house and sho
would not contain more than 40,000 to 50,0
cubic feet, so that the clause is practicall
inoperative in London. The question, ther
fore, is one that calls for legislative enac
ment, which shall provide fireproof lobbie
passages and landings and stairs, as in th
above section, and also a special means of escap
from each floor occupied by different tenant
The latter is of paramount importance. W
think it ought to be made a regulation tha
before shop premises can be let as tenement
above, a distinct staircase of fireproof mat
rial should be provided for, say, a certai
number of tenants residing above th
shop, with easy entrance from every flo
and directly leading into the street. Th
stairs should be constructed of concrete
certain ingredients, and the walls inclosing
should be at least a brick in thickness. Su
separate entrances and staircases are to
seen in middle-class dwellings erected in fla
like those built by the late Mr. Allen,
Stoke Newington, which were models of co
struction in their way, every floor of whi
was of concrete and iron constructed in
simple and inexpensive manner. But hous
with shops below, and inhabited by tenan
above, are common in London. The who
care of the premises is left in the hands of
man or woman residing in the basement
attic, and the tenanted floors are entirely d
pendent on the safety of the shop. A
accidental spark or lamp explosion ma
ignite the inflammable and over-drie
stock in the shop, and the whole
the tenants above are at its merc
There never could be a more cruel tra
than what at any moment by accide
can be turned into a kindling fire beneath
building of several tenanted stories! Sho
below, lodgings above. Above what?
space crammed with combustible substances-
even an oil or lamp store—and which migh
at any moment become a raging furnac
Earl Wemyss, the other day in the *Time*
referred to an invention for encasing wood
work such as that used to cover the timb
trusses of the dome of St. Paul's Cathedra
and which has rendered them proof again
fire. These casings are simple enough
only the builder could be made to adopt them
but experience has to be dearly purchase
before even the plainest safeguards are take
In the case of fire, prevention is a thousan
times better than cure in the form
"automatic sprinklers" and fire-extinguishi
appliances.

UNEQUALLY-LOADED ROOF-TRUSSES

THE strains acting upon iron roof-truss
will only be symmetrical when the lo
consists of the roof material or that with o
uniform layer of snow on the top, for t

Fig. 1



wind pressure will only act on one side at a time; hence there will usually be a difference between the loads on the two sides of a roof.

In some cases it also happens that the permanent load is not uniformly distributed over the surface of the roof, as, for instance, in the roof over a Bessemer converting shed where, on the side where the converters are placed, it is necessary to have the roof open.

The loads on roofs measured on the surface (not on the covered area) due to different covering materials are as follows per 100 superficial feet: Lead, 7cwt.; zinc, 1½cwt.; corrugated iron, 3½cwt.; slates, 7½cwt. to 9cwt.; tiles, 8cwt. to 15cwt.; ¾in. boarding, 2½cwt.

The wind pressure is usually taken, in this country, as equal to 50lb. per square foot on a surface normal to its direction; therefore, to find the direct pressure normal to the surface of the roof, its angle to the direction of the wind must be taken into account, and with this matter we shall deal subsequently, assuming for our present purpose a total vertical load on the roof-truss, one side being entirely covered, and the other partially, every alternate bay between the principals being left open, there will then be twice the load on one side that there is upon the other.

In Fig. 1 $a\ b\ c$ represents a main roof principal consisting of two secondary trusses $a\ b\ d$ and $c\ b\ e$, joined by an apex plate at b and a horizontal tie $d\ e$.

Let the total span $a\ c$ = 40ft.; the rise $b\ s$ = 8ft.; and the height $b\ t$ from the apex to the tie $d\ e$ = 6ft., and the distance between main principals 10ft.

A slate covering being used, the load per square foot on the covered part may be taken, including wind, as 40lb. per superficial foot. We must now find the length of the rafter $a\ b$. All the dimensions we shall require will be determined by the properties of right-angled triangles. The lengths of the elements will be the same on both sides of the centre line $b\ s$, but the load on $b\ c$ will be one-half of that on $a\ b$.

$$a\ b = \sqrt{as^2 + bs^2} = \sqrt{20^2 + 8^2} = 21{\cdot}54\text{ft.},$$

the total load on $a\ b$ will therefore be, as the principals are 10ft. apart, $10 \times 21{\cdot}54 \times 40\text{lb.} = 8{,}616\text{lb.}$, and that on $b\ c$ 4,308lb.

The loads on, and, therefore, the re-actions at the points of support a and c must now be found.

The horizontal springing line $a\ c$ is divided into four equal parts by the lines $f\ p''$, $b\ p$, and $g\ p'$, because the struts $f\ d$ and $g\ e$ are placed at the centres of the rafters $a\ b$ and $b\ c$; working then upon the principle of moments, the weight upon a will be, if p'' p and p' represent the total loads at f b and g, $W = \dfrac{30\,.\,p'' + 20\,p + 10\,p'}{40}$.

This is the weight which passes through the truss rods only, for there is a further load, half of that between a and f, which comes directly upon a, and does not, therefore, affect the truss.

At f will be carried half the load on $a\ f$, plus half that on $f\ b$—that is, half the whole load on $a\ b$, or 4,308lb. = p''. At b will be carried half the load on $f\ b$, plus half the load on $b\ g$; therefore, 2,154lb. + 1,077 = 3,231lb. = p, and at g is carried half the load upon $b\ c$; therefore, 2,154lb. = p'. The reaction, then, at a will be $W = \dfrac{30 \times p'' + 20 \times p + 10 \times p'}{40} = \dfrac{30 \times 4308 + 20 \times 3231 + 10 \times 2154}{40} = 5{,}385\text{lb.}$, and similarly the reaction at c will be $W' = \dfrac{30 \times p' + 20 \times p + 10 \times p''}{40} = 4{,}308\text{lb.}$

These two reactions should be equal to the total weight passing through the main truss to the points of support—5,385 + 4,308 = 9,693lb., and 4,308 + 3,231 + 2,154 = 9,693lb., also thus checking the results.

In order to determine the strains upon the different parts of the truss, the diagram should be drawn out to a large scale, such as one inch per foot, so that the loads may be accurately set down to scale, and the resulting strains measured off, with a sufficiently close approximation to absolute truth.

Through the point a draw a vertical line, and to any convenient scale set off $a\ r$ equal to the reaction 5,385lb., then complete the parallelogram $a\ r\ q\ o$; then will $a\ o$ = the thrust on the rafter $a\ f$, and $a\ q$ = the tension on the tie bar $a\ d$. The thrust is found to scale 26,750lb. and the tension 25,150lb.

At the point f where the rafter is supported by the strut $f\ d$, there is a vertical load p'' = 4,308lb., on the vertical line make $f\ m$ = 4,308, and complete the parallelogram $f\ l\ m\ n$, then $f\ n$ will represent the thrust on the strut $f\ d$, and $f\ l$ that on the rafter $f\ a$ due to load at f. These respectively scale 4,050lb., and 1,680lb., and this latter being opposed to the reaction thrust on the rafter will at f so reduce it that for the part $f\ b$ the thrust will be 26,750 − 1,680 = 25,070lb.

About the line $f\ n$ describe the parallelogram $f\ m'\ n\ n'$, making $m'\ n$ and $n\ n'$ respectively parallel to $a\ d$ and $d\ b$; then will $m'n$ and $n\ n'$ represent the strains brought upon the ties $d\ a$ $d\ b$ through the strut $f\ d$; the secondary truss $a\ b\ d$ being symmetrical, the strains will be equal, and are found to scale 10,200lb. each.

Deducting this amount from the 25,150lb. acting at a on the tie $a\ d$, there is left 25,150 − 10,200 = 14,950lb. acting in the direction $a\ d$; this must be resolved upon the two ties $d\ b$ and $d\ t$, so that on $d\ b$ there will be an additional strain besides that brought upon it through the strut $f\ d$.

Produce $a\ d$ and make $d\ u$ = 14,950lb., complete the parallelogram $d\ r\ u\ w$, then will $d\ w$ = the strain on the tie $d\ t$, and $w\ u$ will equal the strain from this source upon $d\ b$. These lines scale 10,770lb. and 4,800lb. respectively, so the total tensions on $d\ b$ will be 15,000lb.

We must now refer to the strains on the other half of the main principal before dealing with those at the apex b. The load at g being half that at f, the strains caused by it on the parts $g\ e$, $e\ c$, and $e\ b$ will be half those on the corresponding parts $f\ d$, $d\ a$, $d\ b$. They will therefore be, on $g\ e$ = 2,025lb., on $e\ c$ = 5,100lb., and on $e\ b$ = 5,100lb. The angles of the rafter $c\ b$ and tie $c\ e$ being symmetrical with those of the rafter $a\ b$ and tie $a\ d$, the thrusts and tensions will be in direct ratio to the reactions 4,308lb. and 5,385lb. The reactionary thrust on the rafter at c will be 26,750 × 4,308 ÷ 5,385 = 21,400lb.; the tension on the tie at c = 25,150 × 4,308 ÷ 5,385 = 20,120lb. The remainder strain on $c\ e$ to be resolved upon $e\ t$ and $e\ b$ will be, therefore, after deducting the strain opposed by that due to the load at g = 20,120 − 5,100 = 15,020lb. This strain resolved between $e\ b$ and $e\ t$ should give on the latter 10,770lb., the same as on $d\ t$, the bar being continuous from d to e; therefore it should be 14,950lb. The slight difference is due to error in scaling; but it is so small, $\frac{7}{1{,}502}$, that it is not practically appreciable; also the additional strain on $e\ b$ may be taken as 4,800lb., making the total on that bar 5,100 + 4,800 = 9,900.

At A (Fig. 1) is shown a separate diagram of the apex for the sake of clearness. $b\ a'$ and $b\ c'$ are the upper ends of the rafters $b\ a$ and $b\ c$, and $b\ d'$, $b\ e'$ are the upper ends of the ties $b\ d$ and $b\ e$. We will first deal with the load at b, which = p = 3,231lb. Draw the vertical line $b\ t'$ from b, and mark off $b\ i$ = 3,231lb. Complete the parallelogram $b\ h\ i\ k$, then $b\ h$ and $b\ k$ are the thrusts on $b\ a'$, $b\ c'$ due to the load at b: they are equal, each being 4,350lb. The strains on the ties $d'\ b$ and $e'\ b$ must now be resolved upon the rafters $b\ a'$, $b\ c'$; but their resultant must first be found. The strains on these ties, as given above, are 15,000lb. and 9,900lb. respectively; make $b\ y'$ = 15,000 and $b\ y$ = 9,900; complete the parallelogram $b\ y'\ z\ y$, then will the diagonal $b\ z$ be the resultant of the two tensions.

From the point z, and parallel to $a'\ b$ and $c'\ b$ respectively, draw the lines $z\ z''$ and $z\ z'$; then $b\ z''$ = 20,750lb. is the thrust brought upon $b\ a'$, and $b\ z'$ = 16,250lb. that brought upon $b\ c'$ = by the ties $b\ d$ and $b\ e$.

For equilibrium to obtain in the rafters, the sum of the thrusts passing downwards from the loads and from the ties must be equal to the upward thrusts from the reactions at a and c.

Adding together the two thrusts at b and that at f, we have 20,750 + 4,350 + 1,680 = 26,780lb; the scaled reaction is 26,750lb., so these quantities only differ by about one-ninth of 1 per cent., and may therefore be practically taken as accurate. In like manner summing the thrust for the rafter $b\ c$, we find 16,250 + 4,350 + 840 = 21,440lb., as against a reaction of 21,400lb., a difference of about one-sixth of 1 per cent.

The tension on the tie $d\ e$ can be checked by the principle of moments; the depth of the truss $b\ t$ = 6ft. We have the reaction 5,385lb. acting about the point b at a horizontal distance of 20ft., and the load at f = 4,308 acting downwards at a horizontal distance of 10ft; hence the resulting moment will be equal to 5,385 = 20 − 4,308 × 10 = 64,620ft.-lb., and as the distance at which the resistance of the tie acts from b is 6ft., the tension at t = 64,620 ÷ 6 = 10,770lb., the same as was found by scaling on the tie $d\ t$. The same result is found by calculating from the point c in the same manner, thus: 4,308 × 20 − 2,154 × 10 ÷ 6 = 10,770lb., and thus the whole of the strains have been ascertained and checked. We will now determine the sections of the different parts.

Commencing with the rafter $a\ b$ the difference of thrust upon $a\ f$ and $f\ b$ is so slight that the section will be made the same throughout, which will also be more convenient for the purposes of manufacture.

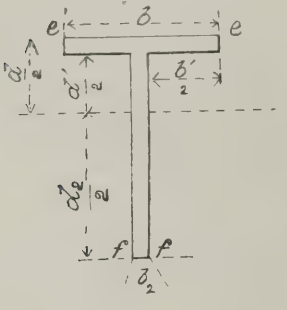
This member must be treated as a strut, and for purposes of calculation its length will be half $a\ b$ = 21·54 ÷ 2 = 10·77ft. *Laterally*, it will be stiffened by the purlins of tee iron which, to suit the slates, will be placed 10½in. apart along the rafters. The ratio of the depth at right angles to the length must be taken for r in Gordon's formula, which for the breaking weight in pounds per sectional square inch for wrought iron struts of this kind of construction is $= 2{,}240 \times \dfrac{19}{1 + \frac{r^2}{900}}$, and taking 4 as the factor of safety the working strain per square inch will be $= 560\ \dfrac{19}{1 + \frac{r^2}{900}}$. Let the rafter consist of a tee iron 6in. deep, then r = 10·77

$\div 0{\cdot}5 = 21{\cdot}54$, and $21{\cdot}54^2 = 464$ (nearly); the working strain per square inch will then be $= 560 \times [19 \div (1{\cdot}515)] = 7{,}016$lb. The rafter will, however, also have to resist the bending strain due to the load distributed along its length.

Slates are commonly carried on tee irons 1½in. by 1½in. by ¼in. thick, 10½in. apart; but the main principals must not be so far apart as 10ft., or, if they are, there must be intermediate rafters consisting of plain tee irons resting on purlins attached to the main rafters at *f* and *g*; if there are two of these between each two main rafters, the distance between them will be 3·33ft., and the load upon each and also upon *a f* and *f b* will be: 10·77ft. × 3·33ft. × 40lb. = 1,436lb. The horizontal span is 10ft.

We must now examine into the resistance of tee irons to transverse strains. Fig. 2 shows a

Fig. 2



cross section of a tee iron in the positi on in which it would be placed to act as a rafter.

Let the dotted line *a a* show the position of the neutral surface, then the moments of resistance of the section above it must be equal to the moments of resistance of the section beneath it. Considering, then, the part above *a a* as half the section of a girder, if M = pounds moment of resistance in inch-pounds, dimensions being in inches, and S′ the maximum working resistance in pounds per square inch at the part *e e* most distant from the neutral surface, $M = \frac{S'(bd^3 - b'd'^3)}{12 \cdot d}$, being one-half of the usual expression for the whole section if the lower part were the same as the upper. Similarly dividing the expression for a solid beam, the moment of resistance of the section below *a . . . a*, if S = maximum working resistance of fibres in pounds per square inch at *f* will be $M = \frac{S \cdot b_2 d_2^2}{12}$; therefore, $\frac{S'(bd^3 - b'd'^3)}{2d} = \frac{S \cdot b_2 d_2^3}{12}$. But the resistances of the fibres per square inch are in direct ratio to their distances from the neutral surface; therefore, $\frac{S}{S'} = \frac{d_2}{d}$, and, therefore, $\frac{bd^3 - b'd'^3}{d} = \frac{b_2 b_2 d_2^2}{d} = \frac{b_2 d_2^3}{d}$, and $bd^3 - b'd'^3 = b_2 d_2^3$.

If now we fix some of these dimensions, we shall be able to determine the remaining, and then find the resistance of the whole section.

Let $b = 4$in., $b' = 3{\cdot}5$in., $d = 2{\cdot}8$in., $d' = 1{\cdot}8$in., and $b_2 = 0{\cdot}5$in.; then $bd^3 - b'd'^3 = b_2 d_2^3$ becomes $4 \cdot 2{\cdot}8^3 - 3{\cdot}5 \times 1{\cdot}8^3 = 0{\cdot}5 \cdot d_2^3$, wherefore $d_2 = 5{\cdot}128$in. $\frac{d}{2} = 2{\cdot}564$in., and the whole depth will be $1{\cdot}4 + 2{\cdot}564 = 3{\cdot}964$in., the nearest obtainable section to which will be 4in. × 4in. × ½in. thick. As the upper part of the section, that above *a . . . a*, will have a resistance equal to that of the lower, the whole resistance will be twice that of the part between *a a* and *f f*, or equal to the resistance of a solid beam having depth d_2 and breadth b_2. The moment of resistance of such a beam will be $M = \frac{S \cdot b_2 d_2^2}{6}$. Let S = 11,200lb., then $M = \frac{11{,}200 \times 0{\cdot}5 \times 5{\cdot}128^2}{6} = 24{,}545$ inch-pounds.

The moment of strain at the maximum will be $M = \frac{W l}{8}$, where W = safe load and *l* = span in inches. The horizontal span is 10ft. = 120in., therefore $\frac{W \times 120}{8} = 24{,}545$; $W = \frac{8 \times 24{,}545}{120} = 1{,}636$lb. The actual load on the intermediate rafters was found to be 1,436lb. so the section of tee iron 4in. × 4in. × ½in., will suit very well, allowing a little margin over the absolute strength required.

On the rafter *a f* there is also a load of 1,436lb. producing a bending strain, and the moment of this strain will be $M = \frac{W \cdot L}{8} = \frac{1{,}436 \times 10 \times 12}{8} = 21{,}540$ inch-lbs. Proceeding as before, let $b = 4$, $b' = 3{\cdot}5$, $b_2 = 0{\cdot}5$, $d = 4$, $d' = 3$. $4 \times 4^3 - 3{\cdot}5 \times 3^3 = 0{\cdot}5\, d_2^3$; $d_2 = 6{\cdot}83$in. The moment of resistance of the whole section will be equal to that of a beam 6·83in. deep and ½in. thick. $M = \frac{S \cdot b_2 \cdot d_2^2}{6} = \frac{11{,}200 \times 0{\cdot}5 \times 6{\cdot}83^2}{6} = 43{,}539$ inch-lb. Here, then, only one-half the sectional area will be required for the bending strain. The section of the tee iron is 4in. by 5·415in., by ½in.—say, 4in. × 5½in. × ½in. These strains on this section due to the bending load will be 5,600lb. per sectional square inch at the fibres *f*, and $5{,}600 \times 2 \div 3{\cdot}415 = 3{,}279$lb. per sectional square inch on the fibres at *l l*. The total area of the section is $(4 + 5) \times \frac{1}{2} = 4{\cdot}5$ square inches The strain per square inch due to the direct thrust will be 26,750lb. ÷ 4·5 = 5,944lb. per sectional square inch over the whole section, from the neutral surface to the edge *f*. This will gradually diminish because of the tension due to bending strain on the under side of the bar, at *f* the compression per square inch will be 5,944 − 5,600 = 344lb. per square inch.

The sectional area of the part of the rafter above the neutral surface will be $(4 + 1{\cdot}5) \times \frac{1}{2} = 2{\cdot}75$ square inches. As has been shown above, the strut for direct strain will bear safely 7,016lb. per square inch, so deducting the 3,279 bending strain thrust we have available 7,016 − 3,279 = 3,737lb., showing a deficiency of 5,944 − 3,737 = 2,207lb. per square inch. This, on 2·75 square inches will be 6,069lb., but this is taking the maximum 3,279lb. through *a . . . a*; but the average will be the mean between the strains on the outside and inside of the horizontal limb which $= \frac{(3{,}279 + 2459{\cdot}2)}{2} = 2869{\cdot}12$lb., making for the 2·75 square inches $5{,}944 - (7{,}016 - 2869{\cdot}12) \times 2{\cdot}75 = 4941{\cdot}75$lb., requiring, therefore, in the upper part of the section an additional area of $4941{\cdot}75 \div 7{,}016 = 0{\cdot}704$ square inch, so it will be sufficient to increase the thickness of the tee iron to ⅞in., or it might be done by increasing the depth of the section to 6in., as originally calculated on, as this would help by increasing the resistance to the bending strain.

The direct load producing bending strain on the rafter *b c* will be one-half that on *a b*, and it will be practically accurate to regard the moment of resistance as varying with the thickness of the metal. The resistance in the former case was twice the moment of strain if the whole section were taken; hence, the area required will be, for the bending strain, 4in. × 5½in. × ¼in.

We will assume that for *b c* a tee-iron 4in. × 5½in. × ⅜in. thick is used, and see how it works out for strength. Its sectional area will be $9{\cdot}125 \times 0{\cdot}375 = 3{\cdot}422$sq.in.; therefore, the thrust per square inch due to direct strain $= 21{,}400 \div 3{\cdot}422 = 6{,}254$lb. (nearly). The lower part of the section being in tension from the bending strain will receive and dispose of the thrust on that part. The area being three times that required to resist the maximum moment, the maximum direct strain (at *f* Fig. 2) will be $11{,}200 \div 3 = 3{,}733{\cdot}3$lb. per sectional inch. The mean fibres in the horizontal member are distant from the neutral surface 2in. − 3/16in. = 1·8125in.; hence, as *f* is distant 3·5in. from the neutral surface, the mean compression on the horizontal member from bending strain will be $3{,}733{\cdot}3 \times 1{\cdot}8125 \div 3{\cdot}5 = 1{,}933$lb. The mean thrust, therefore, in the upper part of the section will be 6,254 + 1,933 = 8,187lb. per square inch on a section of 1·5sq.in. The excess, then, is $(8{,}187 - 7{,}016) \times 1{\cdot}5 = 1{,}756$lb., which may be covered by making the section 6in. deep. For appearance sake the rafters on the two sides of the main principal should have the same outside dimensions; and moreover, for our direct thrust we have calculated upon a depth of 6in. Therefore, the scantlings to be adopted for this roof are: For heavily-loaded rafter *a b*, 4in. × 6in. × ⅝in.; and for light rafter *b c*, 4in. × 6in. × ⅜in. The other elements of the truss, being subject to simple strains only, will be more easily dealt with.

The struts *f d* and *g e* may conveniently be made of cast iron, embracing the web of the rafter at the top and the tie bars at the bottom; the length *f d* is 2·2ft. The thrust on these struts is so little, 4,050lb., that they cannot be kept down practically to theoretical size; for by the formula, $560 \times \frac{36}{1 + \frac{r^2}{400}}$ = safe working resistance per square inch, we find for a strut 1in. in diameter, a resistance of 7,280lb., which would be for the area of the strut $7{,}280 \times {\cdot}785 = 5{,}714{\cdot}8$lb. It would not do in practice to make the strut of this section: but it should be in the form of a cross, 2in. wide in each direction and ¼in. in thickness. The ties will carry safely a strain of 11,200lb. per sectional square inch, so their areas will be as follows, and the diameters taken will be the next commercially obtainable above those corresponding to the theoretical areas:—

For the tie		The diam. required
a d,	$25{,}150 \div 11{,}200 = 2{\cdot}245$sq.in. =	1½in.
d b,	$15{,}000 \div 11{,}200 = 1{\cdot}339$sq.in. =	1⅜in.
d e,	$10{,}770 \div 11{,}200 = 0{\cdot}961$sq.in. =	1in.
c e,	$20{,}120 \div 11{,}200 = 1{\cdot}790$sq.in. =	1⅜in.
e b,	$9{,}900 \div 11{,}200 = 0{\cdot}884$sq.in. =	1in.

It now remains to determine the number and sizes of the bolts required at the different joints. The general forms of the joints are shown at Fig. 3. *a a* and *b* are bolts in the apex joint, which is made by two plates having between them the webs of the main rafters and the eyes of the secondary ties (*d b* and *e b*, Fig. 1); *c* and *d* are the bolts at the top and bottom of the struts (*f d* and *g e*, Fig. 1); *e* is the cotter connecting the tie with the cast-iron shoe, and $f_1 f_1$ the bolts connecting the rafter with the same.

There being two joint plates at the apex, the rivets will be in double shear; therefore, the strain will be taken on four sections. The working resistance to shearing strain is 8,960lb. per sectional square inch. The thrust on *a a* will be 25,070lb.; $25{,}070 \div 8{,}960 = 2{\cdot}8$ square inches, corresponding to two rivets of 1⅜in. diameter. It must be seen, however, that we also have sufficient bearing area in the body of the rivet. This area will be the diameter of the rivet multiplied by the thickness of the plate through which it passes. The working resistance will be the same as that for shearing strain; therefore, the bearing area must also be 2·8sq.in. at least. Now, the thickness of the web of the rafter is ⅝in., hence the bearing area of each rivet (say) 1in. diameter, will be 0·625sq.in., so that five rivets will be required instead of two.

For appearance sake the joints will be made the same on both sides of the truss. On the bolt *b* is the strain from the secondary tie (*d b*, Fig. 1) = 15,000lb., and the area required will be $15{,}000 \div 8{,}960 = 1{\cdot}67$sq.in. The tie is 1·375in. in diameter: that will therefore be the thickness of the eye, and the bolt will require to be 1½in. diameter, this will give a bearing of $1{\cdot}375 \times 1{\cdot}25 = 1{\cdot}719$sq.in. The thickness of the joint plates to give equal bearing for the bolt must evidently be 11/16in. each, where the bolts pass through; the area of the two sections in shear will be ample, being 2·45sq.in.

The pressure on the bolt *c* is only 4,050lb., hence the bearing area required will be under half a square inch, so as the rafter is ⅝in. thick, a bolt ¾in. diameter will give sufficient bearing.

The bearing required on the bolts *f f* at the shoe will be $26{,}750 \div 8{,}960 = 3$sq.in. (nearly), to make this up four bolts 1½in. diameter would be required, or to shorten the shoe, a ⅝in. strip may be riveted on each side of the foot of the rafter, as shown at *g*, then with the extra thickness sufficient bearing would be given by two 1½in. bolts, for we should have $2 \times 1{\cdot}125 \times 1{\cdot}375 = 3{\cdot}09$sq.in.

The connection now of the tie (*a d*, Fig. 1) with the shoe must be considered. The bearing area required is $25{,}150 \div 8{,}960 = 2{\cdot}81$sq.in. The diameter of the tie is 1¾in., and the



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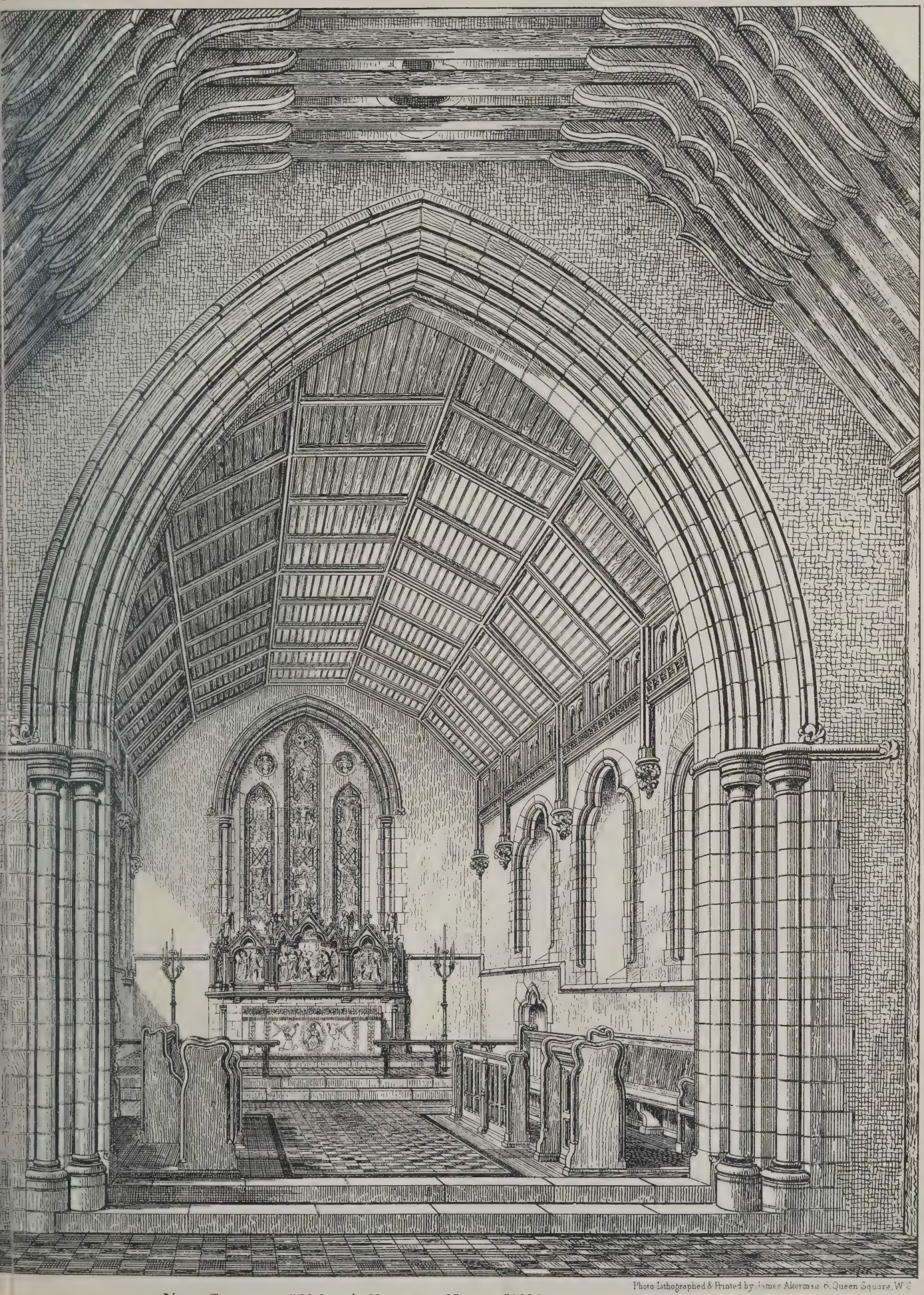
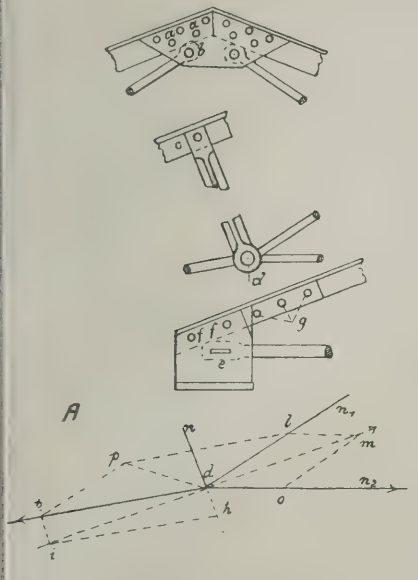


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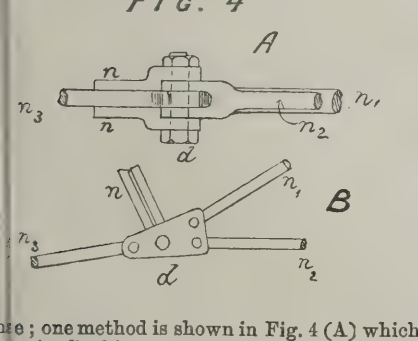
ickness of the eye may be made 2in.; then
e thickness of the cotter to give the proper
aring = 2·81 ÷ 2 = 1·405in. = (say) $1\frac{7}{16}$in. The
tter in practice should be made about $2\frac{1}{4}$in.
ide. The only joint of the truss remaining
that at which the strut and three ties meet,
d in order to find the strain on the bolt *d* we

Fig. 3



ust have recourse to a diagram as shown at
Fig. 3.
l is the centre of the bolt connection between
s and strut, the directions of which are
licated by the lines corresponding as follows
the bars in Fig. 1; *d n* to strut *df*, *d n'* to
d b, *d n*$_2$ to tie *de*, and *d n*$_3$ to tie *d a*. The
ow heads show the directions of the strains
ing at *d*.
Produce *n d* and make *d h* = 4,050lb., the
npression on the strut; make also *d k*
25,750lb. the tension on the tie, and complete
parallelogram *d k i h*; then will *d i* be the
ultant of the two forces *d k* and *d h*: it scales
6001b. Now make *d l* = 15,000lb., and *d o*
=10,770lb., and complete the parallelogram
m o; then *d m* will be the resultant of the
ces *d l* and *d o*, and it is found to be equal to
and also opposite in direction, but in the
ne straight line, so that *d i* and *d m* stand to
h other as action and re-action, and the
ce upon the bolt *d* is 24,6001b.; the size of
t to give the necessary bearing area must be
nd: what this will be will depend in a great
asure upon the way in which the joint is

Fig. 4



e; one method is shown in Fig. 4 (A) which
viewlooking upwards; the same distin-
hing letters are used as at A, Fig. 3.
this arrangement the bearing will be de-
ined for each bar according to its strain;
as shown here the bars *d n*$_1$ *d n*$_3$ are made
inuous, having a single eye at the centre
ugh which the bolt *d* passes; thus a part of
strain passes from *d n*$_3$ to *d n*$_1$ without
ting the bolt *d*; we must determine, there-
how much pressure does fall on the bolt
in the eye referred to.
his strain will be the resultant of the strains
n$_1$ and *d n*$_3$. Referring again to the dia-
A, Fig. 3, complete the parallelogram
k, then will *d p* be the resultant required.
It scales 13,0001b., hence the bearing area corresponding is 13,000 ÷ 8,960 = 1·45sq.in. The bearing in both sides of the fork on tie *d n*$_2$ = 10,770 ÷ 8,960 = 1 20sq.in. That on the two sides of the strut *d n* = 4,050 ÷ 8,960 = 0·45sq.in. The thickness of the tie *d n*$_3$ is 1·75in., hence the required diameter will be 1·47 ÷ 1·75 = 0·838in., say $\frac{7}{8}$in.; adopting this diameter, the length of bolt required in the fork of *d n*$_2$ will be 1·2 ÷ 0·875 = 1·37in., or the thickness of each side of the fork must be $1\frac{3}{8}$in. The length required in the sides of the strut will be 0·45 ÷ 0·785 = 0·51in.: but, practically, these sides would require to be made $\frac{5}{8}$in. thick.

We must now examine the shearing strains. The working loads being the same as for bearing strains, the required areas will be the same. In each case the bolt is in double shear, therefore the sectional area required for the central part will be 1·45 ÷ 2 = 0·725sq.in., therefore nothing under an inch bolt will do, and the thicknesses will be for the eyes: the centre 1·75in., each side of the fork *dn*$_2$ = 0·7, say $\frac{11}{16}$in.; and the strut sides as before. The only objection to this joint is its width in the fork of the strut, which, in this case would be $3\frac{3}{8}$in. between the jaws. Another form, shown at B, Fig. 4 is therefore sometimes used. In this arrangement all the bars have single eyes at the ends, and these are held between two joint plates, the tensile strain on which will be the resultant *dm* (A, Figure 3) = 24,6001b, the nett area therefore of the two plates (after deducting the bolt holes) must be 24,600 ÷ 11,200 = 2·19sq.in. The diameters of the bolts will be determined on precisely the principles used above; hence it will not be necessary further to exemplify it in this place.

It may, however, be useful here to set down the general relation existing between the bearing length and diameter of bolts, always, of course, assuming that the safe working strength is taken to be the same for compression as for shearing per sectional square inch.

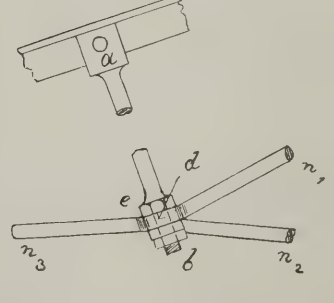
Let L = length of bearing, and D = diameter of bolt, both in inches; then the bearing area is = L × D, and the shearing area for single shear = 0·785 D^2, but these two must be equal, therefore L × D = 0·785 D^2; and L = 0·785 D; but for double shear L = 1·56 D.

In places where rivets are used so much bearing area is not required, as the strain is taken up partly by the friction of the plates which are tightly pressed together by the contraction of the rivets in cooling.

We have above taken a simple form of truss for our example, but the principles to be followed in other cases are precisely analogous, and therefore it is unnecessary to amplify illustrations. We shall, however, before leaving this part of the subject, show one more form for the joint at *d*, to be used when the strut is of wrought iron.

The form of joint referred to is shown in side

Fig. 5



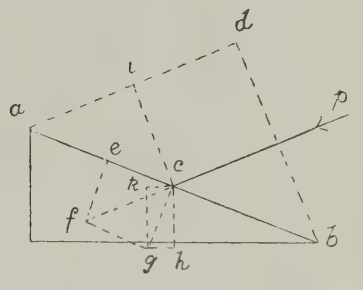
elevation in Fig. 5, at *b*. The top of the strut at *a* is formed with a fork the same as before.

The ties *d n*$_3$ *d n*$_1$ (A, Fig. 3) are made in one length here also, but flattened out at the centre, and an eye formed through which the end of the strut passes, as also through an eye in the tie *d n*$_2$, the whole being secured by the nut *b* on the screwed end of the strut; a collar *e* forged on the strut forms an abutment against which the ties are pressed by the nut *b*. The shearing strain on the screwed end will be that brought upon it by *d n*$_2$, and the strain (13,0001b.) which acted as a shearing force in the first joint (A, Fig. 4) will now become tension on the screwed end of the strut, between the collar *e* and the nut *b*.

We will now pass to the consideration of the effect of wind-pressure upon roofs, as intimated in the commencement of this article.

In Fig. 6, let *a b* represent the line of rafter

Fig. 6



on one side of a main principal, and for purposes of calculation let a length of roof of 1ft. be taken, and the wind-pressure be taken as 50lb. per square foot on a surface *at right angles to its direction*.

Let *c* be a point at the centre of the rafter, and draw *p c* in the direction of the wind, draw *a d* parallel to *c p*, and from *b* draw *b d* perpendicular to *a d* and therefore to *c p*, the total wind-pressure will be on the 1ft. strip; 50lb. multiplied by *b d*, therefore the pressure per foot on the roof = 50 × *d b* ÷ *a b*; but this does not act normally to the surface of the roof. Produce *c p* to *f*, making *c f* = 50 × *d b* ÷ *a b* and complete the parallelogram *c g f e*, then *c g* will be the normal pressure on *a b* per square foot. From *c* draw *c i* parallel to *d b* and at right angles to *a d* and *c p*; then in the right-angled triangle *a i c* the angle *c a i* is the complement of the angle *a c i*, and because *i c f* is a right angle *f c e* is a complement to the angle *a c i*, and therefore = the angle *c a i*, and the right angles *c e f*, *c i e* are equal. Therefore the triangles *a i c* and *c e f* are similar; but *c g f* and *f e c* (being halves of a parallelogram) are similar, and *a d b* is obviously similar to *a i c*; hence the triangles *c g f* and *d b a* are similar, and *d b* ÷ *a b* = *c g* ÷ *c f*.

Let P = normal pressure per square foot on the surface of the roof, then P = 50 × (*d b* ÷ *a b*) × (*c g* ÷ *c f*) = 50 × *d b*^{2} ÷ *a b*^{2}. This force is to be again resolved into two others, the one pressing vertically upon the roof, and the other tending to slide it upon its bearings; complete the parallelogram *c h g k*, then *c h* will be the vertical component per square foot of roof surface; let *w* represent this, then $w = P \times \frac{ch}{cg}$ $= 50 \times \frac{cg^2}{cf^2} \times \frac{ch}{cg} = 50 \times \frac{cg \times ch}{cf^2}$. Scaling these lines we find for the load due to the wind pressure $w = 50 \times \frac{35 \times 33}{50^2} = 23$lb. per superficial foot. Therefore, in calculating the strains this must be added to the weight of the roof covering on one side, and the sizes of the elements for that side having been determined, both will be made to them, as the wind will be sometimes on one side and sometimes on the other.

Having the above formula, it is evident that in practice it will not be necessary to draw all the lines shown in Fig. 6, *c f*, *c g*, and *c h* being the only ones required for use, so that, in fact, the only lines we need draw are *c f*, *f g*, *c g*, *g h*, and *c h*.

THE SCIENCE AND ART DEPARTMENT.

THE expenditure and estimates of the Department of Science and Art for the present year have been published as a Government return. The corresponding figures are also given for the five previous years.

Under the head of aid to science instruction is set down an expenditure of £101,175, of which £88,000 is payment on results and £5,800 prizes and scholarships. The expenditure has risen continuously since 1882-3, when it was £59,686; and since last year it has risen by more than £20,000. The sum expended on instruction in art, £48,725 (£41,000 for results), does not show as rapid an increase as that for science. In

1882-3 the sum was £32,275, and last year £49,622 ; so that this year there is a slight decrease. To this must be added £5,345 for the National Art Training Schools, which cost only £4,641 five years ago. Grants for drawing in elementary schools are set down separately from art instruction and under this head we find this year £55,800 expended, as against £36,068 in 1882-3.

The museum at South Kensington, and its branch at Bethnal-green, expended £77,196, a sum rather below the average of the five years. While the expenditure on staff, which is now £57,196, has continuously increased, the sum of £2,000 devoted to purchases is the lowest sum in any of the six years.

The estimate on expenditure on the museum in Edinburgh, the museum, library, and botanic gardens and the Royal College of Science in Dublin, the geological museum in Jermyn-street, the Geological Survey of the United Kingdom, the Royal Hibernian Academy, the Solar Physics Committee. and local museums, was £54,212 five years ago, and it has risen to £60,047 in the current year. No sum is taken for aid to local museums in the current estimates.

The totals of all these items amount to £279,537 in 1882-3 and advance by continuous steps to £363,435 in the current year. The whole expenditure of the Department, however, rose from £347,625 to £438,558 in the same space of time. The difference between these several sums, year by year, represents the cost of administration, which rose from £67,588 to £75,123. It will be seen that the cost of administration has risen at a much slower rate than the grants administrated, for during the past six years the expenditure has increased 30 per cent., while the cost of administration has increased by only 11 per cent.

BUILDING MATERIALS.—II.*

By W. Y. Dent, F.C.S., F.I.C.

(*Continued from p.* 240.)

THE materials that come under the designation of stone as used for building purposes, consist either of the rocks belonging to the earlier geological formations (such as the various descriptions of granite), or of deposits that are the result of the decomposition of such formations, as represented by those that are of a sedimentary character. These sedimentary rocks may be classed under two heads —sandstones and limestones—some of them partaking of the nature of both, such as the Mansfield redstone, which is a silicious magnesian limestone. Of the sandstones there are a great variety, some of them being of too hard and too coarse a texture to be available for buildings the character of which necessarily entails a considerable amount of ornamental work, but they afford excellent material for plain heavy masonry, where strength and durability are the main points to be considered. We have examples of such material in the grey sandstones of Dundee and Arbroath, which have been much used for paving in Edinburgh and Glasgow, and of the coarser varieties in that which is known as Bramley Fall stone, used for Kirkstall Abbey, built in the 12th century, the name being derived from the quarry in the neighbourhood of Leeds, whence this description of stone was first obtained. This quarry has been closed for some time, but the original name is retained, and now represents a quartzose sandstone, varying considerably in its texture, belonging to the millstone grit formation, and obtainable in very large blocks from a number of quarries in Yorkshire, ancashire, and Derbyshire. It is chiefly used or engineering works, such as engine beds, dock walls, and foundations, being especially adapted for massive work of every description where large blocks are required. The finer descriptions of sandstone come under the designation of "Freestone," a term that has no very distinctive meaning, but one which is commonly employed when speaking of any stone, whether it be a sandstone or a limestone, that is capable of being easily tooled, quite irrespective of its chemical composition. There is an ample supply of excellent sandstone for general building purposes both in England and Scotland. In England this is especially the case as regards the counties of Lancashire, Yorkshire, and Derbyshire, in which there are a number of quarries yielding a very durable material, which is, at the same time, sufficiently soft to admit of being easily worked with a chisel. The stone from the Darley Dale and Knabb quarries, in Derbyshire, has been largely used in Manchester, and it would not be easy to find a better test of the durability of stone than subjecting it to the influence of such an atmosphere as that of the city of Manchester. The New Stanton and Coxbench quarries yield an excellent material for building purposes, some of the stone from New Stanton being also suitable for grindstones. Of the Yorkshire sandstones, amongst those that have been longest known may be mentioned the Hare Hills and Park Spring stone, which have been extensively employed for many years in London and in various parts of the country. The Scotgate Ash quarries, near Pately Bridge, yield an excellent building stone, some of the beds affording a material suitable for landings. A fine grained sandstone is obtained near Sheffield, which has few rivals as regards its properties as a grindstone, and in the district which lies between Bradford and Halifax are obtained in large quantities the flagstones for which Yorkshire possesses such a high reputation. The red Corsehill stone from Annan, in Dumfries, is one of finest of our red building stones. It is uniform in its texture, of a rich deep red colour, which is but little liable to alteration. This stone is peculiarly adapted for use in conjunction with bricks or terracotta, and has been employed with good effect for several buildings in London and its neighbourhood. One of the finest sandstones is that known as the Craigleith stone, which has been very extensively used in Edinburgh. It is a close-grained compact stone, consisting almost entirely of silica, the particles of quartz sand being bound together by a silicious cement, the total quantity of silica it contains, as shown by analysis, amounting to 98 per cent. The permanent character of this stone has been thoroughly established ; exposure to the weather for 200 years having in some cases scarcely produced any effect upon it, but it is questionable, however, whether the stone now obtainable under the name possesses the excellent properties of the original supplies. The Minera stone from near Wrexham, in Denbighshire, has been largely used in Liverpool and Manchester, and was employed in London for the building near the Mansion House occupied by the National Safe Deposit Company. At Grinshill, near Shrewsbury, there are quarries which yield a fine-grained building stone, of which there are three varieties, white, yellow, and red, which has been extensively used in Liverpool, Manchester, and Birmingham, and towns in the Midland Counties, as well as in London. This stone was employed for many of the churches in Shropshire, including Battle Church, standing on Shrewsbury battle-field, and has proved to be a good weather stone. The Prudham stone, from the neighbourhood of Newcastle, has within the last two or three years been introduced into London, and from the condition of this stone, which was employed for buildings in Woolwich Dockyard some forty years ago, it may (if obtained from the same beds) be expected to prove a durable stone. Uniformity of texture is an important consideration, more especially as regards sandstones, inasmuch as some of this class contain portions differing in character from the mass of the stone, showing a tendency to weather at a different rate. Sometimes such portions are less liable to alter than the mass, and are thus left as excrescences, whilst in other cases they weather more rapidly, and the stone presents a more or less pitted appearance. Limestones, as a class, are quite equal in importance to the sandstones as regards the number and variety of the beds yielding an excellent material for building purposes. They differ widely from each other as regards their chemical composition, from white marble, which is pure carbonate of lime, to the magnesian limestone, in some descriptions of which the proportion of carbonate of magnesia is nearly equal to that of the carbonate of lime. Marble is generally regarded as the result of carbonate of lime having been subjected to intense heat in a confined space, where there was no opportunity for the escape of the carbonic acid, and consequently under great pressure. It is a highly crystallised carbonate of lime, of a density equal to that of granite, weighing about 170lb. per cubic foot. Although we have not in England the beautiful white statuary marble of Italy, nor such deposits as would be required for a cathedral like that of Milan, yet we have in Derbyshire and Devonshire marbles that leave little to be desired as a material for ornamental and decorative work. The beautiful black marble from Ashford, in Derbyshire, has been worked for forty years, the beds varying in thickness from 3in. to 9in. It has been extensively used for ornamental work in church buildings and public edifices, of which we have an example in the bases and caps of the balustrading round the ladies' gallery of St. George's Hall, Liverpool. The other varieties of marble from these quarries, as well as those from Hopton Wood, in Derbyshire, have been largely employed for ecclesiastical as well as other decorative work throughout the country. The Devonshire marble can be procured in very large blocks, and to such an extent is this the case that a polished marble tank, weighing when finished nine tons, cut out of a single block, has been supplied from the Oreston quarries near Plymouth. The marble columns at the Home and Colonial Offices were also obtained from these quarries. There are several other limestones that are of such a highly crystalline character as almost to entitle them to be classed with marbles, of which the Niddersdale limestone may be taken as an example. By far the larger portion of the limestone ordinarily used for general building purposes is derived from the beds of the oolitic system, so named from the particles of some varieties of these beds being more or less of a granular character, bearing a resemblance to the roe of a fish. This appearance is not of a marked character in many of the stones belonging to the oolitic series ; but in some of the beds of Bath stone, and more particularly in the Ketton stone, it is too evident to escape the notice of the most casual observer. It is supposed that this appearance is due to the stone having been formed from the disintegrated particles of former limestones which have become rounded by attrition and deposited in a granular condition, or the carbonate of lime has been deposited upon some particle of sand or fragment of shell which was kept in motion by flowing water saturated with carbonate of lime. Such a production of oolitic grains may be observed in process of formation in the springs of Carlsbad. The most important of the building stones belonging to the Oolitic system is undoubtedly that which is known as Portland stone, which may be regarded as the type of a good limestone for ordinary building purposes. It has been used more extensively than any other description for the public buildings of London. St. Paul's Cathedral, Somerset House, the National Gallery, the Custom House, the Post-Office, the Royal Exchange, and the new Law Courts have all been built of this material, and experience has proved that (when carefully selected) it is one of the best adapted for resisting exposure to the baleful influence of a town atmosphere. Fortunately for its reputation, great care has generally been exercised in preventing any inferior stone being employed. Sir Christopher Wren had the stone for St. Paul's Cathedral quarried and exposed to the air for three years before it was brought to London, a full opportunity being thus afforded for rejecting any blocks that exhibited signs of inferiority ; the stone used for the Royal Exchange also underwent a special inspection at the quarries. There are numerous quarries in the island of Portland, and a series of beds, only a few of which yield a really good material. Taking the Waycraft quarry as an example, we find that after sinking to a depth of 25ft. through several strata of but little value, and known by various local names, the Roach bed, 2ft. 6in. in thickness, is reached. The stone of this bed is shelly and full of cavities, and consequently cannot be used for building purposes where a good facing stone is required ; it is, however, hard and durable, and is employed for underground work, its money value not being more than about one half of that of the best Portland stone. Below this is the finest bed of the whole series, known as the Whit bed, 9ft. 6in. in thickness ; and after sinking 8ft. deeper, through stone of little value, termed "curf," the lowest of the series, or base-bed, is reached,

* Being the Cantor Lecture delivered before the Society of Arts.

a name that has sometimes been converted into "best bed," which is somewhat misleading, inasmuch as, although sometimes preferred by masons, it differs slightly in its character from the Whit bed, and is considered inferior to it in durability. It also sometimes contains irregular bands of flint. The thickness of the several beds varies considerably in different quarries. This stone contains 95 per. cent. of carbonate of lime, the hard crystalline particles of which it is composed, as well as the material that binds them together, consisting of carbonate of lime. The next stone in importance belonging to the oolitic system is that obtained from several quarries in the neighbourhood of Bath, with which everyone is more or less familiar under the name of Bath stone. The several beds vary as regards the character of the stone they yield, perhaps to a greater extent than is the case with any other description, and unless great care is taken in its selection, it will generally be found to prove a failure if exposed to such an atmosphere as that of London. At the same time, examples are not wanting of its exhibiting as much durability as other descriptions of limestone, and in one instance, where it has been used along with Portland stone in the same building, in which special care was taken in its selection, it exhibits fewer indications of decay than the Portland. The vast trade that is now carried on in Bath stone may be said almost to have commenced with the opening of the Great Western railway, although the stone has for a long time been a favourite with builders, having been employed since the twelfth century. The stone imported from Caen, in Normandy, was introduced into this country shortly after the Norman Conquest, and was extensively used in building churches down to the middle of the 15th century. Its fine, soft, even texture renders it peculiarly suitable for ornamental work, and there is no better stone for internal decorations involving elaborate carvings. It is not, however, a good stone as regards its capability of resisting the effects of exposure to atmospheric influences, and is quite unsuitable for the exterior of buildings erected in large towns. With but few exceptions, when exposed to a town atmosphere, it has proved a complete failure, its defective condition having had, in some instances, to be concealed by paint. The Doulting stone, obtained from the beds of the lower oolite formation at the base of the Mendip Hills, in Somersetshire, resembles Portland as regards its composition, and also with respect to its density and porosity; and although it more resembles Bath stone in appearance it is superior to it in quality. This stone was used for building Glastonbury Abbey, in the 12th century, and for Wells Cathedral. Amongst other stones belonging to the same class may be mentioned the Ancaster stone, from near Grantham in Lincolnshire, which has been largely used in that and the neighbouring counties, and to some extent in London. The stone from Casterton in Rutlandshire was used for the cathedrals of Norwich and Ely, and in building some of the colleges at Cambridge. The Clipsham stone, from the same county, was employed in the restoration of the cathedrals of Ely and Peterborough, and is similar to what was formerly known as the Barnack stone, which acquired considerable reputation as a good weather stone. The Ketton stone, from near Stamford, has already been alluded to as possessing a very marked granular appearance, exhibiting its oolitic character to an unusual extent. It is a very excellent stone (of which we have a good example in the church of St. Dunstan's, Fleet-street), and is somewhat peculiar in that it possesses but little, if any, distinctive line of bedding. The Headington stone, from the neighbourhood of Oxford, has been largely employed for many of the colleges and churches in that city, the condition of which does not afford any favourable evidence for the durability of the Oxford oolites, much of the stone of the colleges and other buildings in Oxford exhibiting signs of exfoliation and decay. One of the better class of the Oxford oolites is the Charlbury stone, used for the Central Barracks, Oxford. A stone has been largely employed in Oxford for several years past which is obtained from Milton, near Chipping Norton; it has acquired a favourable reputation with several well-known architects, and seems likely to prove more durable than most of the stone that has been generally used for the colleges at Oxford. The stone which is known by three different names—Tisbury, Chilmark, and Wardour—is obtained from quarries in the neighbourhood of Salisbury, the original Tisbury quarry being now closed. It differs in its composition from the limestones before mentioned, inasmuch as it contains 10 per cent. of silica, which partly exists in minute particles forming nuclei, round which carbonate of lime has been deposited, and partly as a crystalline matrix, forming the binding material of the stone. Salisbury Cathedral was built of this stone, and it is now being used for the repairs of Westminster Abbey. The Kentish rag is a dense, hard, and very durable limestone belonging to the greensand formation, largely employed in the south of England for forts and harbours. It is obtained from quarries in the neighbourhood of Maidstone, where it occurs in layers from 6in. to 2ft. in thickness, with alternating bands of a soft silicious limestone, locally termed hassock; it is employed for many of the picturesque country churches in Kent, the hassock being used for the interior portion of the walls. Of the silicious limestones, the finest example is that known as the Mansfield stone, of which there are two varieties, the white and the red, both of which contain nearly 50 per cent. of silica, associated with variable quantities of carbonate of lime and carbonate of magnesia. This stone, more particularly the red variety, has deservedly obtained a high reputation for the beauty and uniformity of its colour, and the fineness of its texture. The magnesian limestone, or dolomite, as it is sometimes called, has obtained a not very enviable notoriety from its having been selected for the Houses of Parliament at Westminster. The name dolomite belongs properly to a mineral of a peculiar granular and crystalline structure known as bitter-spar, which consists of fifty-four parts of carbonate of lime and forty-six parts of carbonate of magnesia, the name being derived from that of a French geologist who discovered it in the Alps. The magnesian limestones are very variable in their character, both as regards their chemical composition and their physical structure. The magnesian limestone used for building is chiefly obtained in this country from the counties of Nottinghamshire and Yorkshire, in the district which lies between Mansfield and Chesterfield, stretching in a northern direction as far as Tadcaster. The quarries in the neighbourhood of Tadcaster were known to the Romans, who employed this description of stone in the construction of the multangular tower, the ruins of which, in the Museum-gardens at York, are still an object of interest. York Cathedral, erected in the 13th century, Ripon Minster, as well as many of the churches in York, are built of this stone, in many of which the signs of exfoliation and decay are but too evident.

(*To be continued.*)

THE ANATOMY OF PATTERN.*

A SERVICEABLE little text book of ornamental design, under the above heading, by Mr. Lewis F. Day, whose essays on art are well known, will be read with instruction by students. This little book is one of a series in which the author has amplified the Cantor Lectures delivered by him before the Society of Arts last December. The book is well illustrated by thirty-five plates or diagrams of Gothic tracery patterns, checks founded on the square frets, and a variety of patterns, in all of which Mr. Day has classified and analysed patterns according to the principle involved in their construction. The chapter on pattern dissection is full of suggestion. Thus we have patterns constructed upon cross lines; of these are checks, lattice, plaids, frets, and a great variety of ornamental diapers. The cross lines may be varied, or may not even appear, but still a great many patterns are made so that they fall within the lines. The diapers constructed on the equilateral triangle are numerous and varied. The frets and interlacings are all produced upon cross lines, and the diapers based on bisecting the square lattice forming triangular forms, develop an immense variety of very pleasing ornament suitable for surfaces. Plates 6, 7, 8, 9 are well worth study. The student will soon discover what a wealth of suggestion he has in the square lattice when placed either on the square or diamond-wise, and crossed by a series of lines bisecting the angles. In both cases the diaper is one of triangles. The equilateral triangle is most fruitful in designs. If we group them together we have the hexagon of six triangles, and an infinite variety of star diapers. Byzantine and other Oriental patterns are made up largely from the triangle. The octagon in like manner is derived from the square crossed diagonally, and many beautiful patterns are constructed upon it. Many of the most obvious of these are illustrated. In connection with the square the octagon will repeat. Several intricate Arab interlacings and lattice patterns are shown in Plate 10, based upon squares, octagons, and hexagons. The author in each case shows by dotted lines the construction of the diaper. It is remarkable what a variety of intricate patterns can be evolved from these simple geometric figures and the lines of radiation. After the straight-lined family of patterns the author treats of those founded on the circle; in this class we have wave diapers and a variety of curvilinear patterns. The intersecting circle is one of the most useful groundworks of ornament. Mr. Day has shown clearly by these examples that all patterns are based on geometric forms of the simplest kind, so that the designer who desires to invent patterns ought to be familiar with simple methods, and ones that can be easily worked. The examples of silks, damasks, wallpapers, tile patterns, and various textiles are well selected, and the book is a valuable introduction to every student of ornamental design.

* The Anatomy of Pattern. By LEWIS F. DAY. London: B. T. Batsford.

GLASGOW ARCHITECTURAL ASSOCIATION—ANNUAL EXCURSION.

ON the evening of Thursday, the 14th ult., a small party left Glasgow for Liverpool as the first annual excursion under the auspices of the Glasgow Architectural Association. It had been at one time intended that the tour should be made in a district of Yorkshire; but as the result of a meeting among those who purposed going, it was ultimately decided to travel in Cheshire. At Liverpool some of the public buildings were visited, including, of course, St. George's Hall, also some of the new buildings in the suburbs. A visit was paid to the Walker Art Gallery, where were viewed the drawings in the Liverpool Cathedral Competition. A forenoon train, on Saturday, was taken to Speke station, and a short walk brought the party to Speke Hall, admission and permission to sketch being kindly granted by the proprietrix. This is one of the most interesting of the old timber halls which are so characteristic of the district. The interior wood and plaster work is especially rich, and the house contains some fine old furniture. The party that night proceeded to Chester. While there they owed much to the kindness of Mr. Lockwood, architect, and Mr. Beswick, his chief assistant. The latter gentleman accompanied the members round the city, pointing out the principal features of archæological interest, the crypts, the Roman hypocaust and columns; the remains, Roman and Mediæval, at the new Grosvenor Museum; St. Mary's Church, of the Perpendicular period, and the fine Norman and Transition church of St. John, at present undergoing restoration at the hands of Messrs. Douglas and Fordham. The Cathedral also was visited, under the guidance of Mr. Beswick, who gave the members much interesting information regarding the building. The south transept is now being restored by Mr. Blomfield. Sketching was engaged in by all the members at the Cathedral; also at Stanley House, houses in Bridge-street and Whitefriars, St. John's Church, &c., and a few photographs were taken. Not only the old but much of the modern work is of great interest to architectural students, several examples by Douglas, Lockwood, and Ould being particularly admired. Leaving Chester, Nantwich was visited. Here there is some half-timber; but the salient feature of interest is the church, with its fine stone pulpit and octagonal central tower. At Sandbach there is a good timber hall and a Per-

pendicular church, restored by Sir Gilbert Scott. From Congleton, Astbury Church and Moreton Hall were reached. Moreton Hall, it need hardly be said, is one of the very finest examples in the district. At Sawsworth there is an interesting Perpendicular church with fine wood roof; also a good half-timber hall. Circumstances proved unfavourable to the viewing of the interior of Adlington Hall, which is understood to be very fine; but at Bramhall the party was conducted over the house by the proprietor, who is now restoring it very thoroughly. Some interesting coloured decorations have just been laid bare. A look over some of the public buildings of Manchester and the Exhibition closed the tour, which will, it is hoped, form a regularly recurring feature of the Glasgow Association's studies.

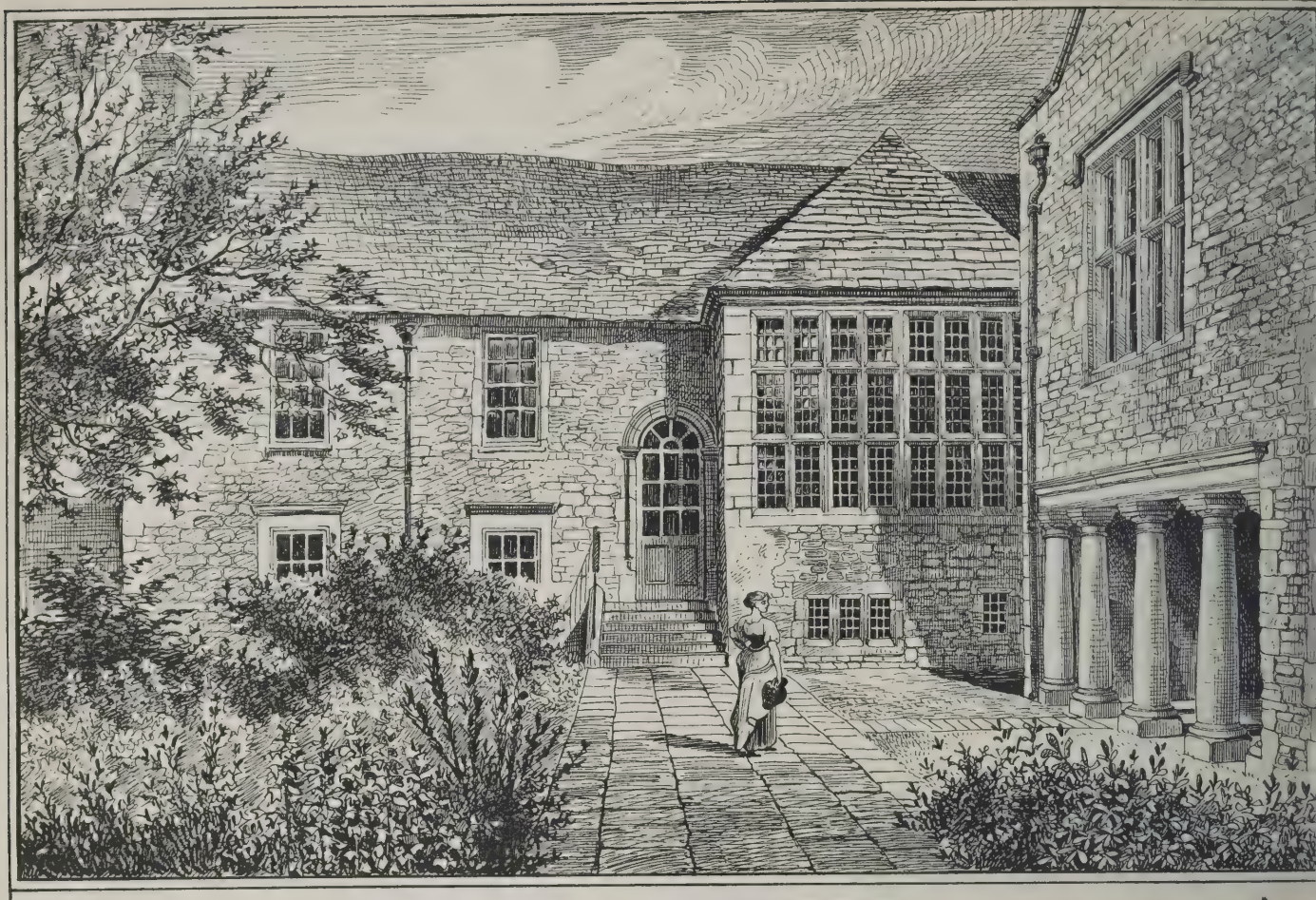
A NEW ROAD PAVEMENT.

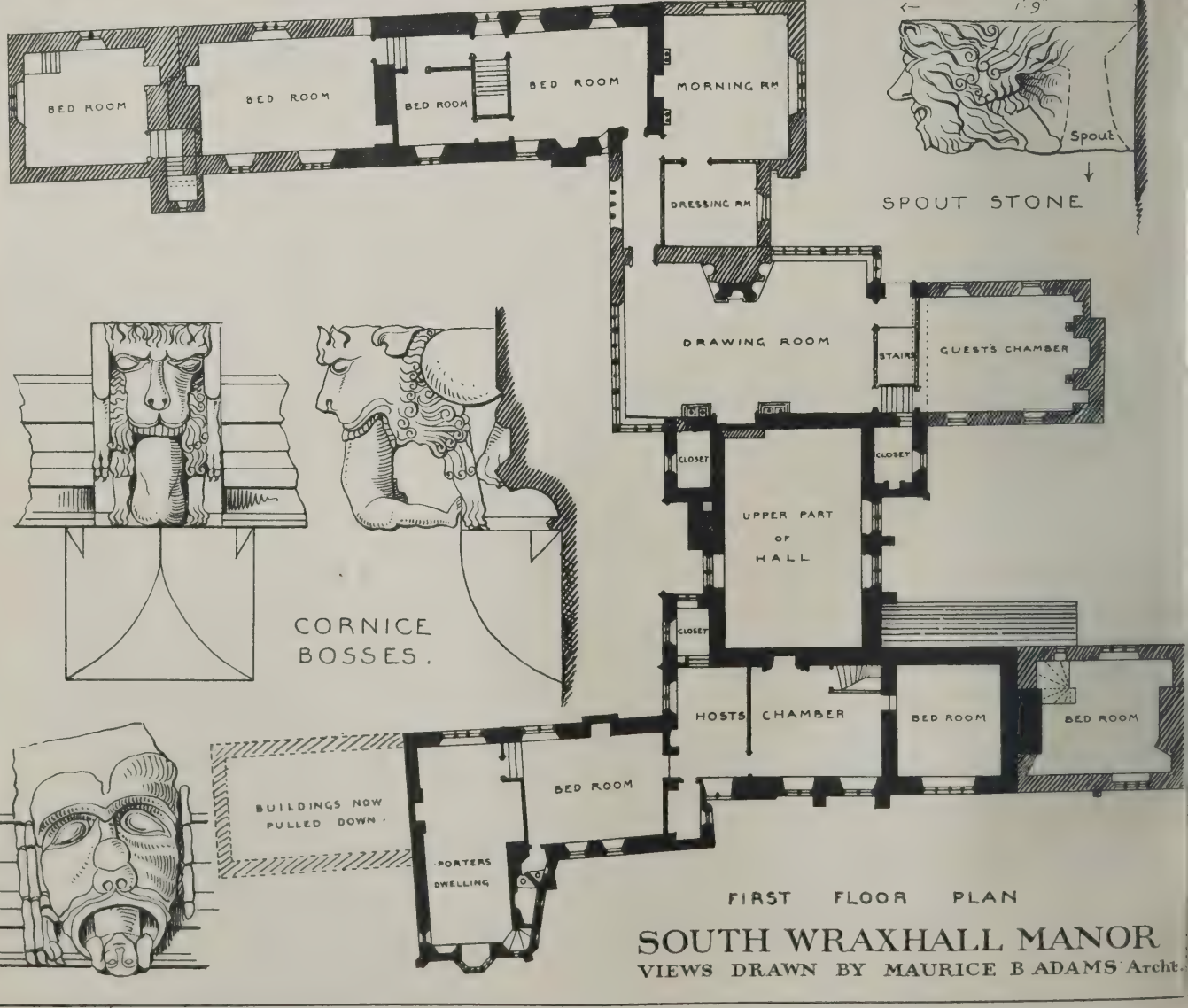
ALTHOUGH, says the *English Mechanic*, many attempts have been made to discover a thoroughly satisfactory road pavement, it is well known that none of the modern devices altogether supplies what is required, for wood, which is the most promising material, and has been tried in various ways, is certainly not all that could be wished; it wears quickly and unevenly, and in wet weather the mud is splashed up in an unpleasant manner upon foot passengers from its absorbent surface, while asphalte is at once the bugbear of drivers and owners of horses, however much it may be praised for its noiselessness by those who transact their business in streets which are paved with it. Granite sets are universally discredited, and macadam is really out of place in any city where there is much traffic, and the rainfall cannot be regulated to suit the roads. Some years ago —at least a quarter of a century—the eastern end of Leadenhall-street, near Aldgate Pump, was laid with cast-iron "honeycombs," the interstices of which were filled with grouting; but this pavement, excellent in some respects, was found too noisy, and, above all, too dangerous to such horses as happened to fall on it, for the iron ridges cut into the flesh of the horses that fell, and the pavement was speedily condemned and taken up. A somewhat similar pavement, with, however, a great difference, has recently been patented, and is likely to come into extensive use in busy streets, for it is based on a scientific principle, and meets all the requirements in a scientific manner. The idea has been taken from the elephant's tooth, which, as it wears, always presents a rough surface, in consequence of the vertical layers of hard substance intermingled with the soft remaining above the latter. In the new road pavement the hard layers are represented by Portland cement, the soft by a mixture of sand and cement, and the surface continuously presented to the feet of the horses is consequently one on which there is excellent foothold, while the resistance to traction is little more than that of asphalte. This method of making road pavement has been patented by Mr. A. C. Ranyard, F.R.A.S. The "sets" consist of "blocks" of alternate layers of hard and soft material, which are so laid on the road that the edges of the laminæ form the wearing surface. In consequence of the unequal abrasion, the surface will always expose a series of ridges of slight elevation—not sufficient to cause jolting in carriages, while securing ample foothold for horses—and, as the material can be laid down in large blocks, and will probably last longer than any of the ordinary pavements, it will have an additional recommendation, for as most tradesmen know, "road up" means little business. The granite blocks require to be taken up when their surface has worn smooth, and though they may be turned over and the other side used, this means a stoppage of business; but the elephant-tooth blocks wear rough as they wear down, and may, it is thought, be used until they are more than half worn through, a process which would occupy a long time, as they are 4in. thick, and very hard when set for three or four months. It is calculated that the blocks will wear at least ten or twelve times as long as granite pitching. The layers of cement and mixture are respectively a quarter of an inch and three-quarters of an inch thick, which give blocks having ridges at such a distance apart that no jolting is experienced in carriage traffic, while the foothold for the horses is perfect, and when the blocks are properly "seasoned" the ridges of pure Portland cement are really harder or tougher than granite itself. The new pavement has been tried experimentally for stables, and is now undergoing the severe test of a gateway entrance where heavy waggons pass frequently; but it will be readily understood that the principle being sound, it is simply a question of cost, to what extent the new pavement will be adopted. Practically it presents that paradox which is the coachman's delight—a rough-smooth surface, that is, rough enough to give a secure foothold to the horses' feet, and yet so smooth that it does not jolt the carriage, nor offer much resistance to traction. As the wear will in all probability be very little, the surfaces of the roads will be comparatively free from mud or dust.

ARCHITECTURAL ASSOCIATION EXCURSION, 1887, WILTS.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

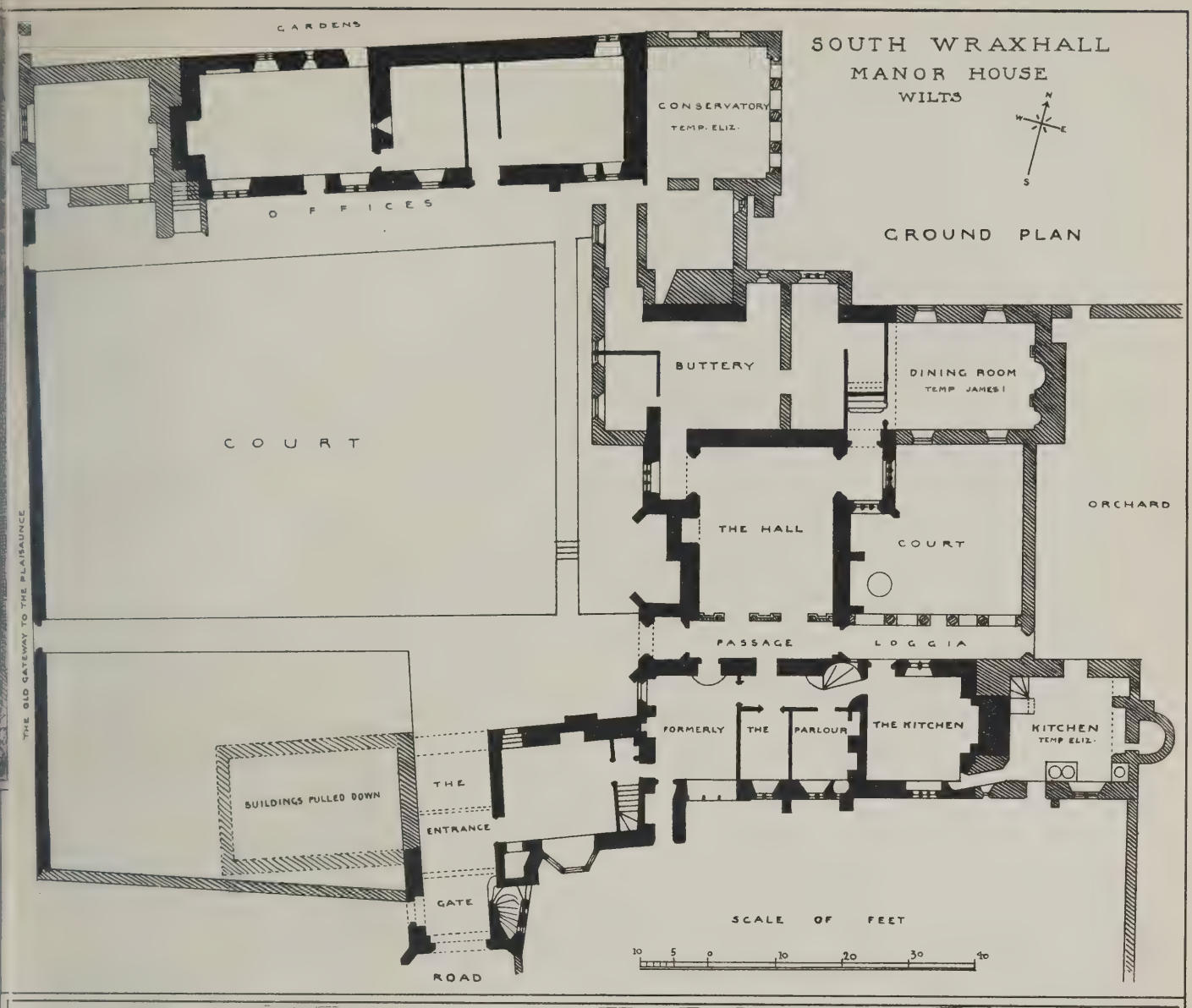
ON Monday the programme opened with a visit to the terraces at Claverton, with the adjoining church and old farm buildings. The former constitute all that remains of the once famous mansion of the Dassets, whose history tells us of their seat being besieged and taken by the Parliamentary party during the Civil War. The open balustrades of pierced stone of uniform design throughout are perhaps too thin to be worthy of imitation; but their general effect, when backed by the gabled house, must have been exceedingly dignified, and the terraces considerably enhanced the importance of the elevation. The piers to the entrance have pierced finials of good character, and the ramping balustrades are happily treated. Defence against military attack of course was not thought of in the planning of these gardens. Jeffrey Wyattville rebuilt the house at Claverton on the top of the hill, but his work here is devoid of interest; and so also is the church, which was reconstructed in 1858. Ralph Allen, the stone quarry owner who erected Prior Park as an advertisement for Bath stone, lies buried in the churchyard under a monstrous inclosure terminating in a great square pyramid. He died in 1766. His house at Prior Park, near Bath, is a dismal piece of building, the work of an architect named Woods, who wrote a book describing his own works under the title of "The Beauties of Bath." It is faced by a great pediment and portico of poor design and indifferent proportions. The building is charmingly situated, and is memorable in connection with "Tom Jones" and Pope, who finished the "Dunciad" there in 1741. The farm buildings at Claverton, like much of the old Domestic work in the neighbourhood of Bath, much resemble Northamptonshire buildings with their simple gables, mullioned windows, and square built chimney shafts. The roofs are, for the most part, covered with stone slabs, and their harmony of colour with the weather-stained masonry of the walls often furnishes the leading charm of their unpretentious architecture. Mr. Wallace Gill, of Bath, briefly described Hinton Abbey, where a most interesting chapel remains almost in a perfect condition, having a groined roof, with rooms over and adjoining it. The other existing part of this old Carthusian Monastery, the first built in England, comprises the building known as "The Refectory," but its proper designation seems to be an open question. The foundation dates from 1227, and the dedication of the Abbey is in honour of the Blessed Virgin Mary, St. John Baptist, and All Saints. Next week we shall publish some measured drawings of the chapel buildings, and will then give other particulars concerning it. The builders were the monks of Witham Friary, which was situated some 12 miles distance from "Hynton," as the place in old days was called, and Ela, Countess of Salisbury, wife of William Longespée, founded it. Hinton House hard by was constructed out of the Abbey ruins in Tudor times, but has modern additions of a characterless type which spoil its façades. The manor house and church at Hinton Charterhouse lack interest. Farleigh Castle is a ruin very beautifully situated above a vast ravine, the well wooded slopes of which, rising from the banks of the Frome, are called, from some antique tradition, the "Danes' Ditch." For 300 years Farleigh was the stronghold of the wonderful family of the Hungerfords, whose glory closed in a story of shame and reckless dissipation in the days of Charles II., at whose dissolute Court Sir Edward Hungerford wasted his substance and fortune. Canon Jackson has written a book of great interest on the history of the place, with plans of the castle restored; but to the architect there remains nothing of special interest. Mr. J. Alfred Gotch read some spirited notes on the ruins, adorning his tale by delicate allusions to the weaknesses of our ancient aristocracy. The Hungerfords associated their interests with the Lancasters in the Wars of the Roses, and, in that cause, sacrificed many of their heads and much of their estates. The chapel within the castle walls was used as a parish church; but, in Grose's time was nearly roofless; while in 1779, when it belonged to the Houltons, who purchased the property in 1730, the sacred edifice was repaired, and again in 1806. Its restoration, however, to its original purpose seems never to have been realised, and the chapel has for very many years been only used as a museum containing a miscellaneous assortment of curiosities, such as sheet armour, jack boots, stirrups, spears, and swords, together with a made-up pulpit, a reredos in Jacobean woodwork, some contemporary chairs, chests, and settles. The family coat of arms and badge of three sickles are ingeniously introduced into the seats and roof of the building, which itself is mainly of Perpendicular design. The altar slab is of pudding-stone. Driving off again after luncheon, the party next visited Norton St. Philip, where the old George's Hostelry is the most notable object of interest to the architect. We give herewith a view of this quaint old building, which is situated in Somersetshire, just beyond the borders of Wilts. A great Cloth Fair once was held here, and the merchants met in the large upper room of the George. Its date is 15th century, and was built as the Grange of the Prior of Hinton. Parker, in his "Domestic Architecture of the Middle Ages," gives some drawings and details of the house. The substructure is entirely of masonry, the upper part in front being in oak constructed half-timber work. The stone-built and cusped bay windows on the ground floor add greatly to the façade, and the great doorway in the centre leads through to the rear buildings, where there is an octagonal stair turret, and a series of cusped-headed windows, now nearly all blocked up. The braced roof of the house is of good design; but sadly needs repair. Inside the house there is not much remaining of note, save a fine wrought-iron firegrate, with a swinging pot bracket of good design, sketched by several of the party. The farmhouse below the village is over-windowed with projecting moulded mullions, a style peculiar to this district. There is at the back of the house an ancient square built and gabled dovecote; the walls are 2ft. 4in. thick, and the pigeon-holes are 16in. deep. The church in some respects is a fine one; but has a coarse western tower, the portal of which furnishes its most interesting detail. This projects from the main wall to the face of the west buttresses, and so forms a porch, which has a traceried ceiling all of stone, and some boldly carved spandrels. Sir Gilbert Scott restored the church in 1847, and it contains some very poor woodwork from his designs. The windows are filled with indifferent glass, added at various times since Scott finished his restoration. With Wellow Church the day's proceedings closed. In the village street a house, now occupied by a farmer, contains a richly-panelled room, having a richly-carved oak chimneypiece, and the doors of the apartment are surmounted by a frieze and scroll terminal corresponding in design, of Elizabethan or rather later date. The work seems never to have been painted, and its detail is refined and well executed. The church, which is of pronounced Somersetshire type, may be described as a fine one, with a bold western tower of good proportions. The fabric was restored in 1845, and the grand roof of the nave has been carefully renovated. Mr. W. Gill lately repaired the old roof of the north aisle and the chapel at the east end, now occupied by the organ. The church is furnished with old seats with poppy-heads of ugly character. There are some Jacobean wall and other monuments,





SOUTH WRAXHALL MANOR

VIEWS DRAWN BY MAURICE B ADAMS Archt.



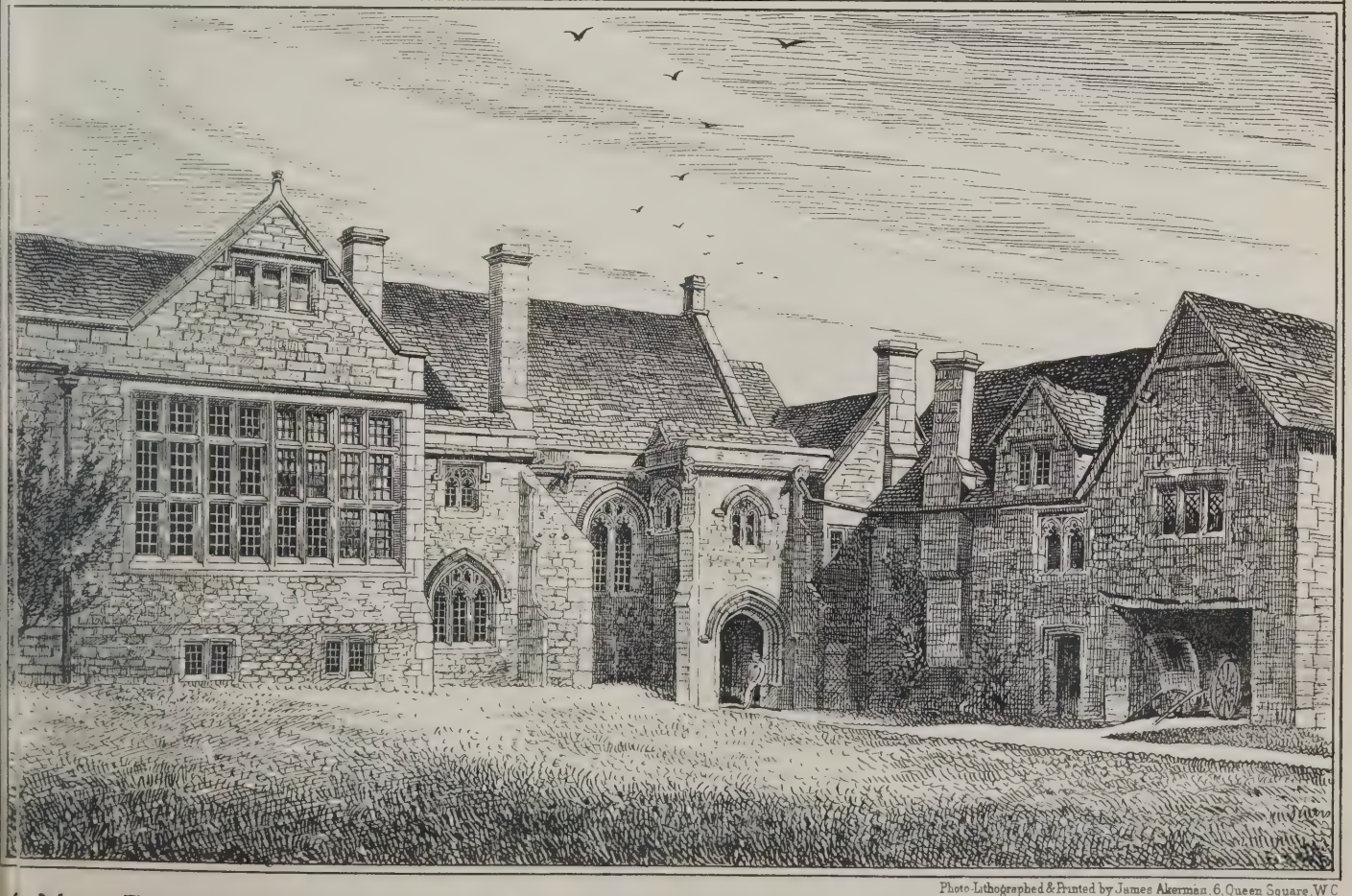


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

ut neither of these are remarkable. First on he list of Tuesday's visits was Cheney Court Manor House, built by the Spekes during the eign of James I. There is nothing remark- ble about the fabric, but it may be described s typical of Old English architecture with imple straight gables, many windows, and ome wrought-iron work to the water-spouts. nside the house are two rather extravagant himneypieces Rococo in style, and conse- uently admired by the more extreme members f the party. Corsham Mansion, Church, and Almshouses afforded material for a stay of ome hours, and the excursionists were shown he grand collection of pictures which was be- ueathed by Sir Paul Methuen, the Spanish Ambassador, who died in 1757, to the ancestor f the present Lord Methuen, who lives at the Court House. These pictures form one of the ldest private collections in England, and com- rise works by Lely, Kneller, Dobson, C. Jan- ens, Vandyck, Riley, Reynolds, Gainsborough, Romney, and others. The house, which is f considerable size, is also a handsome ansion of Early English Renaissance haracter, with gables, high roofs, and himneys; but it is not very interesting s a specimen of architectural design. Nash, f Regent-street celebrity, rebuilt the north ront; but this subsequently was pulled down, nd Charles Bellamy was engaged to rebuild it, ogether with the grand staircase, over which e put a low, square tower forming a centre to he principal front as seen over the main roof. his architect's drawings for these alterations re in the library at the R.I.B.A.; but his xecuted work here is only of passing merit. he house contains some fine English and talian furniture. Mr. G. E. Street, R.A., re- ored the church and built a tower and spire o it, following the type of Wiltshire spires ound in parts of the country, that of Lacock ext seen affording one example, though some- ow the modern work in this case is hardly so tisfactory as the ancient one. The original ower was a central one, and probably was hifted in rebuilding for some good reason. The outh porch of the church at Corsham is teresting with some late additions on the east de of it in Jacobean taste. The nave arcades e Norman, and there are some Decorated indows; but the main portions are Perpen- cular in character, and of good design. The od-screen in stone to the north chapel is rried out with light wooden detail, including e fan vaulting over it. In the chancel is a rt of the ancient wooden screen decorated in lour, and now surmounted over a masonry all to screen off a vestry. There are several assical wall tablets in the church, and some e curiously inscribed. The Hungerfords, as riginal owners of the estate, are thus equently represented, and their virtues are re- unted for the benefit of posterity. The ungerford Almshouses, of which a view is iblished herewith, deservedly attracted a large mber of sketchers, and the woodwork of the apel was measured by not a few. In the UILDING NEWS for June 11, 1886, will be und a complete set of elevations to scale with plan and a sheet of details drawn by r. Fredk. M. Simpson, when Travelling udent of the Royal Academy. The staircase a good one, and in some respects the build- gs are unique, and seem very perfect. Their story was told when the above illustrations re given, with some account of Dame ungerford, who built them. Lacock Abbey cupies a picturesque site situated on the nks of the Avon, and without being in any se a grand house, is certainly most com- hensive in character, including work of the h-century date down to the so-called Gothic Batty Langley, who added the hall about middle of the last century. Lacock was unded by Ela, Countess of Salisbury, as an gustine nunnery in 1232, and shortly after- rds she entered the establishment as a nun, d was elected its abbess. Henry VIII. confis- ed Lacock in 1539, and bestowed it on Sir illiam Sherrington, who transformed the nnery into a house for himself. The church s pulled down, and many changes were de; but the house still retains a considerable t of its monastic features, the beautiful oister being specially interesting. The naissance octagonal tower built by Sher- gton in Edward VI.'s reign is a good mple of its kind with refined detail. The Elizabethan stable buildings, particularly as seen from the rear, group well with half-timbered dormers and bold chimneys. A plan of the abbey will be found illustrated in the BUILDING NEWS for Sept. 22, 1876. The Talbots received the estates by marriage from a daughter of Henry Sherrington, brother of Sir William, the builder, he having inherited it in consequence of no issue. Mr. Talbot, the present owner, received the party of excursionists, and explained every part of the house in detail, showing a large plan of the abbey as it stands. The village of Laycock is almost entirely built of stone, with here and there some half-timbered work, and the many gabled old houses furnish many a good subject for both brush and pencil. The church at Lacock, like the village, is comparatively unknown to architects; but it is a very interesting building in every way. The richly treated chapel on the north side of the chancel is uncommonly good, with beautiful carvings and high-pitched gables behind the embrasures of the decorated parapet. The east wall of the nave, over the chancel roof on the exterior, is masked by an elaborated arch-shaped parapet, cusped and trefoiled, containing beneath it a traceried window. There is a somewhat similar feature at St. Mary's Church, Devizes, but that is not so rich as this example. The south transept has a domestic building adjoining it in very Late Tudor, and this grouping, with the spire, forms at once a picture, with the charming old village street in the rear. There is some good plate in the church, and an Early ciborium, which was also shown the visitors. In the street is a house containing a panelled room, with a good piece of Jacobean woodwork over the fireplace. Passing Pickwick and Box on the way home to Bath, some pretentious buildings and houses lately erected in the stone of the county were noted as specimens of what to avoid, especially the "Gothic" house in the valley of Box-hill.

On Wednesday the day's work commenced by visiting the celebrated mansion of South Wraxhall, of which we now give plans and two views. A sketch of the drawing-room appeared in our pages last week, and we herewith add some particulars of the house. South Wraxhall, or the "litle maner at Wrexley," as Leland's Itinerary describes it, is the historic home of the Longes, and dates its records from the days of Etheldred. In general idea of plan the hall and offices very closely resemble Great Chalfield (seen on Thursday), so much so that one would almost imagine South Wraxhall, which is certainly the older of the two, served as a model for that building, although Chalfield was much larger. The hall at South Wraxhall has a fine hammer-beam roof, and it is 31ft. 8in. long, by 19ft. 9in. wide, and the drawing-room measures 35ft. 2in. by 15ft. 7in. The work is chiefly Tudor and Elizabethan in style, but parts are older, and this hall is the oldest portion of the house. The entrance-gateway, with porter's dwelling over it, seems to have been built at a somewhat later date. The oriel window to the room over the archway is rich, and the angle buttresses are effective and somewhat singular. A staircase within the wall on the right leads up to the room above, where there are some quaintly-arranged privy closets, and a fireplace adjoining the bay window is curiously situated. The chimneypiece in the hall bears the date of 1598, and is an interesting specimen finished with Elizabethan detail. The drawing-room is more strictly in the style of James I., and the chimneypiece is a singularly dignified example of the time with purer enrichments than is usual in work of this date. A male and a female figure, with Ionic caps, on each side, support a very handsome cornice, which is surmounted by a stylobate, whereon are placed columns and entablature of the Corinthian order; between the columns, which are also enriched, are figures of Prudence, Arithmetic, Geometry, and Justice. On the pedestal supporting Arithmetica is the following inscription:—

"Par nuper numeris vestigo site subactis,
Me pete, concinne, si numerare cupis.

And on that supporting Geometria—

"Mensuras rerum spatiis dimetiora equis
Quid Cœlo distet Terra, locusque loco."

"Prudentia" and "Justitia" have no motto. In the centre is the figure of Pan. The view of this drawing-room, which we published last Friday, gives a very good idea of this rich apartment. The room was added by Sir Walter Long in 1600. Both plans which we publish herewith are correct to date, and were originally drawn by Pugin for his "Examples." The two sketches printed herewith are from photographs taken by Mr. Wilkinson, of Trowbridge, and show the exterior from two points of view. The upper sketch shows the side bay window of the drawing-room to the right. In front of the picture is drawn the colonnaded Elizabethan garden-house, or conservatory as it has been called. By the lower drawing a view is furnished of the principal front of the mansion. Some of the gargoyles or boss-stones to the exterior cornices are boldly carved with fancy and freedom, including monsters consuming men and "dragons of the deep." Bradford-on-Avon and Westwood concluded the proceedings on Wednesday. Next week, with further illustrations, we shall conclude our account of the places visited. Chalfield Magna, of which we give a view to-day, was seen on Thursday. The plan shows the character of the old house, which has been rudely modernised, so that in point of fact the front of the house is all that stands unaltered of the original building.

AMERICAN BRIDGES.

SPEED in bridge construction is one of the elements in American practice. Many structures on the Ohio and Mississippi Railway have been erected within remarkably short periods; one span of the Medora Bridge over the White River was erected by thirty-seven men in one day. This element of time is not a matter that weighs with us to the same degree. The system adopted in America of making a specification of the requirements, leaving to the contractors the mode of working out the design, is a procedure that has tended to expedite works, though not always with the best results. The United States method is much like asking architects to send in designs for a building not to exceed a certain amount; though there generally is a competent engineer or board of experts employed to examine the designs, and report on them. The specifications contain clauses on the tensile strain, usually stated as not less than 50,000lb. per square inch of sectional area; the limit of compressive strain allowed is not less than 25,000lb. per square inch. The total weight of structure is one of the things left to each contractor, though a certain weight per foot is allowed for various items above the floor beams. The maximum strains are specified—that for tension is usually put at 10,000lb. per square inch upon the bottom chord and main ties, in other members liable to receive sudden shocks or tension the strain is not to exceed 4,000lb. per square inch. Riveted work, pins, eye bars, wind braces, and floor beams are amongst the points particularly specified, and a clause on the tests required is appended.

These specifications are faulty in giving definite tests, which may be stood with iron of inferior ductility. Thus it has been shown that hard, brittle iron will stand the test well, and exhibit not the least sign of elongation; in this respect, it may be approved, instead of really tough iron. The clause for testing should clearly enforce a percentage of elongation or contraction of area with as much firmness as the breaking strain. In bridge construction the requirements of good iron cannot be proved by tensile strength merely; the members exposed to strain should be ductile as well. A bar with moderate tensile power, if ductile, is better than one of higher power that is brittle. So of other points. Though maximum strains are specified, they do not take into account the effect of sudden shocks. The same want of consideration for the accidental is shown in the details, and what was intended as a specification for a perfect structure is really only one under certain definite and assumed conditions.

"The very highest church in Europe," according to the *Bundner Tagblatt*, "is the pilgrimage chapel of St. Maria de Ziteit, above Salux, in the canton of Graubünden. It lies 2,434 mètres above the sea level—nearly 8,000ft. high, near the limits of perpetual snow. It is only open from St. John the Baptist's Day to St. Michael's Day."

CONTENTS.

Mass and Detail ... 273
Safeguard against Fire ... 274
Unequally-Loaded Roof-Trusses ... 274
The Science and Art Department ... 277
Building Materials.—II. ... 278
The Anatomy of Pattern ... 279
Glasgow Architectural Association—Annual Excursion 279
A New Road Pavement ... 280
Architectural Association Excursion, 1887, Wilts ... 280
American Bridges ... 281
Our Lithographic Illustrations ... 282
St. Margaret's Church, Ipswich ... 282
Competitions ... 282
Architectural and Archæological Societies ... 282
Wayside Notes ... 303
Building Intelligence ... 303
Engineering Notes ... 304
Archæological ... 304
Correspondence ... 304
Intercommunication ... 306
Legal Intelligence ... 307
Water Supply and Sanitary Matters ... 307
Parliamentary Notes ... 307
Our Office Table ... 307
Trade News ... 308
Tenders ... 308

ILLUSTRATIONS.

CLAINES CHURCH, WORCESTER.—NEW CHANCEL, ST. MARY'S, HATFIELD.—THE HORNS TAVERN AND ASSEMBLY ROOMS, KENNINGTON.—ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CLAINES CHURCH, WORCESTER.

We gave a double-page illustration of the exterior of this church on the 8th ult., and described the building and the recent improvements and additions carried out from the designs of Mr. Aston Webb.

THE CHANCEL, CHURCH OF ST. MARY, HATFIELD, HERTS.

The church of St. Mary, Woodhill, in the parish of Hatfield, was erected in the year 1847, and terminated with a small apsidal chancel which was deemed to be inadequate to the requirements of the church. The new chancel, an illustration of which we give this week, was opened by the Archdeacon of St. Alban's, on April 13th, 1887. The walls are of brick, faced externally with Bath stone. The stained glass was executed by Mr. W. G. Rich, of Brentford. The reredos is in fine Bath-stone, with alabaster and coloured marbles for caps, bases, columns, super-altar, &c.; the groups in the three panels are in statuary marble, representing, in the centre, "The Adoration of the Magi," and on either side, "The Annunciation," and "The Nativity." On the north side of the chancel are a spacious vestry and an organ chamber. The church is heated by hot water on the high-pressure system by Mr. John Smeaton, of London. The general contract was taken by Mr. J. W. Falkner, builder, and the whole of the works were carried out from the designs and under the superintendence of the architect. Mr. H. Hardwicke Langston, of 9, Great James-street, Bedford-row, London.

THE HORNS TAVERN AND ASSEMBLY ROOMS, KENNINGTON.

No particulars are to hand in response to our application for them about this building. The architects are Messrs. Crickmay and Son, of 17, Parliament-street. The publichouse is already completed, and the premises adjoining are now erecting.

ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.

For description see p. 280.

Joseph Winch, a builder, of Walthamstow, has been convicted at the Stratford-by-Bow Petty Sessions of having constructed two buildings of bad materials. It was stated that the bricks were soft and undersized, and that no mortar was used. He was fined £3, and ordered to pay £1 11s. costs.

A new board school in Ashwood-road, Parkgate, Rawmarsh, Yorks, was opened on Friday. It cost £2,300, and accommodates 310 children.

Under a bequest of the late Mr. Harvey Ham, to Christ Church, Frome, two new windows are being placed on the south side, one of which will be of stained glass. The stained and other glass will be supplied by Mr. E. Horwood; Mr. E. Whiting has undertaken the stonework; and Mr. W. G. Brown is the architect.

ST. MARGARET'S CHURCH, IPSWICH.

Our illustrations of the above are from part of a set which obtained a national silver medal at South Kensington last year for Mr. Harry Percy Adams, of Ipswich.

COMPETITIONS.

Board School Plans.—Mr. E. R. Robson, F.S.A., consulting architect to the Education Department, in preparing regulations as architectural assessor with regard to a competition for new Board schools at Tottenham, gave the following among other suggestions which may be regarded as semi-official:—(1) The technical definition of a class room is a room which does not hold more than sixty scholars. This is an old definition framed by the Department, and has not been altered to meet modern necessities. (2) Reckoning accommodation on plans the Department take 10sq.ft. superficial area for class rooms; but when a room is to provide for more than sixty, then it is reckoned by the accommodation shown on the plans. (3) Rooms other than class rooms (which would be technically called school rooms) must not exceed 20ft. in width. (4) As to desks, while there is no rule as to the adoption of dual desks or those 6ft. or 8ft. long—where dual desks are used, there need be no gangway at the back.

Scarborough.—The directors of the Constitutional Club, Scarborough, after having examined the designs sent in for the new club, have awarded as follows:—The first premium, 25 guineas, to Mr. Henry A. Cheers (Twickenham, London), the motto under which it was sent in being "Straight and True." Two second prizes of 10 guineas each have been given as under:—Mr. Arthur Bown (Harrogate) and Edward Dodgshun (Leeds), joint authors of the design "Union is Strength"; and to Messrs. Smith and Broderick (Hull), for the design "C.C." in monogram.

Stockport Technical School.—At a meeting of the executive committee of the Stockport Technical School, held last week, for the purpose of selecting the design for the new institution, 22 sets of plans were exhibited, two of the competitors having furnished alternative designs. The committee unanimously selected the design under the motto "Stet," the author being Mr. George Sedger, 26, Great James-street, Bedford Row, W.C.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—The annual Congress of this association is being held this week at Liverpool, under the presidency of Sir James A. Picton, F.S.A. The first meeting was held in the Town Hall on Monday, when the president delivered his inaugural address. He remarked that the sphere of inquiries and observations during the Congress would principally lie in the vicinity of the estuary of the Mersey, which had been from the earliest ages the dividing line between two important districts. When the Romans first penetrated into this country the northern bank was occupied by the Brigantes, and the southern by the Cornavii, two of the most powerful Celtic tribes. Now, the first thing which struck them in reference to the history of the estuary was the fact that all the other rivers along the west coast—the Conway, the Lune, the Voryd (or Clwyd), the Dee, the Ribble—have Celtic or Cymric names. The Roman geographers, Ptolemy and Antoninus, gave these names in a Latinised form. The Mersey was not mentioned by them at all, and it had no Celtic name. They were drawn to the conclusion that subsequent to or during the latter part of the Roman dominion a serious change must have taken place in the physical features of the locality. The members subsequently visited St. George's Hall, and in the evening dined together. On Tuesday the members passed through the Mersey Tunnel to Birkenhead and visited the Old Priory in that town; Bidston, West Kirby, Thurstaston Hall (now the seat of Sir David Radcliffe), and the church at Woodchurch. In the evening a meeting was held at the Walker Art Gallery, where papers were read on "The Origin of Christianity in Wirral," by the rector of Wallasey (the Rev. E. P. Gray, M.A., F.S.A.); "The Connection between Wales and Cornwall during the 5th, 6th, and 7th Centuries," by the Rev. W. S. Lach Szyrma, vicar of Newlyn; and "Some Considerations relative to the Ground Plan and the Walls of Chester," by Mr. E. P. Loftus Brock, F.S.A. On Wednesday the members visited the Calderstone, Speke Hall, and Childwell Hall. Burscough Abbey, at which excavations have been made by Lord Derby, has also been visited, and to-day (Friday) Sir J. A. Picton has invited the members to a garden party at his residence, Sandy Knowe, Wavertree.

Cambrian Archæological Association.—The forty-second annual meeting of this association will be opened at Denbigh on Monday next. The president is Mr. J. T. Dillwyn Llewelyn, M.A., F.L.S., and the president-elect Mr. C. Salusbury Mainwaring. Among the places to be visited are Denbigh Castle, Burgess tower and walls, the Abbey, Penycloddian camp, Rhuddlw priory, castle, and church, Ruthin Church, cloisters, and castle, St. Asaph Cathedral, Ysgubor Newydd tumulus, and Cefn caves.

Sheffield Society of Architects and Surveyors.—A general meeting was held at the Sheffield School of Art on Tuesday, the 16th inst., to receive the report of the Provisional Committee appointed at the preliminary meeting in May last. Mr. T. J. Flockton presided, and there were also present Messrs. C. Hadfield, J. B. Mitchell-Withers, F. Fowler, C. J. Innocent, G. W. Wilson, R. Davidson (borough surveyor), W. C. Fenton, and W. F. Hemsoll, and a large number of the members of the profession, the meeting being of a thoroughly representative character. The rules, which have been modelled on those of the Manchester and other societies, were carefully discussed, and finally adopted; and it was decided that the society should be styled the Sheffield Society of Architects and Surveyors, and that a special meeting should be called in a fortnight's time for the election of officers, &c.

The Leeds Master Builders' Association.—The annual excursion of this association took place on Friday. The members mustered at the New Station, and left by an early train for Masham, whence the party drove to Masham village to inspect its ancient church, and thence to Hackfall. Here the visitors were conducted to the numerous places of interest in the beautiful valley, after which they proceeded to Studley Royal, arriving at Ripon about five o'clock. Dinner was served at the Unicorn Hotel. The annual meeting was subsequently held, and officers for the ensuing year elected.

CHIPS.

A new vicarage, Elizabethan in style, is being built at Edstaston, Salop, from designs by Mr. T. M. Lockwood, of Chester. The builders are Messrs. Charles Tommy and Son, of Wem.

The work in connection with the drainage of the parish of Cheshunt was commenced on Friday. The sewage is to be disposed of by means of irrigation. The farm will be situated between the Royal Small Arms Factory at Enfield Lock and Waltham-cross. The effluent water is to be conveyed in a drain through the parish of Enfield for a distance of about three miles, where it will enter the catchwater ditch of the East London Water Company. The cost of the works is estimated at about £39,000.

The Sunday-school teachers have presented a rose window, from the studio of Mr. Taylor, of Berners-street, to Christ Church, Bexley Heath. The window, which is in the south transept, was unveiled on Wednesday, the 10th inst., as a jubilee offering.

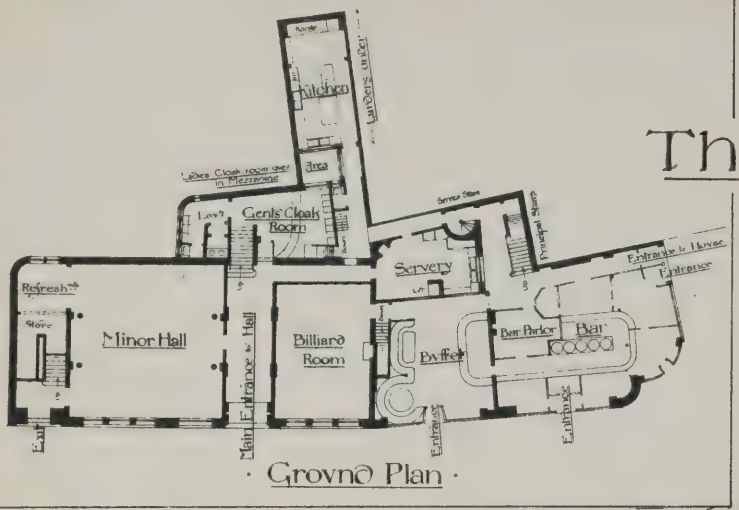
A patent has been sealed and granted to Harry Leith Mackenzie, Victoria-place, Stirling, for an improved sketching protractor for military or other purposes.

Messrs. Denne and Co., of Walmer, are just completing the construction of quarters on the Admiralty Pier at Dover for the accommodation of a battery of Artillery, who will be stationed there for duty in connection with the turret.

Notwithstanding the rain which prevailed over North Wales at the beginning of the week about 4,000 quarrymen are still idle, many of the large slate mines in Carnarvonshire, Merionethshire, and Cardiganshire having been compelled to suspend operations for want of water.

The Horns Tavern & Ass

MESSRS: CRICKMAY & SON · ARCH

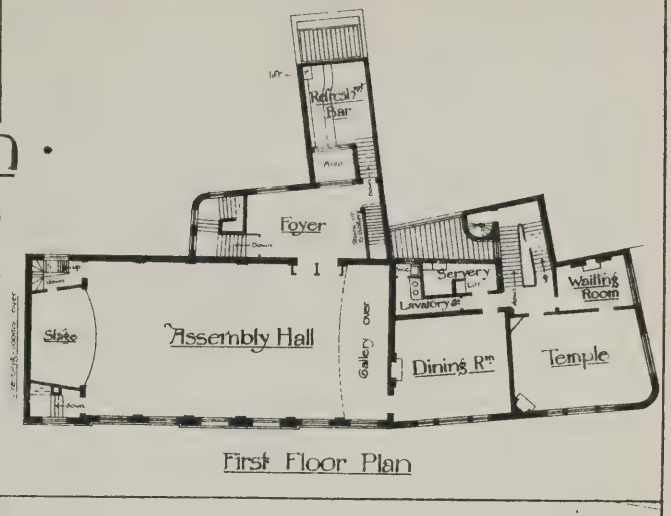


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First Floor Plan



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WAYSIDE NOTES.

OW is it that Baedeker does not publish a guide-book to Normandy and Brittany? would think that if there were any country likely than another to be largely visited nglishmen it would be this northern dis- of France. But even the ubiquitous Cook not supply me with any more satisfactory e than an unwieldy volume in a brilliant cover that rivals the stained glass of this to be found in the Cathedral of Rouen. leker I know by experience is trustworthy convenient, so I was sorry to find he has produced any book dealing with the country nestion. I have, therefore, been compelled ander about the old towns with the afore- bulky article just peeping out of my coat- et, thereby branding me as an undoubted ist. For I do not write in my customary nts, but in a comfortable hotel in the resting city of Rouen. It is a fête day, in consequence, the air seems positively y with the clanging of bells of all sorts sizes. One has this morning been tolled h, judging by the depth of its sonorous , must be of prodigious weight. I believe a monster at St. Ouen, which is only rung times a year. It is more like the boom of non than the sound of a bell.

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uen makes a very pleasant start for a short in Normandy and Brittany. Anyone ing this place for the first time will be a disappointed with the old Domestic work . As a matter of fact, it is fast disappear- and making way for the Renaissance ces of the modern French architect. It is there are some individual examples that very curious, and the typical construction ie half-timbered work is quaint—solid wood tering hung with small slates, and the ling in " of some sort of concrete substance tered over to bring the exterior surface to ooth face. These buildings look very scaly ffect, and there is a wonderful sameness it this work. So it is fortunate that there nany magnificent specimens of ecclesiasti- rchitecture culminating in grandeur with glorious church of St. Ouen. The earlier ions of this building—the choir and tran- s—are grand specimens of the style. The position of this part of the building is so llent that were the church robbed of all its rative ornament—its carvings, mouldings, gargoyles—it could not but be still nsely interesting. And the skyline of this of the edifice is very fine by reason of the tiplicity of pinnacles and flying buttresses.

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ne west portal of the cathedral is literally es thick in what looks like pure dirt and , and it would be well for the inhabitants to turn on the hose of a fire-engine, and h the whole of the carvings after the ner of the suggestion made in an evening er recently to cleanse the Marble Arch! It possible, however, that a good stream of er directed against this world-famed portal ld wash away all the carved work in a few rs, so fragile does the stonework appear. cannot but feel a sense of regret that such agnificent piece of design and workman- as this west portal to Rouen Cathedral ld have been applied to the exterior of a ding. It is totally unsuited to withstand weather. This, however, may be said of most he more elaborate Flamboyant work. It is common-sense exterior architecture, and is ainly wholly unfit for execution in the soft ie that so many of the buildings hereabouts constructed of. In the present instance, heads of statues have disappeared in a lesale manner, and much of the exquisite ing is quite obliterated.

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here appears to be a fair amount of build- going on in the town. They were hard at k in several places on Sunday. I cannot much for the talent displayed. The average lern street architecture is very poor, and s any definite character, being generally e and flat. A new bridge over the Seine is ourse of construction, and will apparently handsome structure when complete. It is in a few yards of the timber bridge at the of the Rue Grand Pont. A total absence rry-building may be noted in these parts. work is well and solidly built, and Mr. Buggins would have to reform his ways if he came here.

I would recommend anyone coming this way not to run through Dieppe without having a day or so in that town. The church of St. Jacques is a most interesting edifice, and contains much that is worth the attention of the sketcher. The château—a castle, or fort on she hill—is a most picturesque pile of buildings, and would make many beautiful water-colour sketches. The machicolations are very fine on this castle, and the whole mass has a grand skyline. It is well, however, to resist the desire to commit to the surface of Whatman's "rough," the lovely tints of the weather-beaten fortresses of this country, unless one especially wishes to see the interior of a French prison, after the manner of Captain Bewicke. Whilst I was on the hill a man, on the point of photographing the place, was quickly sent to the right-about.

Dieppe is just now full of fashionable people. The races come off shortly, and in consequence hotel charges are very high. There is a very good Casino with a fine situation on the beach; but the building does not come up to the one at Scheveningen, which, by the bye, was burnt down a year or so ago, though, I presume about rebuilt by this time. It is a little curious that no buildings of this sort are to be found at English seaside places. In course of time we may expect to see a few Casinos on our coasts, as they could be adopted without their objectionable features as existing on the Continent.

There is a tower to the Church of St. Jaques at Dieppe that is most interesting to ascend, as from many points one is able to examine the old stonework and carvings. The weather seems to have treated the stone in this church in a most remarkable manner, wearing it into little holes varying in size considerably and resembling in their disposition the little sinkings in the more weather-worn carvings—the minute points of shadow that give so much piquancy to the Flamboyant carving as they do in our Perpendicular work. To me this seems very curious, as showing how beautifully the old carvers disposed their light and shade, that it is as artless as Nature herself. And from this tower, also, one can examine the many curious gargoyles. Of all features of these delicate Late French churches, the gargoyle seems to suffer first. Their heads drop off, or they fall away altogether, because their projection is so great. True specimens of the "noble grotesque" are these gargoyles; monstrously ugly, certainly, but generally executed with a marvellous degree of spirit.

It is my intention to move on to the north-western districts of Normandy and Brittany. I do not, however, expect to find a more magnificent perspective than that of the interior of St. Ouen at Rouen. As I saw it from the west end of the nave, during the celebration of High Mass, the effect was beautiful indeed. It is not, however, my intention to enter into the poetic about the church. We had enough of "reverberating aisles" and "dim arches" in the daily papers during the Jubilee week. But I will say that, by accident or intention, the effect of the light of the stained-glass window as seen through the arcades at the end of the apse at St. Ouen, resembles the cool tints of sunrise, and that the many crosses and screens that surround the high altar look black against the light like broken masses of storm-cloud, whilst the flicker of the long candles appear as the twinkling of many morning stars in the greyness of the dawn.

GOTH.

The current number of *Time* contains a short but not uninstructive paper on the "Reform of the Architectural Profession," by Mr. J. Neville Porter.

The Roman coffin which was found in Plumstead Marshes some months since, and was afterwards reburied 8ft. deep in the parish churchyard, by order of the vicar, has just been disinterred through the exertions of Mr. George Payne, of Tunbridge Wells, and is now on view in the drawing-room of the Brenchley Museum at Maidstone.

The Featherstone Local Board have appointed Mr. Malcolm Paterson, M.Inst.C.E., to report on the best means of supplying the district with water.

Building Intelligence.

CROOK.—The new church of St. Catherine, at Crook, near Bowness, which faces the old and disused one on the opposite side of the road, was consecrated on Thursday, the 11th inst. The new church consists of nave, 40ft. by 25ft.; chancel, 21ft. by 19ft.; baptistery, 10ft. by 10ft.; vestry, 11ft. by 10ft.; and an entrance porch. The accommodation is for 165 (exclusive of extra space for chairs). Over the baptistery there is a tower 50ft. in height, containing belfry and ringers' chamber. Yellow freestone dressings have been used both externally and internally, forming a pleasing contrast with the local walling stones. The church is entirely founded upon solid rock. The whole of the roofs are of pitch-pine, open-timbered, those of nave and chancel having arched principals rising off stone corbels. All are boarded and covered with Stevenson and Co.'s green slates from Coniston, finished with red ridges and stone crosses. The nave seats and screen work are of pitch-pine and those in chancel of oak. The chancel is laid with Minton's encaustic tiles, and the heating is by Constantine, of Manchester. The contractors are—for the masons and slaters' work, Mr. R. Pennington; carpenter and joiners' work, Mr. W. Hutchinson; plumbers' work, Mr. L. Airey; painting and glazing, Mr. J. Hine; plastering, Mr. B. Davis; carving, Mr. Simpson; art metal work and iron railing, Mr. W. Wilson. The church is built in the Late Fifteenth-century style, and has, with the fittings throughout, been designed by Mr. Stephen Shaw, of Kendal, and carried out under his superintendence.

LEEDS.—As a memorial to the Rev. C. E. Lamb, who has accepted a living in the South, the congregation of St. George's, Leeds, have decided to enlarge their schools, and to effect this two houses are being pulled down. In the basement will be a room 32ft. by 13ft. On the ground floor will be provided a boys' class-room 32ft. by 32ft., and having two open fire-places; on the first floor, approached by a stone staircase, there will be a committee or parochial room, 32ft. square. The ceiling will have a deep cove, with moulded plaster cornices, and the roof principals will be dressed and moulded. The elevation to Clarendon-road will be of Horsforth sandstone. The windows are to be mullioned and transomed, and with three lights and two lights alternately. The roof will be covered with grey slates from Idle Moor. Messrs. Smith and Tweedale, South-parade, Leeds, are the architects.

CHIPS.

A group of sculpture called "The Virgins," which was bequeathed to the Liverpool Corporation by the late Mr. Daniel Busby, has been accepted by them for the permanent gallery, and has just been placed in position in one of the rooms of the Walker Gallery. The group, which is life-sized, represents two draped female figures, illustrating the parable of The Wise and the Foolish Virgins, and is from the chisel of R. Rinaldi, of Rome.

Mr. John Blackburn has been appointed inspector of nuisances for the Ramsgate urban sanitary district, at £150 per annum.

The foundation stone of a new Sunday school of St. Luke's Mission Church, Selborne-street, Walsall, was laid on Monday. The plans have been prepared by Mr. James Davis, The Bridge, and are of a plain building to accommodate about 400 scholars, at a cost of £600.

The members of the water committee of Newcastle-on-Tyne visited, on Monday, the new reservoir now in course of construction at Hallington. The reservoir is being built from plans by Mr. W. G. Laws, the city engineer, and will cost about £100,000; it is expected to be finished within the next twelve months.

The draft charter of the proposed Teaching University for London, for which University College and King's College have petitioned the Crown, has now been presented at the Privy Council Office. It is probable that the new University, if founded, will be called the "Albert University of London."

Sir Henry Tichborne, Bart., has appointed Messrs. Thurgood and Martin, of Chancery-lane, surveyors to his Doughty Estates, situate in the neighbourhood of Bedford-row, Great James-street, John-street, Doughty-street, and King's-road.

Engineering Notes.

Connah's Quay.—Mr. Gladstone laid on Tuesday the first cylinder of the new railway bridge over the River Dee, between Chester and Flint, which, when completed, will form a new connection between England and Wales. The only railway bridge between North Wales and Cheshire at this moment is that spanning the Dee near Chester, on the Chester and Holyhead Railway. The Manchester, Sheffield, and Lincolnshire Railway Company have obtained the sanction of Parliament to extend the Cheshire Lines from Chester to Connah's Quay by means of a low-level opening bridge across the Dee. The width of the river where the bridge crosses is about 480ft., and the large swing opening will give a free passage to vessels of 140ft. in width, the "tail" span being about 80ft. The bridge is of cantilever design, and will carry a double line of rails. The length of the swinging girder will be 287ft., and the depth of the centre 32ft. The two fixed spans of 120ft. each complete the structure of the bridge. By adopting hydraulic power under a pressure of 700lb. to the inch, the bridge will be opened or closed in 40 seconds. The bridge, when completed, will exceed the span of every other bridge over a navigable river in the United Kingdom by 36ft. Messrs. Cochran and Son, of London, have taken the contract at about £80,000. The engineer for the bridge is Mr. Francis Fox, Westminster.

ARCHÆOLOGICAL.

Cowick Barton.—During the past week the site of the old Benedictine Priory Chapel of St. Andrew at Cowick Barton, St. Thomas, near Exeter, has been brought to light. The priory, which was founded by the Courtenay family, was only in existence from 1263 till 1352, when, according to Dr. Oliver, Henry VI. assigned its revenues to Eton, and at the suppression of Monasteries the lands went, with those of Tavistock, to John, Lord Russell. The excavations are being carried out under the superintendence of Mr. G. H. Fellowes Prynne, architect, of London and Plymouth. A coffin, of 13th-century character and of Portland stone, having a large cross carved on the raised lid, has been found on the site.

CHIPS.

Mr. Willis Wigg, of Lynn, has been elected assistant surveyor to the York City Council, with a salary of £180 a year. Mr. Wigg was pupil and afterwards assistant to Mr. W. G. Mawbey, then borough surveyor of Lynn, and now city surveyor of York.

A new cemetery was consecrated at Great Harwood, Lancs., on the 11th inst. The ground has been laid out, and the three chapels, lodge, and boundary wall erected, from designs by Mr. Angelo W. R. Simpson, of Richmond-chambers, Blackburn, which were selected in competition. The chief contracts, those for masonry, bricklayer's and slater's work, were carried out by Messrs. E. Lewis and Son, of Great Harwood. The total cost, including purchase of land, has been £5,200.

A new church, to be dedicated to St. Alban-the-Martyr, is about to be built at Acton-green, W. Mr. E. Monson, jun., of Acton, is the architect.

Under the provisions of the will of the late Mr. W. Ward, the City Corporation have decided to build a high school for girls on a site in South Crescent, Tottenham Court-road, having a frontage of about 100ft., and an area of about 17,000ft. superficial, now let on lease by the Corporation, for terms expiring in 1902.

Princess Louise visited Winchester on Wednesday, and unveiled a bronze statue of the Queen, which has been erected in front of Castle-hill. The statue is the gift of the High Sheriff, Mr. Whitaker, and has been designed by Mr. A. Gilbert, A.R.A.

It is proposed to build a bridge at Caputh Ferry, near Murthley, N.B. Messrs. W. Arroll and Co, of Glasgow, are the engineers; and the estimated cost is £4,500.

Plans by Mr. Sydney Mitchell, of Edinburgh, have been adopted by the heritors of Bothkennar parish, for the enlargement of the parish church, which was erected in 1789. The works, which will practically amount to rebuilding, will cost about £1,500.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

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Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

Received.—B. S. and R.—R. P. C. Co.—A. and Co.—M. H. B. and Co.—R. H.

Art Student. (There is a Slade Professorship of Fine Art at Oxford.)—Jubilee Juggins. (We have tried the more ambitious subjects before, and competitors either fail or steal bodily from well-known works.)

Correspondence.

THE STONE FAMILY — ST. MARY'S CHURCH, HOLME-NEXT-SEA.

To the Editor of the Building News.

Sir,—As architect for the restoration of the above church, I am desirous of ascertaining through the medium of your paper if any of the posterity of the Stone family are living in England? It may interest them to know that in excavating a few days ago for the foundations of the new seating, a large flagstone, 6in. in thickness, was found at the S.E. corner of the nave, with the following inscription roughly carved thereon :—"Richard Stone and Clemens his Wife." In the chancel is a richly-carved monument of alabaster and marble, with husband, wife, and 13 children kneeling, with the following quaint inscription on a tablet beneath :—

"Here under lyeth Richard Stone and Clemens his Wife who lived in Wedlocke joyersly together for 64 years and three months; of them proceeded 7 sonnes and 6 daughteres, and from those and theirs raised 72 children, whiche gave to the sayd Richard Stone and Clemens great comforte."

Richard Stone died 5th of October, 1607, aged 87 years; and Clemens died 10th day of Novr. (*), aged (*) years.—I am, &c.,

Willm. Adams, Architect.

King's Lynn, Aug. 15.

(*) Dates gone.

FIREPROOF CONSTRUCTION.

Sir,—As I have urged the necessity and practicability of this principle ever since the burning of the previous Covent Garden Theatre, and Whiteley's Emporium being set forth as fireproof, it is damaging to the system to find it fail so much in its object: First, in loss of four lives; the very narrow escape of thirty innocent horses that would in a few seconds, it seems, have suffered the dreadful fate of the sixteen hundred in New York, lately burned to death.

I have been to view the ruins and their mode of construction, as it was difficult for me to conceive such an enormous destruction of property with the precautions we read of being taken to avoid disaster by fire, &c. I have hesitated whether I should express my opinion in print, so I will just briefly recite what I consider deficiencies, or mistakes, and submit it, if you think desirable to publish it. I was in hope others would have written more on this important subject, and so delayed till now I find not so much information or comment as I expected.

First, in case the alarm of fire is made during business hours, the means of escape being of first importance, I was surprised to find the staircases of wood, chiefly oak. What a mistake!

I saw on the brick walls of the ground and first floor charred remains of wood battens and boarding. The iron girders, great and small, were not sufficiently protected from the great heat, as these and the concrete forming the floors and ceilings are battened and covered with simple thin canvas plaster, as can be seen. As the exposed iron bent, it failed to support the weight of concrete, thus the smaller girders forming the chief floors and roof came down wholesale. This can be easily prevented in construction. There need be no wood; even some of the large iron girders that remain are much bent.

In the window openings above the shops there are very large window frames and boxings with sashes, all of wood, and which could well be of wrought or cast iron with but little or no wood.

The shop or ground floor windows burned out show the remains of wood linings round them, so do those in the shops not burned have wood linings, and great iron girders supporting the front walls above shows the casing forming the entablature; this, with the large moulding upon it, is all formed of wood quartering boarded and with lead or zinc covering. I have written and urged before that arched construction of brick instead of girders would be much better over large shop windows, having little or no wood and with all needful glass space. These arches in brick and cement can be constructed to stand fire; all linings, dado, &c., could and should be of good cements or tiles.

The revolving shutters I have read of being of steel I find are of wood metal hinged; to make sure I picked up portions to examine that laid in the street.

Some of the window openings were partly blocked with fallen charred woodwork; in two or three were pieces of flooring, the joists having floor boards attached just as they fell, apparently from first floor girders; this is inconsistent with fireproof construction, as it appears as if part of the flooring was of wood over shop windows. The surface of concrete floors are battened and boarded, but need not be, adding food for the conflagration, while a smooth surface made to the concrete, and covered with corticine or carpet, seems quite sufficient.

In some compartments the mode of construction is exposed, and the fittings, with many shelves, racks, &c., could well be of metal or slate, according to the varied requirements.

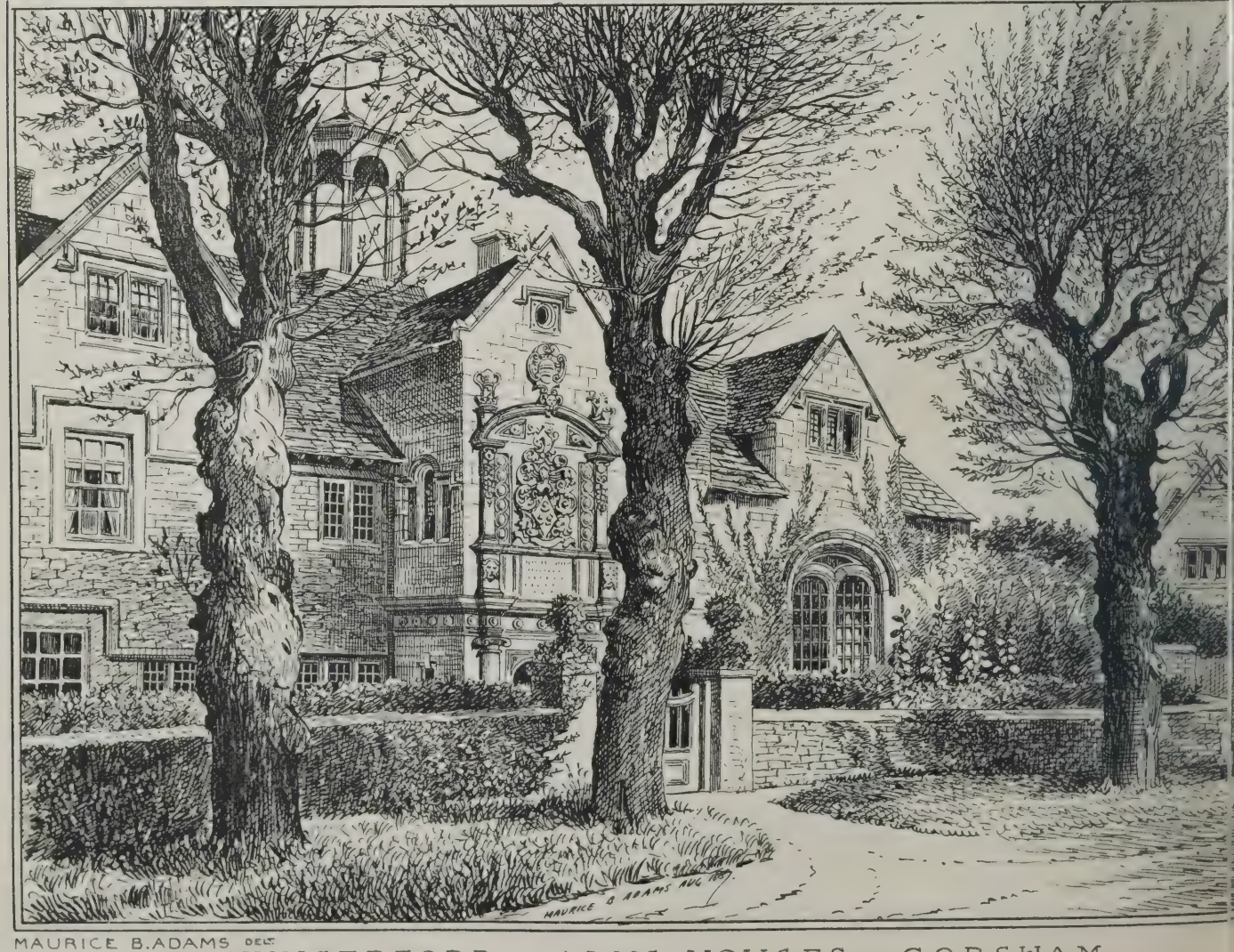
With all the precautions taken, and though the deficiencies existed that I allude to, it is surprising to see such destruction; it really looks like incendiarism, for the flames to have issued from several windows at once, and so it becomes a question whether the separating doors were shut or left open; these, I think, should and could be made to shut automatically, or from the exterior.

The stables I am sorry I did not see; but I just repeat, they can and should, in the name of humanity, be constructed absolutely fireproof, to cause no risk of our good servant, the horse, being burned alive, an event too dreadful to risk or contemplate.

The long and high brick wall forming one side seems, as I saw it at the safe distance, to be little injured beyond being forced out of upright, and crooked, by expansion of girders, &c., showing that brick again proves superior to



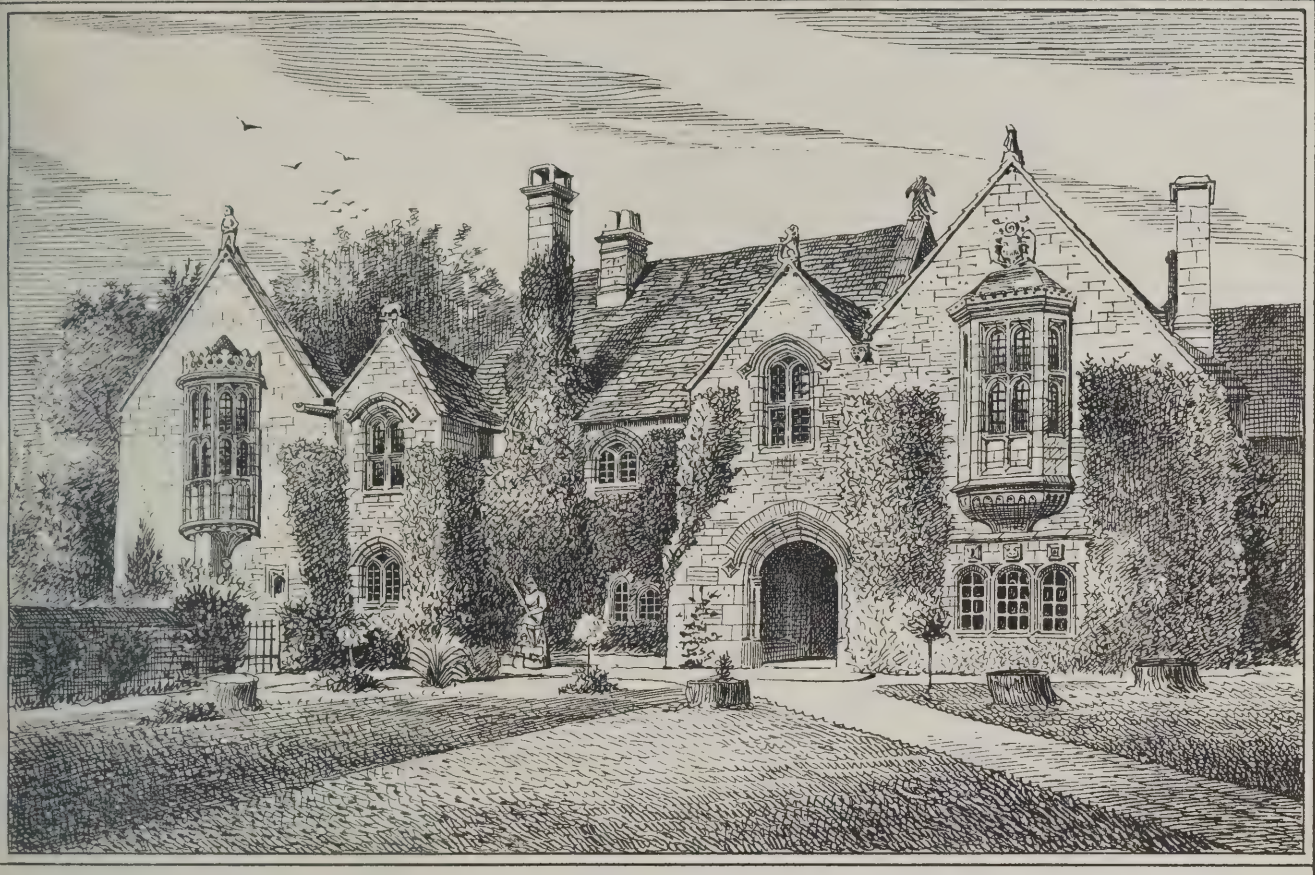
GEORGE INN NORTON S. PHILIP, SOMERSET.

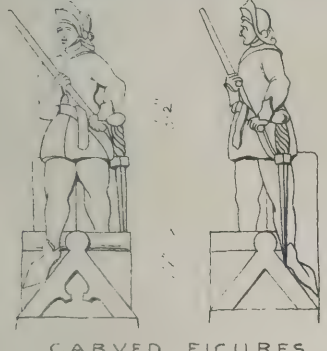


MAURICE B. ADAMS DELT.

HUNGERFORD ALMS HOUSES CORSHAM

ARCHITECTURAL ASSOCIATION EXCURSION
WILTSHIRE AUG. 1887

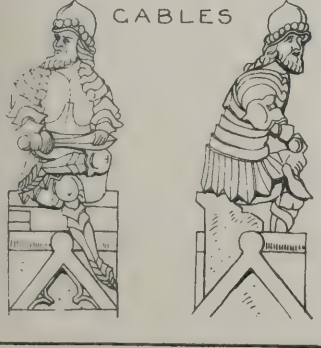




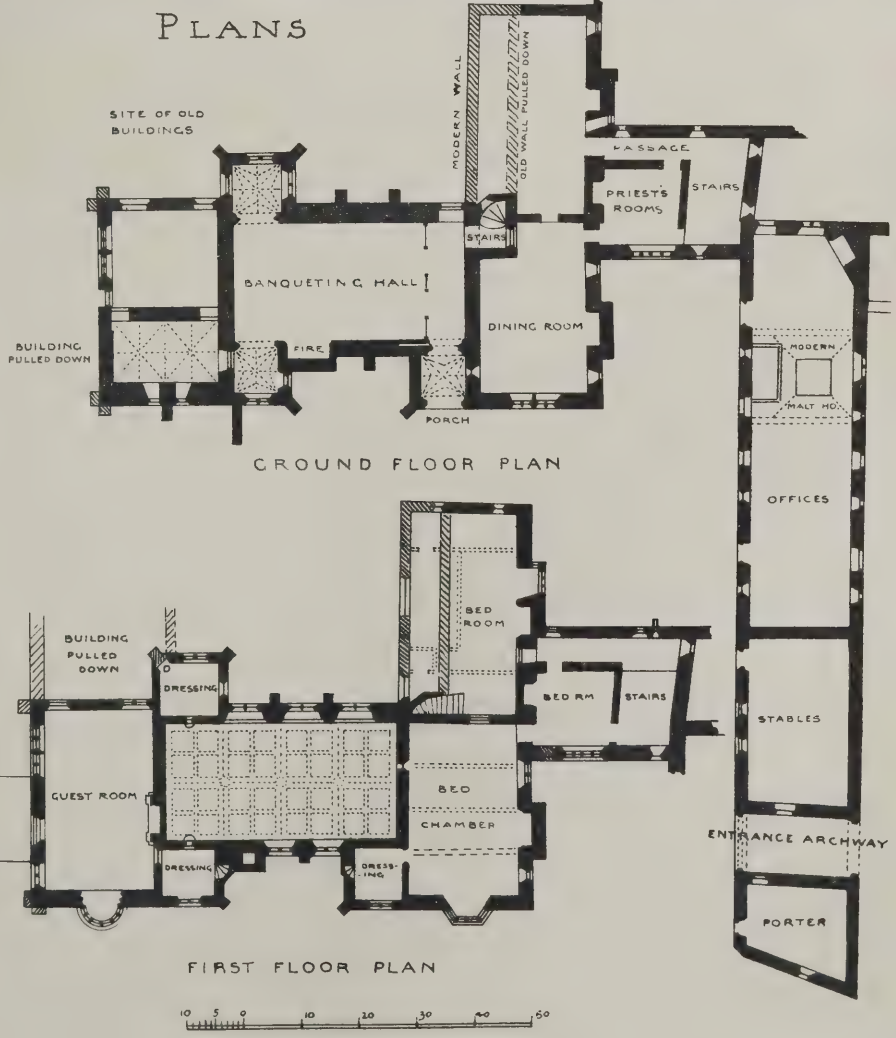
CARVED FIGURES ON THE



CABLES



PLANS



J Akerman, Photo-lith London

GREAT CHALFIELD MANOR HOUSE WILTS.

bursting stone under fire and water in such ildings.

[did not see into the basement; but suppose ground floor above having good abutments uld be arched, and therefore capable of taining the great weight of fallen brick, ne, and concrete of doors and roof from ve, as I read they have; indeed, means should taken to arch all that can be of concrete rs and roofs a little, introducing ties out of ch of fire and air, where it can be done at sonable cost, if no abutment available.

When all needful means are adopted, it may fairly expected that little damage would rue to a substantial structure, if only the tents are burned.

[think it is a shame so much property is rificed through the want of precautions by ners.—I am, &c.,

Broxbourne, Aug. 16th. JAS. PULHAM.

SIR,—After reading the letter of Mr. Fredk. gers in your issue of the 12th inst. with re-ence to fire in buildings, I think he cannot aware of the existence of "silicate cotton" "slag wool," which is now employed as a ans of fireproofing buildings. Of course it a well-known fact that "all sublunary sub-nces" will burn when subjected to extreme at; but some substances are much more rapid sorbents of heat than others; and if a com-ratively speaking incombustible material, nich is a good non-absorbent and non-con-ctor of heat, can be used so as to act as a p-gap in event of a fire, a step in the right rection is assuredly taken. Again, if this sub-nce will *absorb the water* which is pumped o a burning building, instead of allowing it run uselessly into the street, another advan-ge is certainly gained.

Mr. Rogers suggests the use of steam, which rough its own force could be ejected great tances; but I would submit that great diffi-lty would be found, even at close quarters, forcing jets of steam through apertures ere volumes of smoke and flame were coming t. If, however, the greater part of the ter pumped into the building be properly lised and converted into steam, it will essarily prove most effectual in extinguish-g the flames.

As an illustration of the effect of steam upon laming mass, I need only cite the familiar thod of putting out a fire in a chimney by plying saturated cloths to the fire under-ath, thus generating steam which rises and ickly extinguishes the fire above. If silicate ton be employed as a lining for walls, floors, d ceilings, it will not only add very effec-tally as a stop-gap in the event of a fire, but, ould the building be played upon by jets of ter, it will absorb nearly its own volume of ter, and retain it in suspension till the heat the fire turns it into steam.

Trusting that this information may be of ne interest and service to your readers,—m, &c., F. M. H. J.

"SURVEYS OF GREAT BRITAIN."

SIR,—You would be doing a great service to number of your readers employed upon the ve if you could give any information con-ning the intention of the Government wards them, as you are doubtless aware an ire survey of the United Kingdom will, in course of a month or so, be completed (on rge or smaller scale); and unless the authori-s intend to produce upon larger scales, and se large areas of country, a great number of n who have been trained upon this du y ce they left school will be thrown upon the ntry, with very little prospect of being able obtain a living, as the peculiar nature of ies connected with the survey in no way fits to compete with men trained in private ces, especially during the present crush in labour market. We hear rumours that re-on of Yorkshire, Lancashire, the Mid-lian, and even of Ireland are in contem-tion; but nothing definite can we gather. through your columns, you could give any rmation as to districts to be revised, or the nber of men (out of 3,000 and odd employed) t are likely to be discharged, *including* surers, you would be conferring a favour n hundreds of anxious men, who are now living in that unhappy state of mind ever attending upon suspense.

Trusting I am not troubling you too much,—I am, &c.,

Aug. 10. A PLOTTER.

THE NUISANCE FROM SEWER VENTILATORS.

SIR,—On p. 52, of July 8th issue, Mr. R. H. Reeves made the assertion that stack-pipes were utterly useless as a means of ventilating sewers. He based this assertion upon a story about his testing one of these pipes lately, when the air was "almost stagnant," as if the pipe were choked owing to the air underground being heavy. I considered and stated that his conclusion was too hasty and sweeping, because the stack-pipe was not properly put up, and also probably more than three-fourths choked. And on p. 230 of August 5th issue, I said that if his test as to the pipe being clear were the smoke-test, he might easily be deceived. In his letter in reply to me to-day, p. 269, he does not deny this; so, if silence gives consent, I am fully warranted in condemning his hasty and mistaken assertion that stack-pipes are "utterly useless as ventilators for the sewers."

As to the explanation Mr. Reeves gives of his "Fig. 2" in middle column, p. 193, it appears to me to be all nonsense as he there gives it. He does not mention any proper reason why the mere fact of the top of the vertical pipe being 50ft. higher than the inlet should give one-twentieth of an inch barometrical pressure on ground inlet, and so be able to cause a current of ten miles an hour, or 880ft. a minute. His "barometrical pressure" or motive power is also fanciful in this case, for as in the hydrostatic paradox, the water in the thin limb of the U-vessel balances that in the wider limb, so with the aërostatic law, the air inside of the pipe 50ft. high, if of same temperature, balances the whole air outside of it to same height, so that "barometrical pressure" here is nowhere!

Mr. Reeves's question on page 269 as to what additional pressure could be got by adding 10ft. to the height of the stalk-pipe he spoke of, to get it above the chimney, is simply an attempt to trap me; but I land him in it by saying that this extra 10ft. of height was not to get the extra "barometrical pressure" he writes so curiously about, but to enable the wind to get at the top of the pipe, so as to exert an expiratory or sucking-out-of-the-air effect upon it, and so cause an upward current in the pipe. This action of the wind lessens the atmospheric pressure on the mouth of the outlet-pipe, and so, the pressure being greater at the inlet, air rushes or flows towards the outlet. As a proof of this, take a small tube several inches long and dip its lower end half-an-inch or so in water; then, by blowing properly across the top of the tube, the water will rise up in it and be ejected out of it. The scent spray is an example of this force, and water is 800 times heavier than air.

The foregoing is one answer to Mr. Reeves's question on page 269, "What is the motive power that causes air to flow up shafts when the inlets and outlets are at different levels?" I will state another. Yesterday I was testing the drains of Mr. Fraser's house, 2, Crown-gardens here, and at the back of the house, which has a southern exposure, there is a metal rain-pipe put up outside, which discharges above ground. There was very little wind, and what there was, I think, would as likely have tended to cause down-draught as up-current; yet when I put my anemometer into mouth of the pipe at the bottom, 200ft. of up-current per minute was indicated. This, I think, was caused by the sun's rays heating up the pipe, and so making the 50ft. of air inside the pipe lighter than 50ft. vertically of the atmosphere outside of it. The lesson from this is, that ventilating blow-off pipes for sewers would act much more efficiently often on the sunny than on the shady side of street; and a 4in. pipe, although useful off a sewer to relieve air-pressure in it, is open to improvement as to size if good ventilation is desired.

Besides testing the above rain-pipe at Mr. Fraser's house—which house had been shut up, and there was no fire on in it—I also tested the speed of the air-current going through the 6in. drain-pipe, which went underground about 35ft., and then had the vertical soil-pipe and 4in. iron ventilating above it—together about 60ft. high—connected into its higher end. The speed through the 6in. air shaft over the disconnecting trap was 80ft. a minute. When I contracted the inlet to 2¾in., the anemometer indicated 400 lineal feet of speed. The 4in. ventilating pipe of the soil-pipe had one of my fixed exhaust ventilators on its top, and I give the credit of this air-current partly to the wind acting upon the exhaust ventilator, and partly also, perhaps, to the pressure of the wind on the mouth of the inlet. This pressure of the wind on the inlets is often a great cause of air-currents through sewers where the wind comes freely into a street, and meets with obstacles to its ready passage out. The wind passing over the sewer gratings at other times sucks air out at them, especially if gratings are large.

Apart, therefore, from barometrical pressure, the wind can be an active agent in sewer ventilation, if properly taken advantage of. The barometer may be a useful instrument for telling the heights of mountains; but, so far as I can judge from Mr. Reeves's application of it, it does not seem to be of much practical use in sewer ventilation. A scientific friend takes the same view.

I think that I have sufficiently answered Mr. Reeves's questions, and justified my opposition to certain of his statements. As Mr. Reeves is an engineer, I think he would write better on this subject if he wrote more in a practical way than as a pseudo-professor of natural philosophy. It is not everyone who can be both a master in physics and an adept in the practical ventilation of sewers.

As the man who attacks other people's ideas or plans ought to be prepared to justify his own, and to bear being cross-questioned upon them, I would venture to ask Mr. Reeves, under the circumstances, if his condemnation of stack pipes for sewer ventilation on 8th ult. was merely a prefatory blast on the sanitary horn, previous to holding forth on the virtues of sewer *disinfection*, as proposed to be carried out by him, in his newly-patented, elaborate disinfecting appliances therefor?

Perhaps the stalk pipes may yet prove useful for carrying off the smell and vapours from the disinfectants.—I am, &c.,

W. P. BUCHAN.

21, Renfrew-street, Glasgow, Aug. 12.

THE PROFESSION OF A CLERK OF WORKS.

SIR,—All clerks of works who have read the able opinions by Mr. Potter, as published in your columns, and the letter from Professor T. Roger Smith in your last issue, must feel gratified that efforts are now being made to advance the position of clerks of works.

Some of the duties described by Mr. Potter are not required in some parts of the country; but in some cases demands are made on a clerk of works to do certain kinds of work which Mr. Potter, and it is to be hoped many professional gentlemen, would consider outside the ordinary duties.

Would it not be greatly to the advantage of the public, especially architects and contractors, if every clerk of works had to pass an examination before he was placed in such a responsible position?—but by no means such an examination as some of the Government departments require a clerk of works to pass. Assuming that examinations were arranged and conducted by, perhaps, three central boards composed of architects elected by architectural associations as members of the boards, and master masons, bricklayers, carpenters and joiners, plumbers, slaters, plasterers, glaziers, and smiths—all elected by the masters' associations of the various trades as members of the examination board—owing to many circumstances three head centres would be required—for England, Scotland, and Ireland.

It could not be expected that the first examination would show very high general results all over the various departments of building construction; but only a fair knowledge of the different trades, which is necessary before anyone should be allowed to act as a clerk of works. A second examination should also be compulsory at the end of four or five years' experience, going over all the former departments in detail, with painting and heating added to the former trades. A clerk of works starting with a fair knowledge of building construction, and after four years' additional experience, should be able to pass a strict

examination, and prepare detail drawings, and specify materials and workmanship, to show if he has got the necessary knowledge and abilities to superintend important buildings.

A third examination would be an advantage to all clerks of works desiring to attain the highest possible position, and master nearly all the details of building construction. A clerk of works, with eight or ten years' experience on good buildings, should be able to pass a very strict and detailed examination, going over all the subjects already described, preparing detail drawings, showing the construction of all kinds of materials, specifications, strength of materials, value of materials, and workmanship, &c. And not the least important detail of examination would be the clerk of works management under certain circumstances—i.e., the Board of Examination would assume the usual dispute with contractors, and suppose that the contractors have made numerous statements regarding the materials specified, &c. In that case, how would the clerk of works proceed? A course of examinations somewhat similar were suggested and briefly described before the Edinburgh Architectural Association in March, 1885.

At the present time the majority of clerks of works do not receive sufficient remuneration, and most unfortunately the conduct of some is such as to bring them into disrespect. Some architects treat their clerks of works in such a way as to provoke the neglect of duties; cases of this kind have often come to the knowledge, and, on some occasions, the experience, of the writer. It is fairly well known that, as soon as some architects engage a clerk of works, they cease the ordinary courtesy of letter-writing when sending any written instructions to the clerk of works; and as if a matter of little importance to some architects, although their work is well attended to, still they will harass the clerk of works with numerous requests which have not the slightest reference to the execution of good work.—I am, &c.,

A Clerk of Works.

ISLEWORTH PUBLIC HALL.

Sir,—In your issue of to-day we note two errors in connection with our tenders. 1st, *re* "Public Hall, Isleworth," tender should be "£2,423," not "£3,423." 2nd, *re* "Vicarage, Groombridge," our names appear as "Stanbridge and Supple," instead of "Stanbridge and Tupper." Your contemporary also reports "Tupple" in one case. Altogether, matters seem somewhat *mixed*.—We are, &c.,

Stanbridge and Tupper.

Star-road, Eastbourne, Aug. 12.

CHIPS.

Damage to the extent of £40,000 has been occasioned by a fire which occurred at the sawmills of Messrs. Laverick and Goddard, of Great Union-street, Hull.

Two stained-glass windows have just been placed in Blackburn parish church in memory of the late Archdeacon Edward Birch, vicar of Blackburn. The windows, which are the work of Messrs. Burlison and Grylls, of London, are of canopy design of the 14th century, with representations of Abraham and Moses in the window of the north gallery of the church, and of Elijah and David in the south gallery window.

Two new classrooms for the national schools at Tiverton, near Bath, have just been completed. The classrooms cost £500. Mr. E. W. Buckle was the architect, and Mr. J. Long, of Bath, the builder.

The Secretary of the United States Treasury has just appointed Mr. W. A. Freret, of New Orleans, to be Supervising Architect of the Treasury Department, in place of Mr. Melville E. Bell, resigned.

A two-storied vestry is about to be built on the north-west side of St. Paul's Church, Walkden, from plans by Mr. R. K. Freeman, of Bolton. The cost, with other improvements which it is proposed to carry out in the church, will be £600.

The new park at Kilburn, adjoining the Queen's Park Station on the London and North-Western Railway, which has recently been acquired from the Ecclesiastical Commissioners, is rapidly approaching completion, and will, it is stated, be opened on September 1.

By the supplemental charter just granted to the Institution of Civil Engineers the power to acquire and hold lands, &c., has been increased from £1,000 yearly value—as in the original charter of 1828—to a sum not exceeding £8,000 annual value.

Intercommunication.

QUESTIONS.

[9367.]—**Wood Flooring.**—Can any of your readers say if the wood flooring being recently laid in the passages of churches has any advantages beyond deadening sound? Will it last as long as tiles?—Vicar.

[9368.]—**Joseph Deare, Sculptor.**—I am writing for the "Dictionary of National Biography," a notice of Joseph Deare, sculptor, who is said to have been a nephew of John Deare, the sculptor, of Liverpool. I should be much obliged if any of your readers could furnish any facts about Joseph Deare other than those contained in the records and catalogues of the Royal Academy. His death is said to have been the result of a fall from a ladder in his studio in Liverpool, and to have occurred in 1836. I am anxious to learn if this is correct, and also when and where he was born.—Albert Nicholson, the Old Manor House, Sale.

[9369.]—**Sashes.**—I should like to know if some means of raising and lowering sashes other than by weights and pulleys and cords, is in use, and whether the cost has anything to do with the retention of the old method.—Enquirer.

[9370.]—**Unrestored Churches.**—Can any one of the readers of the Building News inform me of any 13th-century parish church which has preserved its plan unaltered throughout, that is to say, in the main structure, and kindly give the dimensions?—Ecclesias.

[9371.]—**Gas-Lighting.**—Which lamp is generally admitted to give the best light, at the same time carrying off the products of combustion? I cannot leave any plants in my room long before they show signs of declining health and begin to wither up.—G.

[9372.]—**Chequered Floor Plates.**—Would some reader kindly show me how to prove the formula $t = \sqrt{\frac{\cdot 000044 \ W \ l}{b}}$ on p. 18, Part II. of Mr. Henry Adams's "Wrought and Cast-Iron Structures," for it appears to me to be wrong?—S. H. G.

[9373.]—**Brown Paint.**—Is it possible to make a chocolate-coloured paint with a white-lead base?—S. H. G.

[9374.]—**Building Construction. Honours Examination.**—Having passed first class advanced stage, I wish to sit for the honours stage next year of the examination held by the Science and Art Department. Will any reader kindly give me a list of books which I should study containing information of the nature required by the examination? Perhaps some experienced reader who has passed will help me in my early career.—A Provincial Pupil.

REPLIES.

[9310.]—**Half-Timbered Walls.**—I am decidedly of the opinion of "Jack Mortise" that half-timbered work should not be reduced to a mere sham, but that the timbers should be of good scantling, and well framed, so that the structure would stand without the filling-in. The timbers or uprights ought to be at least 6in. by 6in., the angle timbers an inch or two wider and deeper, and the filling-in of brickwork would be half-brick thick, built flush with the inside of timbers with the face set back. An inside wall of another half-brick having a cavity between the two thicknesses being well tied together with iron cramps, would render the interior perfectly dry. The panels can be afterwards rough-cast or pebble-dashed. The veneering or modern "half-timber" craze should be discountenanced by all architects as a species of "sham" of the make-believe sort. Far better, tile-hang or stucco the exterior, throwing the work into panels; but do not let them imitate timber.—G. H. G.

[9347.]—**Legal.**—Common-sense should supply the legal reply to this question. Where it was specified that "the contractor is to give all notices and pay all fees," it is not intended that he shall be at liberty to omit any portion of this duty to suit his convenience. "All" does not mean some only. If the contract has been carried out in accordance with the drawings and specifications, it is competent for the architect to certify as to completion, irrespective of the local authority. It is the duty of the local authority to see that the work does not transgress its by-laws, which the architect should make himself acquainted with before commencing the drawings and specification.—A. G. T.

[9348.]—**Boundary Line.**—There is no absolute rule to be relied on to determine the ownership of hedges and ditches. The best guide is to find out which of the owners of contiguous properties pays for keeping the hedges and ditches in repair, as the expense would naturally fall upon the owner. In the case of a field next to a public road, the ditch may belong to the road authorities if it forms the only means of draining the road; but the ditch and right of drainage may belong to either party. The hedge, however, will probably belong to the owner of the field, as it is not essential to the road.—A. G. T.

[9348.]—**Boundary Line.**—"Young Surveyor" will find his question exhaustively treated in back volumes of the "B.N." The ditch which belongs to the fence is generally on the reverse side of the fence. The edge of the ditch is the boundary in this case. The centre of hedge where there is no ditch is presumably the boundary.—G. H. G.

[9349.]—**Concrete Floors.**—This question cannot be easily answered. So much depends upon the quality and proportions of the materials employed and the care used in mixing them. "Kew" had better be sure that he thoroughly understands what constitutes good concrete, and how to make it, and then construct some experimental slabs as nearly resembling the required floor as possible, and test them. Some information as to strength of floors may be found in the *Journal* of the Society of Arts of 3rd July, 1874, and in Potter's "Concrete: its Use in Building"; also as to Cantilevers, &c., in the Building News. Vol. XXX. p. 383. Properly conducted experiments with various mixtures are much required, and would prove of immense value to engineers and architects.—A. G. T.

[9353.]—**Land Surveying.**—"Juvenis" can charge by time. If the buildings and contents of separate fields were required, the charge may be put at a higher rate. I should think the labour may be worth at least £3 to £5 for a field of 3½ acres, according to the scale and detail, but it is impossible to give a correct idea without knowing the trouble and labour. As a rule, surveys of estates, when the contents of each field and the boundaries are shown are charged for from £7 10s. to £10 for the first 100 acres, and one shilling for every additional acre.—G. H. G.

[9355]—**Vanishing Point.**—Answering "S. E. C.,' there is no necessity to draw every line to the vanishing point. When it is once found, it is easy to mark off a scale of proportionate distances at the edge of drawing-paper, marking thereon all the chief intermediate points. The centrolinead will enable the draughtsman to dispense with such labour; generally the artist relies upon his own eye for the intermediate lines.—G. H. G.

[9356.]—**Composition and Design.**—"One Anxious to Know" should carefully read Garbett's "Principles of Design in Architecture." He would do well also to read Alison's "Essays on Taste," especially the chapters on the Beauty and Sublimity of the Material World and those on Architectural Proportion. By reading these works studiously the student will gain all he need to know at present—at least on a subject that can only be learned thoroughly from the study of good architecture, and by experience and thought combined.—G. H. G.

[9358]—**Bottom Flange.**—This is an indefinite question. Formulæ for calculating the strength of such joists as are shown in "A.'s" sketches may be found in Molesworth's "Pocket-book," Humber's "Handy Book on Strains," &c. Two excellent articles on the subject are also to be found in the B. News, Vol XL. pp. 284 and 413 (March 18 and April 15, 1881), which "A." would do well to study. If "A." will furnish the necessary details of any particular case, I shall be pleased to help him to a solution of the question.—A. G. T.

[9366.]—**Cement on Tiles.**—P. cement may be removed from the face of encaustic tiles by means of muriatic acid, commonly known as "spirit of salt" diluted. It would be as well to remove the acid also after the cement is disposed of.—A. G. T.

CHIPS.

The Dudley-road Board schools, Wolverhampton, were reopened last week after enlargement by the addition of an upper story. The accommodation has been enlarged from 578 to 908 school places at a cost of £2,507. Messrs. P. Horsman and Co., of Wolverhampton, were the contractors.

The annual report of Mr. Wilkins, Master of the Edinburgh Fire Brigade, states that the improvements effected in the brigade of late years and the increased efficiency of the corps have reduced serious fires to a minimum in that city. The annual cost of the brigade to the ratepayers since 1873 has been less than a halfpenny per pound rate.

Lord Rosebery, Sir Charles Tennant, Sir F. Leighton, Sir John Gilbert, Sir J. D. Linton, and Mr. W. Agnew have been appointed as the Fine Arts and Loan Committee for the Melbourne Exhibition of next year. All communications respecting exhibits should be addressed to the Secretary, 8, Victoria-chambers, Westminster.

A new church at Criccieth, Carnarvonshire, dedicated to St. Deniol, and built from designs by Messrs. Douglas and Fordham, of Chester, was opened on Friday.

The Wandsworth district board have obtained the sanction of the Metropolitan Board of Works to the borrowing of £12,000 for the erection of a refuse and dust destructor at Battersea.

New Roman Catholic schools to accommodate 350 scholars are being built at St. Illtyd's, Dowlais, Mon. Mr. Edmund Kirby, of Liverpool, is the architect.

On Friday the Prince of Wales received Sir Frederick Abel, the organising secretary of the Imperial Institute, and Mr. Colcutt, the architect of the building, at Marlborough House, and, having examined the revised plans of the latter, gave instructions for the work to be commenced without loss of time. The site of the building at South Kensington, and of the new road which it is proposed shall face it, and which will connect Queen's-gate with the Exhibition-road, was subsequently inspected by his Royal Highness. Sir F. Abel, Mr. Sayles, the assistant secretary of the Royal Commission for the Exhibition of 1851, Mr. Hunt, surveyor of the Royal Commission, and Mr. Colcutt were in attendance.

A public meeting was held at Peel, Isle of Man, on Thursday evening to consider a proposal by Messrs. Tayleur and Co., that the town commissioners should purchase the whole of the shore fronting at Peel Bay, with a view to demolishing old property thereon and erecting modern lodging houses. The syndicate guaranteed all the expenses of acquiring the land. The scheme was favourably received, resolutions accepting the proposal being adopted unanimously. Proceedings to carry out the scheme, which will convert Peel into a first-class watering place, will be taken forthwith.

The parish church of Chelvey, near Bristol, is about to be restored, from plans by Mr. J. H. Spencer, of Taunton.

LEGAL INTELLIGENCE.

Messrs. Doulton and the Smoke Abatement Acts.—At Lambeth Police court, on the 11th inst., a summons was heard before Mr. Saunders with regard to the alleged non-consumption of smoke upon the pottery works of Sir Henry Doulton, at Lambeth. Mr. Poland prosecuted for the Treasury. The evidence showed that dense black smoke was seen issuing from the shaft upon the defendant's works and lasted for some 15 minutes. Sir Henry Doulton said he had gone to an immense amount of expense and trouble in order to meet the requirements of the Act. He had erected a shaft, which was some 250ft. high. Witness thought there was communication from nine kilns and 55 fireplaces. Mr. Coles, the inspector under the Act, said if proper care was used in the firing the smoke might be prevented—the stoking required great care. Sir Henry Doulton said that for years he had made this matter his study and had entered into expensive experiments in order to bring about a total consumption of smoke if possible. With regard to the present case, the kiln mentioned was not so satisfactory as it might have been, and he at once had it stopped and alterations made. Mr. Saunders suggested an adjournment for a month to enable Sir Henry Doulton, who had no doubt exerted himself for years to carry out improvements, to still further see what improvements could be carried out. The case was then adjourned for a month.

Serious Charge against an Architect.—John Leslie Watson, 47, an architect, residing at Blackheath, has been charged, on remand, at Bow-street Police-court with obtaining £150 from a solicitor by false pretences.—The alleged false pretence was with regard to the encumbrances upon an estate, the fee simple of which was vested, the defendant said, in him.—The defendant was committed for trial, but allowed bail.

WATER SUPPLY AND SANITARY MATTERS.

The Sanitary State of Oxford.—A dispute has arisen between the Local Government Board and the local board for the city of Oxford, the latter authority being indisposed to adopt by-laws for the purpose of requiring a certain amount of open space to be provided in connection with every new building that is erected in the city. The Local Government Board have endeavoured to induce the local board to do this, but without success, and the state of things has become so serious that the Board have recently had a special inspection of the town made by their assistant medical officer, Dr. Thorne-Thorne, and their architect, Mr. P. Gordon Smith. The report made to the Board by these officials has just been issued, and in it they state they have been much impressed by the excessive overcrowding of buildings on area, especially in the centre of the city near the Carfax. In many instances the property of comparatively small extent and height has been replaced by lofty buildings covering an increased amount, if not all, of the limited area to the rear; movement of air behind the street frontage being thus greatly interfered with; and the properly acquiring a large increase of value which must almost indefinitely postpone the provision of needed open space to the rear of domestic buildings. Messrs. Thorne-Thorne and Smith add "even where the authority have, under their existing by-laws, powers tending to the proper construction of domestic buildings, they are not properly enforced. Thus, at New Botley, we found that a very inferior class of building has been allowed to be erected, the party walls being only 4½in. thick, and only every second party wall being carried up through the roof; and this although the present by-laws require the walls of new buildings to be of whatever thickness the sanitary authority approve, and all party walls to be carried up 12in. higher than the roof-covering."

Northallerton.—A new water supply is about to be provided for this town at an estimated cost of £12,000. Acting on the advice of one of the surveyors of the Local Government Board, the board have been carrying on boring operations in the side of the hill at Cotcliffe, four miles south-east of Northallerton. Already the boring has reached a depth of 300 yards, the spring, whose course is followed at this point forming the main source of the new supply, which is soft in quality. A second spring in Sigston Wood will also be utilised, and there are several supplementary springs which will be used to augment the supply if necessary. Between Sigston Wood and Cotcliffe an iron aqueduct, varying in diameter, will be provided, the length of the piping being about two miles. From Cotcliffe the conduit will be continued to Thornton-le-Beans, a village three miles from Northallerton, where will be constructed a reservoir containing 1-1-6 million gallons. The water will be conveyed by gravitation to Northallerton by an 8in. aqueduct. Mr. A. M. Fowler, Manchester is the engineer. The contracts for the various works have not yet been let.

PARLIAMENTARY NOTES.

Church of St. Mary-le-Strand.—In answer to Mr. Kimber, Mr. W. H. Smith said, on Monday: Full information as to the present condition of St. Mary-le-Strand was given to my hon. friend on Monday last, and he was informed that, though the Metropolitan Board of Works had considered the suggestion as to the removal of the church, they were not in a position at present to act upon the proposal. It is not the duty of Her Majesty's Government to introduce Bills relative to Metropolitan improvements, and I am unable, therefore, to give my hon. friend any hopes of the Government taking steps in the matter.

Contract for Asphalte.—In answer to Mr. Conybeare, Sir H. Holland said, on Tuesday: The Government and Legislature of Trinidad are considering an offer by the lessees of part of the pitch lake to take a lease of the whole on terms which would insure a minimum royalty of £10,000 a year. That offer and the whole question of dealing with the lake are under the consideration of the colonial Legislature, and it is expected that their opinion will be expressed about the 1st of September. It is believed that the supply of asphalte is practically inexhaustible. I am not aware that any other offer has been made for an exclusive concession, nor would any person except those who held leases of portions of the lake be able to make such an offer. The Government is not in a position to invite tenders for an exclusive concession, as part of the lake is already leased for a considerable period.

Decorations of the Houses of Parliament.—Mr. De Lisle asked the First Commissioner of Works what was the cost of the great mosaic of St. George in the central lobby; if he could state the reasons, other than financial, why the remaining arched spaces had been allowed to remain so long in their present bare and unsightly condition; and whether the Government could hold out any hope that before long exertions would be made to complete the mosaics in a manner becoming the beauty of the lobby and the dignity of Parliament. Mr. D. Plunket stated that the total cost of the great mosaic of St. George in the central lobby, including £150 for the design, was £665. In consequence of the opinion expressed by Messrs. Cope, Ward, Armitage, Poynter, and Watts, who were consulted by Mr. Ayrton in 1870, it was deemed inexpedient to proceed further with the mosaic pictures. A committee was, however, appointed on the subject of fresco paintings in the House of Commons, and their report was duly presented to the House on the 12th February, 1872. Mr. Ayrton then submitted to Parliament an estimate of £500 in the Votes of 1872-3 for completing one annual fresco. The item was, however, struck out in Committee of Supply. Nothing had since been done in the matter, nor could he hold out any hope that anything would be immediately done towards filling up the remaining arched spaces, for which there were no designs at present in existence.

CHIPS.

The will of Mr. William Jacomb, chief engineer to the London and South-Western Railway Company, late of Bardon Lodge, Wimbledon, who died suddenly at his office on May 26 last, has been proved, the personal estate amounting to upwards of £69,000.

At a meeting of the Governors of the General Infirmary for Northampton, held last week, it was reported that £38,600 had been given towards the enlargement of the building. A building committee was appointed, with instructions to proceed at once with the addition of a western wing of three floors, and to make provisions for the subsequent erection of a corresponding wing on the east side.

At the last meeting of the Lancashire and Cheshire Antiquarian Society, the Rev. W. H. Burns exhibited a perforated stone hammer 3in. by 5in., found in 1870 by a labourer for a contractor in Corporation-street, Manchester, in digging through a gravel bed at a depth of 25ft. below the surface, whilst excavating for the foundations of some new buildings near the Trevelyan Hotel. The implement is similar in shape to one figured by Dr. John Evans at p. 158 in his book on "Stone Implements." This is perhaps one of the most important "finds" of the kind in Manchester, and it is now on view in the exhibition of local stone implements in connection with the British Association meeting at the Owens College, Manchester.

The members of St. Alban's Architectural and Archæological Society made an excursion on Friday, the 5th inst., to Redbourne, Flamstead, and Beechwood, under the conduct of their honorary secretaries, Canon Davys and the Rev. H. Fowler. We regret that the late date at which we received a report of the proceedings precludes us from doing more than merely mentioning the meeting.

Our Office Table.

All lovers of art will rejoice that Knole House, Sevenoaks, escaped uninjured from the fire which destroyed an adjacent Mediæval barn and its contents on Tuesday, for, from the almost unaltered character of its fittings and decorations, Knole is one of the most interesting baronial mansions in England; and it contains, moreover, a magnificent collection of Jacobean furniture and many valuable historical portraits. The entrance-hall and ground staircase were illustrated by a double-page photo-litho. in the Building News for August 20, 1886.

We have arrived at the annual season of discomfort when one or other of our great thoroughfares becomes periodically blocked for the purpose of being repaved or repaired, and this year the epidemic of obstruction is peculiarly severe in the neighbourhood of Piccadilly Circus. In addition to the removal of the wood-paving, the opportunity is being made use of for the introduction along Piccadilly of the mains of the General Hydraulic-Power Company. This most modern development of high-pressure service is replacing an ancient line of wood pipes of a type which has now wholly disappeared. The pipes in question, which have evidently been out of use for some time, are constructed of elm, being bored out of the solid tree. The diameter of the bore is 7in., and the various lengths are put together on the spigot and faucet system, the spigot being turned down with a conical taper to an external diameter of about 9in., and inserted into the next pipe for 6 or 7in., the average thickness for the timber surrounding the bore being from 4 to 6in. These pipes, which are each about 8ft. in length, are laid at a depth of about 2ft. beneath the surface, and as a considerable length of piping is being exposed, it may interest our readers to examine these remains of the system of distribution which prevailed in London previous to the employment of cast iron for water mains.

Sir J. C. Robinson protests against the threatened destruction of the church of St. Mary-le-Strand, which is so placed as to strike a keynote of scenic picturesqueness happily re-echoed by all its surroundings. Sir John adds:—"I have always regarded this particular church as he very finest of all our metropolitan ecclesiastical structures of the Wren period and following, as characteristically English in style, and in fact a perfect and beautiful model of a church of the fully-developed Anglican Protestant era. I cannot help saying, indeed, that I think if, while taking reverent care of our ancient Gothic churches and eschewing hypothetical and needless "restoration" *in toto*, we had, in our new churches, worked on the lines of these 17th and 18th-century models, instead of practically swamping and vulgarising our old Gothic churches by an infinite number of vapid, soulless copies, art and religion alike would have been better served. . . . I trust that all artists, all architects, Gothic, Classic, and Queen Anneists alike, and every person of taste and culture, with a heart regardful of ancient things and associations, and an eye for the picturesque, will rally to the defence of St. Mary's-le-Strand, should it be seriously menaced." There is no doubt that projects for removing the church and the south side of Holywell-street, which narrow the Strand to an inconvenient extent, have been under the consideration of the Metropolitan Board of Works and the Strand Vestry many times since the opening of the Law Courts, and the question has again been brought forward by the dangerously decayed state of the external masonry of the church; but threatened buildings live long, and there seems no immediate probability of Sir J. C. Robinson's fears being realised.

If the Abbé Larrieu is to be credited, the Great Wall of China, which every schoolboy is taught stretches for 800 leagues in solid masonry and in an unbroken line along the southern frontier of the Mongolian Empire, is a huge imposture, notwithstanding the description of it given by travellers from the days of the Jesuit Martini to the present time. The

Abbé admits, indeed, that a Chinese Emperor undoubtedly did conceive the idea of a wall from the Gulf of Liao-Long, on the east, to Kansu, on the west, and this, though never realised, had a beginning; and that all along the proposed line of the wall square towers of earth, or of earth faced with brick, were constructed at considerable distances from each other; but these were, he asserts, never joined together by any wall, as was originally intended. In some of the defiles along the route there are walls; but these were intended to close these particular passages, or they are merely the walls of villages, and are not parts of a larger scheme. Hence, the only part of the scheme of the Great Wall carried out was the construction of these scattered towers. The rest, he declares, never went beyond the brain that conceived it. It was never more than a fancy, and it is now a myth.

On the other hand, Mr. W. G. Howell, of Brighton, declares from personal inspection of many portions, that the Great Wall is "as incapable of being explained away as Fleet-street or the Strand." When Mr. Howell was detained a few years since for three weeks at Kalgan (Chan Chia Kow), he and his friends frequently scaled the wall, and traced its course along the hills extending east and west as far as the eye could reach. While, therefore, it is possible that parts of the Wall have disappeared, Mr. Howell adds that "if the Abbé Larrieu states that the square towers along the proposed line of the ramparts were not connected with a Wall, and that this Wall, guarded and defended by these towers, does not run through the valleys and over the tops of these hills, he states that which is contrary to the facts." Mr. J. M. Molesworth confirms this testimony, and states that he has crossed the Great Wall at Kalgan, at Shanhaiquan, on the sea coast, and many other places, and where there are considerable breadths he has walked along from tower to tower. Others who have travelled in China have given similar evidence as to the substantial existence of the wall.

In the 30th annual report of the National Portrait Gallery just published, the trustees lament that no effort has as yet been made to provide the collection with a more accessible home than Bethnal-green Museum, to which it was removed two years since. Among recent donations and purchases are portraits of the late Viscount Cardwell, by G. Richmond, R.A.; William Wilberforce, by J. Russell; E. Hyde, Earl of Clarendon, by G. Souest; the fourth Duke of Bedford, by Gainsborough; Roger North, by Sir Peter Lely; A. Raimbach, the engraver, by Sir David Wilkie; Samuel Rogers, by T. Phillips; Amelia Opie, by I. Opie; Sir Robert Peel, by John Linnell; Viscount Melville, by Sir Thomas Lawrence; and George Washington, by the American painter, G. Stuart. A photograph of John Stuart Mill, taken before his marriage, has also been added to the collection.

By the death of Mr. William Barber Buddicom, of Penbedw Hall, Mold, Flintshire, has passed away one of the few survivors of the great railway and mechanical pioneers of fifty years ago, with whom were intimately associated, in the construction of the first series of railways in England and on the Continent, George and Robert Stephenson, Joseph Locke, John Errington, Thomas Brassey, William Mackenzie, and others who have predeceased him. Mr. Buddicom was born at Liverpool in 1816, and was apprenticed to the engineering firm of Mather, Dixon, and Co., of Liverpool. At the age of 20, he was appointed resident engineer on the Manchester and Liverpool Railway, and during the time he was so employed carried out many important works. Two years later, in 1838, he was appointed engineer on the joint Glasgow, Greenock, and Paisley Railway, where he remained till 1840, when he was appointed locomotive superintendent of the Grand Junction Railway. In 1841 he was called to France by Mr. Joseph Locke to erect works near Rouen for the purpose of constructing the rolling stock for the Paris and Rouen Railway, and he held the contract for working that railway until 1860. He was connected with Messrs. Brassey and others in making the Bellegarde tunnel on the Lyons and Geneva line, and also in constructing and working the temporary Mont Cenis Mountain Railway on Fell's system, the Southern Railways and Maremma Railways of Italy. In 1864 he retired from the business of his profession. He was a member of the Institution of Civil and Mechanical Engineers, and also of the Société des Ingenieurs Civils of France.

The necropolis of the ancient city of Carmona has just been discovered about half a mile beyond the Arab gate of Seville. Between two fields known as the Quarries and the Olive Groves the excavations have brought to light a great many sepulchral chambers, hewn out of the rock, with funeral urns in the sides. The roofs of these sepulchral chambers are some of them vaulted, while others are flat. There are several furnaces either inside or just outside the chambers, and it was in these that the incineration took place, the ashes being placed in black earthenware urns. Among the other objects found were many coins, a mirror with a handle, a lamp, a lachrymary, a bronze statue, pieces of iron, and libation cups.

Messrs. F. J. Besley and Co. have excavated, during building operations on Botolph Wharf, one of the shore piles of the first London Bridge, which is mentioned in Stowe's "Chronicles" as having been erected in the time of William the Conqueror. The pile was dug up at a depth of 20ft. below the surface. It is apparently of oak, an irregular square, about 9in. across in either direction. From the grain of the wood and the position of the centre of the rings, it seems that the pile was not square, but oblong in section. The edges that join the two faces are almost black, and show the fibre of the wood, saturated and blackened with 800 years of immersion in the Thames water and mud, and its weight is, of course, increased thereby. But even yet the stout fibres hold together, and the pile might be used as a trustworthy prop for other eight centuries, for it is in an admirable state of preservation, and right up to the heart seems as solid as if it came from the sawmill yesterday.

Trade News.

WAGES MOVEMENTS.

Edinburgh Joiners.—A largely-attended meeting of the Edinburgh joiner trade was held on Friday night in the Good Templar Hall in connection with the demand for an increase of ½d. an hour on the present remuneration—6½d. Reports were submitted from the different shops and works in the city. Considerably over forty employers have unconditionally agreed to give the increase. A few have offered the men 6¾d., but that had been refused, causing between 80 and 100 men to cease work. The reports were considered satisfactory, and a resolution was carried unanimously pledging the men to continue the agitation till it is carried to a successful issue. At an adjourned meeting held on Saturday it was reported that 55 employers had agreed to give the halfpenny advance and that only about 15 large masters still held out. Eleven of these having given in, the strike terminated on Tuesday.

The Theatre Royal at Bournemouth has been transformed into a town hall, and will be opened in its new capacity on Monday next. The building now seats in the large hall 1,600 persons, and has five entrances and exits. Messrs. Jenkins and Son, of Bournemouth, are the builders.

The ninth annual exhibition of decorative arts, under the auspices of the Union Centrale, was officially opened at Paris on Friday, in the Palais de l'Industrie, by M. Spuller, Minister of Public Instruction, Fine Arts, and Worship.

A new boot factory has just been completed at Fillwood, near Banbury, and in celebration of the event the proprietors entertained the workmen in the employ of the contractor, Mr. W. Godfrey, of Kingswood, at dinner on Saturday.

St. Leonard's parish church, Woore, was reopened after restoration, from plans by Messrs. Lewis and Son, of Newcastle, Staffs. Mr. Webb, of Silverdale, was the builder.

The members of the Monmouthshire and Caerleon Antiquarian Society held their annual meeting at Peterstone on Tuesday, when the interesting churches of Peterstone, Marshfield, and St. Bude were visited.

The new waterworks which are being constructed at Amsterdam by Messrs. John Aird and Sons are nearly completed.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 50 years.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

Alsager.—For building a villa residence at Alsager, Cheshire, for Mr. F. C. Mayer. Messrs. R. Dain and Son, Burslem and Hanley, architects. Quantities supplied by the architects:—

Sadie, Chesterton	£2,175 0 0
Booth, Alsager	1,950 0 0
Stringer, Sandback	1,850 0 0
York, Tunstall	1,837 0 0
Gallimore, Newcastle-under-Lyne	1,816 0 0
Cope, Tunstall	1,785 0 0
Cooper and Jones, Tunstall ...	1,781 10 0
Longden, Burslem	1,767 0 0
Bennett, Burslem	1,760 0 0
Kearton, Tunstall	1,723 0 0
Cooke, Burslem (accepted) ...	1,700 0 0
Foster, Longport	1 680 0 0
Bowden, Burslem	1,670 0 0

Berkhampstead.—For construction of a boys' playground at the workhouse, for the Great Berkhampstead board of guardians:—

Matthews	£54 10 0
Osborn, D....	52 0 0
Nash (accepted)...	38 0 0

THE BUILDING NEWS
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THE MODERN ARCHITECT AND HIS REQUIREMENTS.

THE requirements of the modern architect are becoming so numerous, demanding from him attention to details of so varied and miscellaneous a nature, that it is no longer enough that he should be a designer and builder. He is frequently called upon in the same work to bring into requisition a knowledge of many different branches of physics, to be an expert chemist, geologist, and sanitary engineer, in addition to the artist. It will be said to be impossible for one man, however generally conversant, to be both a scientist and an artist — the two vocations are so essentially opposed or hostile in their nature, the faculties necessary for acquiring scientific facts are of a nature entirely different from those exercised by the artist, and that, therefore, it would be safer and better on public grounds to separate the duties and to subdivide the profession as much as possible. In no other profession are such contradictory functions and duties called into requisition. The medical practitioner has to become a proficient in a number of independent branches of science; but they are all of correlated classes, so that the faculties have not to undergo that severe mental wrench called for when attention has to be drawn from some scheme of decoration or colour to the details of plumbing; from a piece of architecture, pure and simple, to the working details of iron construction. The lawyer has to undergo no such intellectual feat as that of turning from a building contract or a complex bill of quantities to the conception of an ideal design, calling for the functions of the poet and painter. An advocate at the Bar has to do many things, to be competent to examine scientific facts, to cross-examine doctors, engineers, artists, and manufacturers; but diverse though the questions be, the mental faculty engaged is that of collecting evidence for or against a certain legal position. Scientific laws and facts are mere dice in his hands. The architect alone of all the professions has to learn and apply things which conflict with his art, to make them subserve his purpose, to harmonise them as he best can. He is compelled to accept new ideas of construction and every new appliance or material as part and parcel of his business. There seems to be no limit to this ever-increasing domain of his art. He is obliged to keep himself informed of this and that brick, this new method of warming and ventilation, some recent sanitary appliance, or some new method of flooring, and he has to bring to the consideration of these matters a knowledge of facts and scientific principles to enable him to arrive at a right judgment as to their merit and suitability. That he often fails to judge rightly cannot be wondered at, seeing how many prejudices he has to study or conquer. The engineer's accomplishments are of a more coherent kind. They do not quarrel with one another. His mathematics are on good terms with his mechanical and hydraulic requirements; he deals simply with facts and results as he finds them without respect for any ideas or sentiments. The phrase "fine art" is not to be found in his vocabulary, and opinions and tastes are relegated to the region of frenzy, quite outside the domain of engineering science. Therefore, he has nothing to reconcile. He has not to clothe his iron construction with "art faïence," or to consider the necessity of giving "apparent" strength to his mechanical structures. He knows of no proportion but that derived from natural laws and formulæ. With the engineer scientific construction is everything; with the architect it is supposed only to subserve art.

There are very few Da Vincis and Michael Angelos, men proficient in art as well as science, who can turn their minds readily from the mechanical requirements of building to architecture, painting, or sculpture. Nay more; many in the profession find it impossible to acquire more than two or three things really well. Those architects who can devise a good plan are seldom equal as artists; but a greater disparity is to be found between those who can make designs on paper and those who can carry them into effect. The consequence of which is an unfortunate separation that has irretrievably injured the profession in the public mind—viz., practitioners and artists. There are two definitions of the architect as now exercised. The first of these is an individual who can devise plans and construct buildings to meet any of the numerous requirements of modern life, who is sufficiently master to know what is necessary; the second definition is one who can design attractive and handsome buildings or monuments.

To enumerate a few of the branches of building in which architectural knowledge has to be largely supplemented by special attainments: (1) Hospital construction. Here medical science and hygiene are the chief questions. The medical principles involved in the planning and classification of hospitals have been to a large extent formulated, and plans based on experience are accessible to the architect. For all that he ought to be abreast of medical opinions. The structural arrangements are necessarily subordinate to the right understanding of health and disease or the laws necessary to the attainment of the one and the treatment of the other, for it is on the right interpretation of principles that structural types and arrangements must be based. We might trace several changes in hospital construction during the last few years if space permitted. Even the form of ward has been more or less modified. Years ago buildings of three or four stories were erected upon a plan that seemed to favour economic results; but lately hygienists and medical authorities have boldly pronounced in favour of single storied pavilions like those proposed by M. Tollet in the system bearing his name. The vital question of ventilation and warming is one of the first importance to those engaged in designs for hospitals, and no amount of precedent will atone for ignorance of the laws of the subject. Some architects run away with the idea that if so much cubic space be allowed for each bed, according to printed tables, their work in the matter is at an end; but there is more to consider than space—there is renewal of air, and the number in the ward. What is necessary to find is the coefficient of aëration, or the renewal of air necessary, for, as is evident on a little consideration, there is no uniform figure without reference to the size of room and the number of persons in it. Thus it is explained by a French authority that the larger the space, the less will be the quantity of fresh air to be introduced within a given time for each patient, in addition to any burning lamp. Pathology and chemistry have not yet determined what amount of organic impurities are prejudical to inmates of hospitals, what normal standard of purity ought to be obtained, and what temperature is required, and until these factors are decisively known the problem of establishing a general rule will be unsolved. We believe that hospitals in the future will have to be rather a collection of small than large wards. Pasteur and other pathologists have shown that the fewer the sick in a given space the better; however good the ventilation may be, large aggregations of human beings are found to generate a condition of health injurious to all exposed to it. The conditions favouring blood-poisoning in hospitals point especially to a reduction of the number in each ward. Then, again, there is the question of connecting pavilions. Recent practice in France Germany, and the United States completely separates the accessory administrative buildings, and the pavilions are isolated, whereas not long since connecting corridors were deemed essential. Other arrangements partially adopt the detached pavilion, with open covered passages or corridors confined to the ground stories. In short, the architect has to make himself a master of pathological researches into this matter; he ought to be acquainted with the results of investigations into statistics bearing on hospital gangrene and fever. (2) Schools. This is a class of buildings requiring a large amount of special information and statistical details. The elementary school has within our time developed from a very insanitary type to a building that may be pronounced almost perfect. But in this class also the question of aëration and good lighting requires the studious attention of the architect. He should not follow implicitly plans of existing buildings, however good, but should make himself master of the results of recent investigation, and papers read at annual conferences, which he can only do by reading the professional journals. There is no royal road to knowledge; it must be followed through a certain amount of hard and uninteresting reading, which we are inclined to think many architects have little taste for in these busy times. But it is the only way to obtain facts and data, which no amount of looking up illustrations of buildings can possibly do. Look at what a school architect ought to know in addition to his building knowledge of school hygiene, if he really wants to become a master of this branch of his business. Pneumatics and chemistry as they affect ventilation, physiology as far as it bears on seats and desks, a knowledge of orthopœdic surgery, which is engaged in cases of curvature of the spine and bone diseases developed by bad postures and sitting in schools; systems of ventilation and warming; light and structure of the eye and the defects of vision which are found to follow prolonged exertion of the eyes and inadequate or improper lighting. The Educational Department and the London School Board rules have to be learned of course; but these can only make a regulation plan, certainly never a masterly design. (3) The Technical School presents a problem to the modern architect. All at once he finds it necessary to know what technical education is, and the course of instruction so as to meet the requirements of school promoters. To know how a building ought to be planned and fitted up for technical classes it is necessary to learn a great many things appertaining to physics, such as the methods of measurement, the use of instruments employed in measuring and determining specific gravities, hydrometers, pendulums, &c. In the class-rooms for mechanics various apparatus and fittings are required; for example, professors engaged in teaching mechanical engineering need a very long blackboard for representing mathematical formulæ, and this board ought to be hung up so as to be very easily raised or lowered with a touch of the finger. The requirements of chemical laboratories are numerous, and the designer of these schools ought to know something of the working of laboratories, the width between the benches, the shape and position of sinks, the fitting of sulphuretted hydrogen closets, reagent racks for students engaged in quantitative and qualitative chemistry. Let us give an instance: In many chemical operations injurious vapours and gases are evolved, and have to be removed quickly, and the architect has to provide niches convenient to the student in which

the experiments can be made. Sometimes recesses are provided between the windows for the purpose, with projecting slate slabs with sinks, the gases and fumes being carried off by a flue leading from a hooded top, with special porcelain tubes conducting fumes away from any apparatus. A fresh-air inlet to each niche is necessary, and a sliding sash to close the receptacle from the room. In some laboratories concrete foundations are necessary for the tubes, to minimise vibration in carrying on delicate operations; in short, every science is treated, so that the practitioner in designing requires a knowledge of the operations and experiments carried on in the several departments of a technical school. An ordinary architect would be incompetent to design such a school, unless either he had made such schools as those of Finsbury College, or Owens College, Manchester, a study, or had himself gone through the course of instruction in a technical college. It has almost become, in fact, a specialist's branch. Another class of recent practice is that employed in the design of baths of various kinds, medical and otherwise; establishments for the treatment of special diseases and surgical cases. Medical schools come within the technical school class. Schools of art, museums and libraries, make a large and lucrative field, to say nothing of such special buildings as astronomical observatories and those for particular manufactures.

The old masters of the art knew nothing of these multifarious kinds of structure. Houses, churches, schools, almshouses, and hospitals comprised almost all the buildings for which an architect was called in. Their range of knowledge was limited to types for which centuries had supplied precedents. With the reorganisation of society, and the progress of knowledge and manufactures, architecture has vastly widened its sphere; it has become the art expression of not only religious worship and of man's dwelling, but of every conceivable form of human life and intellectual employment. There can be no wonder that in the work of incorporating modern elements and factors of civilisation the architect must constantly be coming into conflict with them. Every new material he has to subject to the crucible of his intellect, to turn or mould it into some form that shall not do violence to his taste; every mechanical appliance has to be shaped and fitted into the structure, and each new requirement demands a careful reconsideration and adjustment of plan and design. A hydraulic lift may become a disagreeable or a pleasing feature in a central hall, according as the architect has neglected to arrange for it, or has made it a feature of his design. Wherever we find an appliance overlooked, the result is an excrescence—it looks and strikes one as an after-thought. An electric lighting installation need not be a severe tax on the resources of the architect, though it is better thought of and provided for when the plans are being prepared. A ventilating system is now an absolute necessity to buildings. A few years ago all kinds of nostrums were introduced; churches and schools were disfigured by all sorts of cowls and excrescences because architects had not realised the necessity of making the outlets visible features on their buildings. All kinds of ugly terminals were invented, and many architects began to imagine that ventilating appliances must be ugly, and that no building could be ventilated without being spoiled architecturally. Thanks to the persistent efforts of a few sanitary engineers, ventilating appliances are now rendered anything but obnoxious; the "air pump" and patent "pneumatic" ventilation, and other systems founded on the vacuum-creating principle, are introduced on buildings as features as necessary as bell turrets and chimneys, and these forms have been architecturalised and adapted. The systems of heating have long troubled the art architect; but if he only makes up his mind about the principle he cannot fail to meet with advertised systems which leave little to be desired. Gas and electric lighting claim a share of attention of the architect; but the arrangement of burners, the shapes of lamps to give the highest illuminating power, incandescent and arc lamps and their details have been too long overlooked. Even such structural matters as fireproof floors and construction and patent floorings have been regarded with aversion, and left to the engineers and manufacturers from motives that are sufficiently obvious. "Discretion is the better part of valour." An architect cannot master all these details of building; imperfect knowledge cannot be pleaded after failure, and he is the wiser who submits his rough plans to the engineer before completing his contract drawings and specification, rather than let them go to contract with incomplete arrangements, and then enter into subsequent contracts for ill-devised schemes that must inevitably lead to disappointment.

CHURCHES STRUCK BY LIGHTNING.

THE severe and almost unprecedented thunderstorm which broke over the south-western parts of the Metropolis last Wednesday week has left marks of its ravages, not only in the bursting of sewers, the flooding of basements, and the tearing up of road surfaces, but in the injury the lightning discharges inflicted on several churches in the neighbourhood. The edifice which suffered most in London was Christ Church, Endell-street, and so much has it been damaged that the accustomed worshippers, unwilling to remain in the church last Sunday, were compelled to use the dining-hall of the adjacent workhouse. A general examination of the building has revealed not only a dangerous condition of the stone spire, which is a prominent object in Endell-street, where it stands out beyond the line of the adjoining buildings, but holes in the roof, and damaged masonry at the side of church. Newspaper reports, which are generally of an exaggerated kind, have given even more alarming accounts of the injury done than really appears. Two large openings are made in the spire; one about 10ft. from the summit is not quite so large that a "cab and horse" could be driven through it, as one account stated, though it is nevertheless a very ugly gash, and occurs on the eastern face of the spire; the other is lower down on the north-east angle. This angle and adjacent faces have suffered the most. The whole masonry, in fact, from the top downwards, is badly shaken, the angle is broken in several places, and a large fragment of stonework has been knocked off it just above the lower gablet of the eastern face of spire. There are besides apparent bulgings and a general shaking or displacement of the courses of masonry. The electric current appears to have tracked out the iron cramps of the stones, and to have shaken or split all masonry connected by them. In the St. Giles's workhouse yard adjoining we find it took a horizontal course along the iron railings and struck a large quoin stone of one buttress just where the iron railing is stayed to the buttress. The pieces of stone that fell from the spire have made a hole in the roof, and have smashed a piece of the coping, a man at the time in a box below having a narrow escape. A hoarding has been erected round the church in front, and Messrs. Robert Aviss and Co., of Baltic Wharf, Putney, have commenced the operation of erecting a scaffolding round the spire to take it down previous to re-erection, which will have to be conducted with considerable caution. The reconstruction is being undertaken by the County Fire Office, Mr. Coleman being the foreman of the work.

The church is a Gothic structure, of Early English character, designed by the late Mr. B. Ferrey, with some good details. It has a short nave, side aisles, and chancel with side galleries, the tower and spire being at the west end adjoining the nave. There is little of architectural interest except the spire, which forms a feature in the street, and we hope it will be re-erected on the old lines. It is of plain masonry, with two tiers of spire lights and angle beadings, the base being of the broach form. The angles look much serrated, and the stone generally is crumbling. Little less than rebuilding will be judicious. One important point to remark is that this spire is without a lightning conductor, though it is quite 120ft. or 130ft. in height. Reports also bring the news of damage to the tower of St. John's Church, Walham-green, which was struck on the same evening. A large piece of the brickwork of pinnacle on the north-west angle of the tower was knocked out, the bricks being hurled over to the southern side of the church. The pinnacle has been damaged in two places, the lightning having glanced down and struck the inside of the parapet of tower, making a hole in the wall. Of the other churches that were struck, of which reports are to hand, is one in Elm Park, Tulse Hill, a small temporary structure in the parish of Holy Trinity, dedicated to St. Matthias. It is a brick church with galvanised iron roof, and a small bell-turret at one end. The lightning discharge here knocked off the finial and portion of the turret, and tore up the zinc covering of the turret itself. The accident is more remarkable inasmuch as the turret is low, not in fact so high as most of the neighbouring brick houses and chimneys, showing that the metal finial attracted the fluid, or became the easiest passage between the clouds and earth at this point. Holy Trinity Church, Tulse Hill, which stands on a considerable eminence, and which has a lofty spire, but without a conductor, was only slightly touched; the tower and spire do not appear to have been struck at all, though reported to have been seriously damaged in a daily paper—the mistake having probably arisen from confounding the smaller with the mother church. Many other church steeples have been more or less damaged in other parts of the country.

What is worth particular notice in these accidents is that the buildings struck are without the protection of lightning conductors. Why are they unprovided? To us it appears remarkable that architects and church builders should be so indifferent to the safety of their buildings as to leave costly and handsome spires like that of Holy Trinity, Tulse Hill, without a conductor. We are no longer in any doubt about the protection afforded by these silent dischargers of the electrical fluid. A few people at one time entertained the idea that lightning conductors drew the lightning to the fabric and really increased the risk, without considering that their presence dissipated the electricity, silently causing its discharge either from the clouds downwards or the earth upwards. Many people, and we are sorry to include architects and well-informed persons, entertain very wrong and indefinite ideas of the nature of electricity and the operation of a conductor. They think it acts only in one way, as drawing off the electricity of the clouds harmlessly to the ground, whereas the conductor relieves the earth also of its accumulation. It is a path of least resistance between the overcharged cloud and the earth. The electricities—and these are always of two opposite kinds—act in two ways; when the discharge is upwards, the earth is positively electrified and the clouds negatively, and the conductor is simply the conveyer or dissipator of the charge. A "flash" is imminent when there are two points—one of high tension, in the neighbourhood of the overcharged cloud, and the other of lower tension—say, the earth—and

in obedience to the universal law of equilibrium, or balance of forces, the discharge takes place along the most favourable passage. If that passage is not provided the flash is eruptive and dangerous. If any object within its range is a bad conductor, the electric spark strikes it with force and destroys whatever may be in its path. It ought not also to be forgotten that every thundercloud exerts an inductive action on all bodies within a certain radius, and these bodies become charged with the opposite electricity. But this action cannot take place where a lightning-conductor is, for its presence prevents the accumulation of electricity, either in the cloud overhead or in the earth, the negative charge is being constantly and silently drawn off from the soil by the positive charge in the cloud, and *vice versâ*, and the two are restored to their natural state. So that in point of fact the conductor prevents the accumulation of these electric states, and restores the clouds to their natural condition. In this respect it may be likened to a pipe conveying liquid between a higher and a lower level. In short, the presence of lofty buildings with lightning conductors dissipates thunderstorms instead of, as usually thought, attracting them. The highest objects are exposed to the electric discharge, as it is upon them the density is greatest. There are a few points to be attended to in fixing conductors to buildings: the rod or part above the structure should be terminated in a fine point, the conductor should avoid angles and be placed in electrical connection with all metal work near its course, zinc roofs and iron gulleys, and there should be a good branched earth connection by means of well or hole filled with powdered coke.

Architects may learn all they want to know from any work on the subject, such as that by Mr. Anderson. They would, at least, be acting wisely to provide lightning conductors on every building of any height, instead of leaving them to bare chance. Every church tower and spire, every lofty chimney, turret, or gable summit, ought to be provided with a conductor for the purpose of preventing the accumulation of electricity at that point. Expense is trifling when the building is in progress. Afterwards it may become a very expensive affair. Hundreds of our great buildings and cathedrals have been saved by the expenditure of a few pounds, that is considered too expensive on structures that have cost thousands.

SCHOOL-WORKSHOPS.

So much has already been said and written about technical instruction, and so few people have made up their minds concerning what is meant by these words, that it is satisfactory to learn from the tenour of the Bill brought forward in Parliament that the idea they should convey is nothing more nor less than the subjects of science and art included in the "Directory" issued by the Science and Art Department. When South Kensington first began to attract attention and made a bold bid to take the art of the country under its wing (it did not tackle the science until much later), one of its greatest triumphs was the popular doctrine that art was a subject which had to do with everyday life. People learned for the first time that in choosing their wallpapers and in embroidering their babies' dresses, they were really unconscious votaries of art, and though the adoption of an art career involved a preliminary course of freehand drawing and perspective, there was yet for the many an art life outside of this drudgery, intimately bound up with their daily occupations. And now, again, after long years, and in consequence of the desponding cry of impending ruin, in some way or other the result of foreign competition and the absence of technical training, South Kensington again comes forward to the rescue, and blandly assures us that we have already made vast strides in technical education, and that we possess in the numberless science and art classes connected with the Department the instruction which is to save the country from overthrow and to enable us to displace the foreign rivals, of whom some would seem to stand so greatly in dread. Far be it from us to diminish in any way the feeling of security which must arise from such an assertion, or to offer any other interpretation of the nature of the training which has contributed so greatly to the acknowledged superiority of the foreign workman, notwithstanding the absence abroad of a Science and Art Department, and the failure of Continental nations to accept in any shape or form our English system of "payment on results." We would not, indeed, willingly intervene, or dispel in any way this pleasant dream, but for the fact that we are convinced that the above classes, be they "technical" in its true sense or not, are not the classes which will satisfy the aspirations of those ardent advocates of instruction in technology who have forced upon us the contemplated legislation, and who have stirred up the present movement. In Birmingham, Sheffield, Bradford, Preston, and a host of other manufacturing centres there is a cry for manual instruction, and for the creation of schools equipped with machinery and apparatus for the practical teaching of certain branches of skilled handicrafts allied to the industries with which these various towns are connected. In these schools, side by side with the practical teaching of the trades, they would have a sound and graduated course of instruction in the arts and sciences which underlie their manufacturing operations in them, in short, the dyer shall learn chemistry, the laws of colour, and the structure of the fibres of the various raw materials; there the metal worker shall acquire a thorough acquaintance with metallurgy, mechanics, and machine drawing; while, in addition to this theoretical instruction, the dyer and the metal worker shall alike have an opportunity of putting their theories to the test on actual machinery and plant of the latest and best description. This conception of a technical school, be it right or wrong, is quite outside anything to be found in the programme of the Science and Art Department, and such buildings would need for their erection and maintenance a far heavier call upon the ratepayer than the Chancellor of the Exchequer would seem to contemplate. Let us here glance for a moment at the students and the nature of the instruction which Mr. Goschen believes will be given under the Act. The teaching will be provided for children—boys apparently—who have reached the sixth Standard in the Board school, or those whose elementary education has attained to this level; children, therefore, still of the school age—13 years and upwards—whose parents can afford to keep them at school for a year or two longer. Mr. Goschen tells us that there are some 60,000 children in the kingdom who are qualified, and of this number he assumes that 32,000 are boys. It is estimated that only 4,000 of these boys in any one year would avail themselves of the proffered training, or, as the course would extend over three years, there would be 12,000 lads at one time in the various technical schools. It would appear, moreover, that the nature of the instruction to be afforded under the Act is precisely that now given in some of the best of the existing higher grade Board schools. It is not easy, under these circumstances, to understand why special legislation is needed, or the reason for any additional call upon the ratepayer, since under the Act of 1870 there is no difficulty in equipping and maintaining these higher grade schools. It is true that when the seventh Standard has been passed, the Act makes no provision for the continuance of the child in the elementary school; but here the Science and Art Department steps in and offers to the "Organised Science School" a yearly capitation grant, under certain conditions, of 10s. per student and large payments on results. So liberal are these payments that at Manchester and Birmingham it has been found that such schools can nearly be made self-supporting, and with a slightly-increased fee and the power of rejecting all but the best children we believe such schools could be carried on without dipping into the ratepayer's pocket. But even with the wide powers which can be taken in the choice of teaching under the Science and Art Department, no mention is made of workshops for practical instruction in the use of tools, and no grant can be earned for teaching of this kind, which is manifestly costly, and requires special preparations. Nor can any aid be obtained for work of this character from the City and Guilds of London Institute, for it is a condition, in the case of their payments, that the student shall be practically engaged in the trade in which he is being examined, and schoolboys would at once be debarred under this clause from all participation in the grants made by the City Guilds. How, then, have these workshops been obtained in the past, and in what way does the scheme of technical education which has been under discussion in the House of Commons contemplate their future creation? The answer to the former part of the question is, we believe, that their creation has hitherto been due to voluntary subscription or to the munificence of some individual member of the School Board. In reply to the latter part of the question, we must own that unless the Department of Science and Art should enlarge the sphere of its operations, we see no place for school workshops in the future. Science laboratories with all necessary fittings can be obtained under the regulations of the Department; but benches, and lathes, and tools for wood and iron working are not contemplated in the Directory. Workshops of the kind we have in view exist in connection with many of our public and middle-class schools; but in all these cases the absence of any influence upon the future artisan, or of any action in overcoming foreign competition, renders them quite beyond the scope of our present observations. What many of us have hoped for in the promised scheme of technical education was the provision of good night schools, resembling the best Continental Continuation Schools, or the Industrial Schools of Belgium, in which the young workman should have every opportunity for learning the theoretical branches of his trade, and of seeing how to apply his theory to the operations carried on in the factory, on good working models of the machinery, if not upon the manufacturing plant itself. Our ideal school would be one attached to the factory, as has been so ably done at Salford by Mr. W. Mather, M.P., where the apprentices and lads employed in the works learn the science subjects most likely to be useful to them, and have every facility for making themselves familiar with the actual machinery in the works. Good mechanical drawing must be the basis of all teaching in such a school, and the syllabus of the Science and Art Department will supply all that is required for the theoretical branches of every important industry.

No doubt in course of time, when technical schools abound, and when the ratepayers have discovered how small a sum they need add to the large grants which the Treasury will furnish, it may be found expedient to add somewhat to the sphere of the Science and Art Department, and to absorb, may be, the work so well begun by the City Guilds; but this time is, we think, as yet far distant. In the immediate future, the technical train-

ing which the Government has to offer us is that provided by the Science and Art Department, and the ratepayers will only be called upon to supplement the Government grants in supporting higher grade schools. The idea that workshops attached to Board schools for teaching the children carpentry and metal work can really and indeed provide "Technical Instruction," or that the creation of a reasonable number of such workshops will exert any appreciable influence in diminishing foreign competition, is too puerile to merit serious attention.

WORKS IN WATER.—XXXIII.

(*Continued from page 946, Vol. LI.*)

FLOATING BREAKWATERS.

A REDUCTION in the cost of breakwaters is very desirable if it can be done with reasonable prospect of the endurance of the structures to be substituted for them, or, otherwise, that they should be made in such manner that the destruction of parts may be easily repaired, while the destruction of one or two parts on any one occasion may not render the breakwater use-

Fig. 1

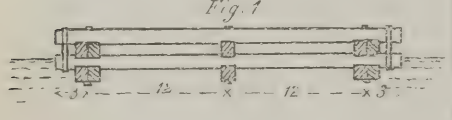


Fig. 2

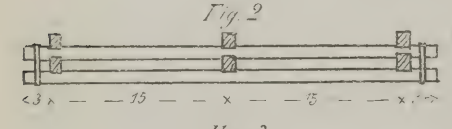
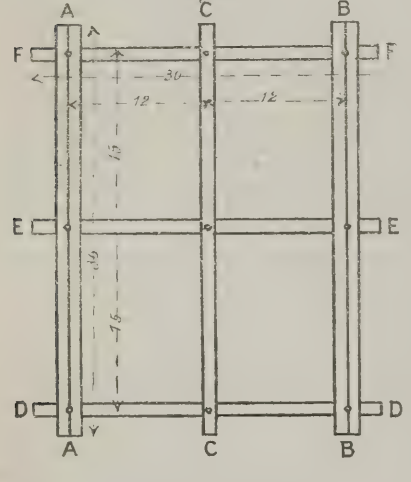


Fig. 3



less. It must be admitted that the great breakwaters we have hitherto commented upon—those of Holyhead, Plymouth, and Dover—have been excessively costly, and although the cost of the Portland Breakwater has been less than that of the others, being done by the labour of convicts in a great measure, yet £1,033,000, or £127 per lineal foot, which is what it did cost, makes it still an expensive work. So far as harbours are necessary for national purposes—as all these were when they were made, and, indeed, are so still—no outlay of money upon their construction can be too much which is necessary to make them large enough and secure against the ravages of storms round the coast, with the additional requirement, in the case of some of them, that they afford a means of repairing, refitting, and victualling of ships of the navy in case of war; and the establishment of harbours such as these is in the first instance chiefly a question of site. If a harbour of this sort were required in any particular position, it would go hard, indeed, with the engineer if he could not find means to construct a breakwater to protect it from the effects of the sea in gales of wind, however much exposed the situation might be, or however deep the water; and when the enormous expense of some of the breakwaters is referred to, it should be remembered that the engineer has been called upon to do his best in the place where the harbour was required to be made; and perhaps if the situation and depth of water were considered when the great expense is referred to, there would be less wonder at it, and fewer remarks upon the subject. Nevertheless, it is highly desirable to reduce the cost of breakwaters by any means which afford sufficient protection, and we intend to examine with that view the proposals which have been made for the formation of floating breakwaters, which, it need not be said, would be very much less costly than those founded on the bed of the sea, in anything like a depth of water of 40ft., which appears to be the minimum

Fig. 4

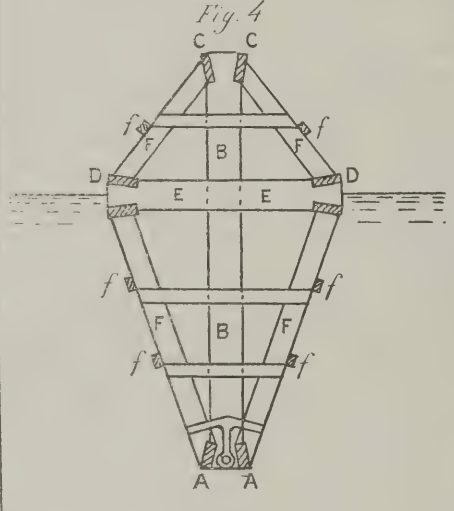
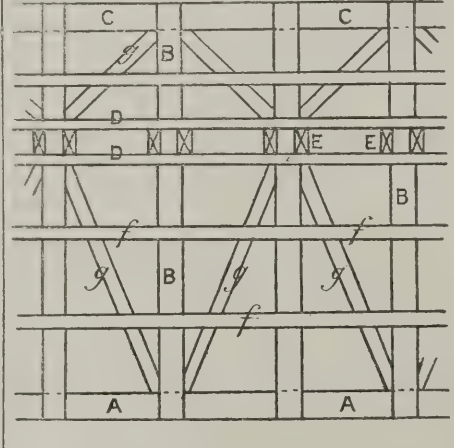
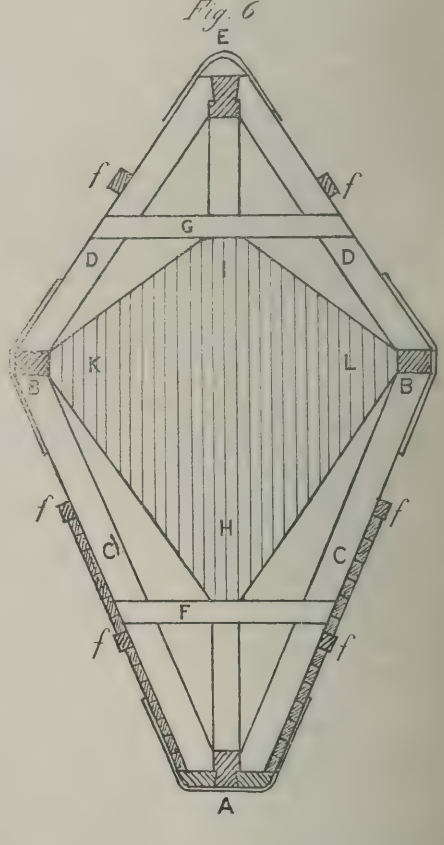


Fig. 5



which can now be recommended for the entrance of large ships, seeing that some allowance must be made for the send of the sea when entering at low water, and for a sufficient clearance of the bottom; and it is a feature distinctly favourable to the question of floating structures that the depth of water is, within certain limits, of but little consequence. It seems to be almost necessary to provide 40ft. of water or more at the entrance, although less than that may be sufficient within the harbour; and the reason, we take it, why the depth at the entrance should be greater than that inside is that in rough weather this allowance must be made for the height of the waves, first above the mean level—say 6ft. or 7ft.—and then as much below it, so that to prevent ships' bottoms touching the ground the depth outside the entrance should be one or two fathoms greater than it need be inside. Such considerations as these determine the position of the entrance as regards the distance out from shore, and the draught of water of the vessels to be provided for determines the line of breakwater, and consequently the depth in which it must be constructed. This depth, moreover, must be that below the level of low water, so that, all things considered, a breakwater built of stone or concrete is necessarily an expensive construction. This has led at various times to proposals to effect the same object by floating structures, so that the depth of water would be of less importance. The proposal of Mr. John White was to frame balks of timber together in the manner shown in Figs. 1, 2, and 3, the sizes of the balks being as large as could conveniently be procured, and laid in the following manner: First, double balks, A, A, and B, B, with a single balk in the middle between them, C, C. Upon these, crosswise, were single balks D, D, E, E, and F, F, all being bolted together vertically at the intersections, and for situations not much exposed this frame was considered sufficient; but in more exposed places a greater depth of timber was

Fig. 6



recommended, and in these the double and single balks were repeated, one upon another, as shown in Figs. 1 and 2, the whole being bolted through at the intersections, and also strongly hooped at the projecting ends. The frames were to be attached by means of cables to anchors or other moorings at the bottom. It was foreseen that from various causes the buoyancy of the frames as here described might become insufficient to float them properly, and in that case buoys were to be attached to the frames, or any other usual means taken to keep them afloat.

The proposal of Admiral Tayler, which he carried into effect on an experimental scale in this country and in a practical one at one of the French ports, was to build a breakwater of timber, of any length desired, made up of separate lengths of about 90ft., each length being 18ft. high and 10ft. wide. He calculated that the immersion would be two-thirds, so that there would be 12ft. in water and 6ft. out., the form being that shown in Figs. 4 and 5, Fig. 4 being a cross

section and Fig. 5 a longitudinal elevation of a part of one length. The construction is first to lay a double sill, each piece 12in. by 8in., A, A, in each figure. The length of 90ft. would require that the pieces be scarped, but this would he no material weakness in a floating structure. Upright timbers, 12in. by 10in., B, B, are placed upon the sills, 4ft. apart in the clear. Each of these pieces is 18ft. long, the bottom being cut to a dovetailed form and set between the sills. The top is cut in like manner to receive two cap sills, 15in. by 5in., C, C, bolted together crosswise, as are also the bottom sills. The next principal parts of the structure are two double shear planks, D, D, each piece 15in. by 5in., the outer edges of each pair being placed 10ft. apart horizontally, and held in position by a cross beam E, E, the ends of which are cut in a dovetailed form, and the shear plates let into the shoulders. Each of these cross beams is in two pieces, 12in. by 6in., one piece on each side of the upright, both the upright and each piece of the beam being sunk an inch at the crossing and bolted through. The outer timbers F, F, 9in. by 6in., and 21in. apart in the clear, are tenoned into the sills and shear planks. This forms the main frame, but further timbers are required to stiffen it, as the walings *f*, *f*, 8in. by 8in., which are connected across the frame by ties 10in. by 5in., double, one piece on each side of each main upright, each piece being sunk an inch at the crossing as in the main beam. Also it is necessary to introduce braces *g*, *g*, to prevent "working" of the joints in a longitudinal direction.

The inventor described this floating structure as a method of abating or lessening the shock or force of waves, and of reducing them to the comparatively harmless state known as broken water, and thereby preventing the injury done to, and increasing the durability of, breakwaters, piers, wharfs, and embankments, and also of adding to the security and defence of harbours and other places exposed to the violent action of waves. But there are two purposes to which the invention was to be put: one, to protect other works; the other to act as the work itself which should protect a harbour; and in this respect Admiral Tayler claimed to have substituted for a solid fixed resisting body, such as a stone breakwater, a yielding body, partly floating on the water and partly resting and vibrating upon its keel at the bottom, such yielding bodies being linked or connected together, the waves consequently flowing over or under the yielding bodies, according to circumstances, and becoming divided or broken, and thus deprived of further mischievous action. These yielding bodies constitute what he called his floating breakwater, and they might be formed in various ways, and built in many different forms, and of any proper material, but still retaining as their essential principle that of yielding to the shock of the waves, instead of opposing them. For attaching the floating breakwater to its moorings there are two iron straps, 7in. by 1½in., made in the form T, one being placed on each side of the upright B, second or third from each end of the breakwater, or rather each length of it, and the mooring chains are attached thereto by a shackle. Ordinary mooring chains, if of sufficient strength, would be so ponderous that they would detract from the buoyancy of the breakwater, and an ingenious system of mooring was proposed, consisting of 12ft. lengths of straight-grained red fir, larch, or American ash, which would bear a much greater strain in tension than an equal weight of iron. These lengths of timber were 9in. square, joined by shackles, and a link of common mooring chain. Admiral Tayler proposed for certain situations another kind of floating breakwater, which consisted of a framework about 30ft. in height and 18ft. in width, constructed as follows, and of which Fig. 6 is a cross-section:—A sill A, 16in. by 14in., is laid from end to end of the breakwater, or each length of it, with side pieces each 16in. by 8in., shouldered into the central sill. At about 18ft. in height above the bottom, two sills, B, B, were laid, the width apart to the outside of each being 18ft. Between the bottom sills and these main sills at the line of flotation, the side timbers C, C, were inserted, tenoned into each sill above and below, and above these main sills raking timbers D, D, were set, meeting in a cap sill at the top E. These timbers were stiffened by wallings *f*, running the whole length of the structure. Cross beams F and G were bolted to the outer timbers at the height 16ft. apart in the clear, short pillars being inserted between these and the two sills at the bottom and top respectively. Between these two cross beams, and between the two main sills B, B, a watertight framed and planked caisson H, I, K, L is fixed, being attached thereto with iron knees and bolts. The caisson is covered with 4in. pine planking, the joints being rebated, and the lower part of the external frame is also covered with 4in. planking from the bottom sill to the second waling on each side. The bottom pieces are all strongly bound together by iron straps reaching 4ft. up each side of the main timbers; and the top is similarly treated.

BUILDING MATERIALS.—II.*

By W. Y. Dent, F.C.S., F.I.C.

(*Concluded from p.* 279.)

THE selection of magnesian limestone for the Houses of Parliament was decided upon chiefly on account of the very excellent state of preservation in which this stone was found at the cathedral church at Southwell, in Nottinghamshire, Roche Abbey, near Tickhill, and the castles of Conisborough and Bolsover. The particular stone chosen was that from the quarries at Bolsover, in Derbyshire, whence the stone used for the church at Southwell had been obtained. The stone that could be supplied from these quarries was, however, found to be too small in quantity for so extensive a building, and blocks of sufficient size were not procurable; other sources of supply had consequently to be found, and the North Anston quarries, on the borders of Yorkshire, were determined upon. The choice of magnesian limestone, notwithstanding all that has occurred, in connection with the defective condition of many portions of the building at Westminster, cannot be regarded as altogether an erroneous one. Magnesian limestone had long been regarded as affording an excellent material for building purposes. It was, in the opinion of Sir Christopher Wren, only inferior to Portland, and examples are not wanting which afford evidence of its capability of bearing exposure to such an atmosphere as that of London without injury, of which the Museum of Practical Geology in Jermyn-street may be quoted as an instance. The greatest care was taken in selecting the kind of stone to be used; a Royal Commission was appointed, consisting of men eminent for their geological attainments as well as for their practical experience, who undertook a laborious investigation, visiting all the principal quarries in England, and examining 150 varieties of stone. The cause of the unsatisfactory condition of much of the stone employed in the building is unquestionably due to want of inspection at the quarries, and—as a necessary consequence of this laxity of superintendence—the inefficient manner in which the stone was worked. We find stones taken from the same part of the building, varying materially as regards their porosity and physical character, to such an extent as could not possibly have occurred had proper precautions been taken for preventing the arrival in London of any stone of inferior quality. The securing a proper supervision over all quarrying operations is of quite as much importance as care in the selection of the description of stone most suitable for any building operations, of the truth of which the Palace of Westminster affords, unfortunately, plenty of evidence. A very excellent stone of this class is obtained from Huddlestone, situated between Sherburn and Tadcaster, consisting of 54 per cent. of carbonate of lime and 41 per cent. of carbonate of magnesia, of which we have an example in London in the cross erected in front of the Charing-cross Hotel. Building stone of good quality is obtained from various parts of the magnesian limestone district, differing in composition as regards the relative proportions of lime and magnesia. The nearer the composition of the stone resembles that of true dolomite, and the more crystalline is its character, the better building stone is it likely to prove. The Bolsover stone, originally selected for the Palace at Westminster, contained 51 per cent. of carbonate of lime and 40 per cent. of carbonate of magnesia. It would be useless to attempt to give anything like a detailed account of the vast number of very excellent building stones with which this country abounds, but I shall endeavour to make a selection of such as may best serve to illustrate the chief differences that exist between them, both as regards their chemical composition and physical structure. In examining a specimen of stone, our first inquiry would naturally be directed towards ascertaining its chemical composition, so far, at all events, as would be requisite for deciding upon the class to which it belongs, whether it is a sandstone or a limestone, or partakes of the character of both. Having determined this point, we should ascertain the condition in which its constituents exist, whether crystalline or otherwise, and proceed to a careful examination of its physical properties generally, such as its hardness, density, and strength, and also its porosity, as shown by the amount of water it will absorb. It is upon these physical properties that the value of a stone mainly depends, for we find sandstones containing very nearly the same amounts of silica, or limestones containing the same proportions of carbonate of lime, and yet differing widely from each other in their relative value for building purposes, their durability or otherwise being mainly dependent upon their physical structure. In conducting an investigation of this nature, the examination of sections of stone under a microscope will afford much useful and valuable information as to the nature and character of the minerals of which it is composed. As regards the more practical tests, it is very desirable, if not absolutely essential, that they should be conducted in as uniform a manner as possible, otherwise the results obtained are no longer capable of being compared with each other, and consequently lose much of their value. The capability of stone to resist a crushing force is usually stated in the circulars issued by quarry owners, as being represented by the number of pounds per square inch, or tons per square foot, which it is capable of bearing without breaking; but these results are not strictly comparable with each other unless the tests have been conducted in the same manner, and with blocks of the same size. The method most generally adopted is to subject 6in. cubes, bedded between pieces of pine ⅜in. in thickness, to hydraulic pressure, noting the amount of force obtained when the first crack makes its appearance, and also when the crushing takes place. Another useful test of the strength of stone is to expose repeatedly small slabs saturated with water, and inclosed in a metal case, to a freezing temperature. The density may be taken approximately by simply weighing 6in. or 12in. cubes, if carefully cut; but for more accurate determinations, the usual manner of taking the specific gravity of solids by ascertaining the difference in weight in air and when immersed in water may be resorted to. For this purpose, small 1in. or 1½in. cubes are the most convenient sizes. The specimens, previously dried and weighed, should be rendered impervious to water by immersion for an instant in melted paraffin, or by coating them with a thick solution of shellac in methylated spirit, and again weighed. The difference between the specific gravity of paraffin or shellac, and that of water, is not sufficient to give rise to any serious amount of error, whilst the necessary correction for this difference can be easily calculated for, if greater accuracy be desired. In drying specimens of stone, care should be taken to avoid too high a temperature; if time allows, it is preferable to do so

* Being the Cantor Lecture delivered before the Society of Arts.

by simply exposing them to the air of a warm room, and under no circumstances should the temperature be allowed to exceed 212° Fahr. When dried rapidly at this temperature, the specimens should be allowed to remain for an hour after removal from the drying chamber, in order that they may cool down and take up their hygroscopic moisture before weighing. The variations that exist as regards density in different kinds of stone are considerable. The lighter descriptions, such as Caen and Bath stone, weigh from about 116lb. to 123lb. per cubic foot, whilst the heaviest, such as granites and marbles, will weigh from 165lb. to 175lb. The amount of water absorbed by stone is sometimes determined by exposing the dry specimen to an atmosphere saturated with moisture for forty-eight hours, a method which gives very good results when making a careful comparative examination of two different specimens of stone; but a more rapid and sufficiently accurate method for most practical purposes is to immerse a slab about 3in. square and ½in. in thickness in water, until no further bubbles of air make their appearance, when it is taken out; the water on the surface is removed with a piece of bibulous paper, and the increase in weight ascertained. The less durable kinds of stone, such as Caen stone and many descriptions of Bath stone, absorb as a rule more water than Portland, Ancaster, or Doulting, whilst granite and marble may be regarded as non-absorbent. In a report to a Commission appointed at Munich on the subject of stone, the following tests were proposed for adoption:—1. Determination of the salts soluble in water. 2. Determination of its porosity by ascertaining the amount of water taken up by capillary absorption during twenty-four hours, as well as that absorbed by total immersion. 3. Exposure of a sample saturated with water and inclosed in a metal case to a temperature of from 5° to 14° Fahr., such exposure to be repeated ten times. In carrying out experiments with stone, it is always desirable to have a specimen of stone of known quality, and belonging to the same class as those under examination, included in the investigation, since it is difficult to insure the conditions under which experiments are made being precisely the same under all circumstances. However much care may be taken in the examination of specimens, it must never be forgotten that it is absolutely necessary, before deciding on the relative merits of different kinds of stone as to their suitability or otherwise for any special purpose, that the quarries should be visited, and the several beds carefully inspected, for in almost every quarry, whatever the description of stone may be, a very material difference will be found to exist in the quality of the stone yielded by its several beds. Samples of stone from the same quarry, and sometimes even from the same bed, in which no practical difference can be detected by chemical analysis, will not unfrequently be found to exhibit considerable variations in physical structure, a knowledge of which can only be obtained by actual inspection of the stone *in situ*. No opportunity should be lost of obtaining information as to the condition of buildings in which the stone has been employed, and all quarrying operations should be conducted under efficient superintendence, in order that no stone of inferior quality should be permitted to leave the quarry. Time should be allowed for what is termed the "quarry watèr" to dry out, by which the surface of the stone is hardened, and the tendency of pieces to split off, so frequently exhibited by newly-quarried stone, especially in frosty weather, is decreased. The hardening which takes place during the process of slow drying, by exposure to the air, is probably owing to the deposition within the pores of stone of mineral matter previously held in solution by the quarry water. This beneficial result is not obtained when any process of artificial drying is adopted, which is too rapid to allow the matter deposited to assume such a crystalline structure as results from the slow drying effected by simply exposing it to air. Moreover, such artificial drying may have an injurious effect, on account of its giving rise to unequal expansion and contraction of the surface of the stone as compared with the moist interior.

PRESERVATION OF STONE.

The question of the preservation of stone is one upon which much time and trouble have been expended without, however, leading to the attainment of any very satisfactory results, inasmuch as when good stone is employed no preserving process is required, and if, unfortunately, the best has to be made of inferior stone, it is only in exceptional cases that the cost and trouble involved in the adoption of any such process is likely to be incurred upon an extensive scale. When the extent of the decay which had taken place in the stone of the Houses of Parliament was first fully realised, it created a good deal of excitement, and a Government Commission was appointed to inquire into the subject, who invited proposals for arresting its progress. In answer to this invitation, a great number of projects were brought forward for the attainment of the desired object, differing widely from each other in their character, many of them being the outcome of much thought and careful study of the question, whilst others were of a very crude nature and had no pretensions to any merit. The principle upon which any process of this kind depends for success is evident, for since it is by means of water that the acid matters which act so injuriously upon stone obtain access to it, any process which succeeds in filling up the pores with some material of a permanent and unalterable character must be likely to act as an effective preservative. This, at first sight, would seem very easy to accomplish. There is no difficulty in closing the pores of a piece of soft chalk or Caen stone, so as to harden the surface and make it non-absorbent of water. When, however, stone is once in position, and we have it in the form of a vertical wall, the task is a more difficult one. Under such circumstances it is impossible to make any solution penetrate to a sufficient depth by a single application; it requires to be frequently repeated, beginning with very weak solutions, before the stone can be made to absorb it in sufficient quantity, or to any considerable depth; whilst if it be a mere surface covering, it is likely to be of little more use than ordinary painting, which requires to be renewed every four or five years. Since we know that of all the constituents of stone there is nothing more permanent than silica, and that the combinations into which this substance enters are numerous and varied, and, moreover, that silicates are capable of being readily manufactured by easy and inexpensive processes, it was natural that some solution of silica should have been amongst the first to suggest itself to the chemist as likely to prove eminently successful as an application for the hardening of stone. Accordingly we find that, as far back as the year 1826, Professor Fuchs, of Munich, proposed an alkaline solution of silica, under the name of soluble glass, for the solidification of stone. Professor Kuhlman, of Lille, subsequently read a series of papers before the French Academy of Sciences, on the application of water glass (silicate of potash) to the hardening of stone. The great drawback to the use of the alkaline silicates is the efflorescence to which they necessarily give rise. In order to avoid this difficulty, other methods were proposed some years later to the Commission appointed to inquire into the condition of the stone of the Houses of Parliament. Among these was a solution of baryta, followed by a solution of superphosphate of lime, which produced a precipitate within the pores of the stone of insoluble phosphate of lime and phosphate of baryta; another was silicofluoric acid in conjunction with baryta, both of which processes were attended with a certain amount of success. Limestone may also be rendered non-porous by the application of oxalate of alumina, which produces an insoluble precipitate of oxalate of lime and alumina. Any of these processes fill up the pores of the stone with material of a permanent character without giving rise to the production of soluble salts which require to be washed out. The use of organic substances, such as linseed oil, affords considerable protection for a time, but organic matter of this description is liable to be changed by combining with the oxygen of the air.

In the case of ordinary painting, it is the oxidation of the oil of the paint that causes the paint to scale off in the course of a few years, the oil being converted into a brittle resinous substance. The rapidity with which guttapercha, when exposed in thin strips to influence of light and air, loses elasticity and is converted into a brittle material, affords a good illustration of this oxidation of organic matter. Of materials not belonging to the inorganic or mineral class, one of the least subject to any change is paraffin, and on this account the use of paraffin applied in various ways, sometimes in solution and sometimes in a melted state, has been at various times suggested as a means of preserving stone by preventing the penetration of moisture. We have a striking example of the effect of climate upon stone in the Egyptian obelisks, which, after remaining unaltered for thousands of years in the dry climate of Egypt, are no sooner removed to such an atmosphere as that of London than they begin to show signs of disintegration and decay, as is more or less the case with all the three obelisks that have been brought away from Egypt—one erected in New York, another in Paris, and a third on the Thames Embankment. Their condition is no doubt, to a considerable extent, due to injuries received whilst they laid neglected on the sands of Alexandria, and partly to such as were unavoidable in transporting them to the several positions they now occupy. The decay that has taken place in the New York obelisk appears to have been very much greater than is the case with the one erected in London. In a paper read before the New York Academy of Sciences, it is stated that exfoliation had taken place to a serious extent, pieces of considerable size becoming detached from the mass. Attempts at preserving the stone from further decay have been made both at London and New York. The method adopted in New York by the advice of Dr. Doremus consisted in the use of paraffin, which was applied in a melted condition (mixed with a little creosote) to the stone, previously warmed by means of a small portable furnace. In this manner the paraffin could be made to penetrate to a depth of from a quarter to half an inch. A very popular building stone in New York is that known as "brown stone," which, from its liability to decay, necessitates the use of some preservative process, and the paraffin treatment has been employed upon various buildings in New York with results that have been regarded as successful.

With respect to the obelisk, however, the last reports I have seen are not in favour of this mode of treatment. Any process which involves the heating of the surface of the stone must always be attended with considerable risk of failure. The obelisk on the Thames Embankment has also been subjected to a preservative process, but of a different kind. Upon its showing indications of being acted upon by exposure to the atmosphere of London, the Board of Works, in 1879, under the joint advice of their engineer and consulting chemist, intrusted the task of coating it with a preservative solution, consisting essentially of a solution of gum resins in petroleum spirit, to the Indestructible Paint Company. The solution was very carefully applied after cleaning the obelisk thoroughly, beginning with a very weak solution, and repeating the application as long as the stone could be made to absorb it. So far, the application appears to have been of service, but a period of eight years is too short a time to allow of any decided opinion being formed as to the durability of such a protective coating. As regards the Palace at Westminster, the decay, after all, cannot be said to have affected its stability as a building. It has been chiefly confined to places underneath stringcourses or ledges, which are kept constantly damp by the rain collecting upon, and percolating through, the stone above. Some of the finials have also been broken by the rusting of the iron rods that supported them. What is now being done in the way of preservation is to coat such projecting surfaces with mastic or cement, so as to allow the rain to flow off freely, without allowing it any opportunity for penetrating the stone, and to remove decayed and imperfect stone, replacing it with sound material. If care be taken in the selection of stone, it is only under special and exceptional circumstances that it will be considered desirable to resort to methods of preservation, which must necessarily be expensive, and can only be regarded as the best cure for defects that admit of no other remedy.

ARTIFICIAL STONE.

The numerous attempts that have been made at different times to produce an artificial material that should be capable of being used in the place of natural stone have resulted in the very general use of concrete, or materials in which Portland cement is the binding material. The closest imitation of natural stone is perhaps that manufactured by Mr. Ransome, who took out his first patent 42 years ago. It was not, however, until 1856 that any successful result attended his experiments, when he found that by the use of calcium chloride, in conjunction with silicate of soda, an efficient binding material could be obtained that, when mixed with sand, would solidify into a hard mass. By the action of calcium chloride upon silicate of soda, an insoluble silicate of lime is formed, leaving a soluble sodium chloride, or common salt, which had to be removed by washing, an operation which, although apparently very simple, proved to be extremely difficult in practice. In spite of the greatest care it was found impossible to wash out the last traces of soluble salt from massive blocks, and consequently the stone was liable to be disfigured by efflorescence. This stone was subsequently prepared by an improved process, but it cannot be produced to compete with the lower price at which substitutes for stone can be made by the aid of Portland cement. Silicate of soda is readily obtained by boiling flints in a solution of caustic soda under a pressure of 60lb. on the square inch; or it may be obtained by simply boiling certain silicious deposits found in various parts of the world in an open vessel. In certain strata of the lower chalk formation in the counties of Surrey and Hampshire there are beds which contain silica in this readily soluble condition, some of which, in the neighbourhood of Farnham, will yield as much as from 50 to 70 per cent. of silica by simply boiling with caustic soda. The Victoria Stone Company has for the last sixteen years been producing a very excellent material as artificial stone, especially adapted for sinks, flagstones, and landings, which is capable of competing successfully with the best Yorkshire flagging. It may be regarded as a fine description of concrete, being produced by binding together granite siftings by means of Portland cement. Their principal works are situated near the Groby granite quarries, not far from Leicester, and it is the siftings of the broken granite that are thus utilised. These siftings, after being washed, are mixed with Portland cement in the proportion of three parts of the former to one of the latter, sufficient water being added to cause the cement to set. The surface of the blocks is further hardened by being placed in tanks containing a solution of silicate of soda.

There are other kinds of artificial pavement now manufactured, in the preparation of which broken granite and blast furnace slag are employed, but they all depend principally upon Portland cement as the binding material.

TERRACOTTA.

During the last twenty years much attention has been paid to the manufacture of a material to be used as a substitute for stone, which, so far from being of modern origin, is associated with the very earliest history of our race. It is known by the name of terracotta. As regards durability, burned clay is capable of resisting the effects of time to as great an extent as any other material used for constructive purposes, of which we have abundant evidence in the specimens of Assyrian and Egyptian antiquities in the British Museum. The use of terracotta affords facilities for the production of elaborate designs, the clay model itself being converted by baking into a material more durable than stone. It is much lighter than stone, as compared with the crushing force it will sustain; and by the use of different clays a variety of colours may be obtained. Against these advantages must be considered the difficulties presented in the liability of the clay to shrinkage, both in drying and firing, which, in spite of the greatest care and experience, not unfrequently produces distortion from unequal contraction. To the improved manufacture of this material, a great impetus was given by its being adopted to such a large extent for the Albert Hall and other buildings at South Kensington, the perfection to which it has now attained being to a great extent, due to the energy and skill displayed by Messrs. Doulton and Co., as well as by other manufacturers. Success depends upon the use of a due proportion of the several materials employed, on the attention paid to the grinding and mixing, and to the care bestowed during the operations of drying and firing.

FIREBRICKS.

The plastic clays consist of silica and alumina, chemically combined with water. They are hydrated silicates of alumina, their plasticity depending upon the water that enters into their composition. The water, with which the clay is mechanically combined, can be expelled at a temperature a little above that of boiling, without detriment to its plasticity; but the whole of the water it contains cannot be driven off without raising the temperature to dull redness. Silica, alumina, and lime are all separately very infusible substances, and are capable of resisting exposure to very high temperatures without softening. It is on account of its extreme infusibility that lime is found to be the most suitable material for the cylinders upon which the oxyhydrogen flame is made to impinge to produce a brilliant light, the intensity of the light being due to the extremely high temperature to which the lime is raised. Lime, however, from its want of cohesion, could never be brought into general use for such purposes as fireclay is employed, and this is also the case as regards silica, which requires the addition of some substance of a basic character with which it will unite, and so cause the particles to bind together. The nearest approach to the use of silica alone as a firebrick is in the well-known Welsh brick, made from the Dinas rock in the Vale of Neath. This material, before it was made into firebricks, had long been used for repairing the furnaces at the copper works of South Wales, for which purpose its peculiar property of expanding when subjected to the influence of high temperature, instead of contracting (as is the case with ordinary fireclay), renders it particularly suitable, the cementation of the bricks being facilitated by the increase of temperature. In order to make bricks of this Dinas rock (which occurs in various conditions, from that of a firm rock to that of disintegrated sand), it is necessary to mix with it about 1 per cent. of lime. These Dinas bricks will stand very high temperatures, but they are more friable than ordinary firebricks, and will not resist to the same extent the action of basic substances, such as furnace slags containing much oxide of iron. The bricks are porous, readily absorbing moisture; hence it is necessary that furnaces built of these bricks should be gradually heated, the bricks being liable to crack if sufficient time is not allowed for driving off the moisture. The composition of the clay used for firebricks is a question of considerable importance, inasmuch as the quality depends greatly upon its chemical constituents, although its power of resisting fusion when exposed to intense heat is affected by its mechanical condition. The same materials, when mixed together in the form of a coarse powder, will require a higher temperature to fuse them than would be the case if they were reduced to a fine state of division. For the manufacture of firebricks raw clay is ground between rollers or under edge stones, or reduced to powder by means of a Carr's disintegrator, which consists of large cylinders constructed of wrought-iron bars revolving rapidly in opposite directions. The clay is then kneaded with water, old bricks or other fired ware reduced to a coarse powder, technically known as "grog," being mixed with the raw clay. This admixture of previously burnt clay renders the bricks less liable to shrink, and enables them to bear a much higher temperature without fusion than would be the case if only new clay were employed. The qualities required in firebricks are:—1. That they should bear exposure to intense heat for a long period without fusion. 2. That they should be capable of being subjected to sudden changes of temperature without injury. 3. That they should be able to resist the action of melted copper slags. It is not to be expected that any one description of brick should exhibit all these qualities to the fullest extent, and it is therefore essential that, in selecting the kind of firebrick to be used, due regard should be paid to the particular purpose for which it is required. A firebrick like the Dinas, containing 98 per cent. of silica, will bear exposure to a higher temperature than a Stourbridge, but it will run down sooner than the Stourbridge when in contact with the melted iron slag. Gannister is the name given to a fine grit, which occurs under certain coal beds in Yorkshire, Derbyshire, and South Wales, which is especially adapted for lining cupola furnaces; the peculiar black gannister from the neighbourhood of Sheffield is in great request for this purpose, as, owing to the large quantity of silica it contains (from 80 to 90 per cent), it will stand high temperatures without shrinking. The Lee Moor bricks are manufactured at Plympton, in Devonshire, from the coarser portions of decomposed granite, separated from the china clay during the process of washing. These bricks contain a large proportion of silica, and are very infusible, their power of supporting exposure to very high temperatures being increased by the coarseness of the particles of disintegrated granite, of which they are composed. Firebricks are also made of silicious clays from granitic deposits in other parts of Devonshire. The material employed for such bricks, as well as for the Dinas, differs materially in its character from what is ordinarily understood by the term fireclay, as used in the manufacture of such well-known bricks as the Stourbridge, Newcastle, or Glenboig; the quality of which, as regards their chemical composition, depends upon the relative proportions of silica and alumina, and their freedom from iron oxide and alkaline salts, the presence of which tends to render the clay more fusible.

ARCHITECTURAL ASSOCIATION EXCURSION, WILTS, 1887.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

WE left the party last week in our description of the excursion at South Wraxhall Manor, where some hours were spent in preparing practical studies of the work. We printed some historical notes of the place, and so may pass on to the parish church, nearly a mile distant. The tower, with its stone-built pack-saddle roof and large stair turret on the west side, is very French in character, the upper part being a later addition. The composition is decidedly picturesque, though the church itself has but little interest. Mr. C. Adye, borough surveyor of Bradford-on-Avon, restored the fabric a short time since. This architect also assisted in bringing to light the much-talked-of Saxon Chapel at Bradford, which is now fully repaired. This was next visited, and members examined Bradford church and bridges, and also Kingston House. The grouping of the ancient stone-built gabled houses of the town rising on the slopes of the valley of the Avon in picturesque confusion, is very pleasing; while the hideous town hall, designed by Fuller in 1855, does not look so bad in the distance when its detail becomes obscured. The township possesses a wonderful history, too long to recount here even in abstract, for want of space; suffice it to add, after all that has been said, architects will not find much to detain them in Bradford, which is somewhat disappointing. Kingston House, though a big building, is overwindowed as well as pretentious, and years ago was over-restored and internally altered. The excursionists next drove to Westwood, some two miles S.W. of Bradford, and visited the Manor House, now occupied as a farm, and the adjoining church, which has a noble western tower, somewhat elaborated, after Bath Abbey central pile in the matter of wall treatment. The most interesting part of the sacred building, however, is the charming chapel of Late Gothic work on the north side of the chancel. Inside there are remains of colour decoration in the niches of this chapel, and some old glass in the chancel window. A sculpture of Satan quaintly treated is labelled with the injunction, "Resist me and I will flee." The Manor House is picturesque with its circular stair turret, but furnishes a subject rather for a painter's pencil than an architect's study of building. Thursday's outing was somewhat upset by a break in one of the drags, necessitating the omission from the programme of Keevil, near Holt, where there are two half-timbered houses worth seeing. The first

halt was made at Great Chalfield Manor, of which we published a view, with plans and details, last Friday. The church and house are somewhat difficult to find, hidden as they are in a valley, away from the road some distance. Mr. J. A. Gotch described the buildings, of which the following are some particulars :—The manor house of Great Chalfield or Chaldefield, deriving its name from Roman times as the site of an ancient outpost, connected with the *Fosseway* into Bath, forms, with its church and Elizabethan offices and stables, a very interesting group of buildings, rich in detail and thoroughly English in design, dating from the latter days of Henry VI., and built by Thomas Tropenell, who died in 1490. Large fish ponds once existed at the rear of the house, and were supplied by natural springs; the principal pond was 538ft. long by 51ft. broad, the two others were each 83ft. long by 31ft. wide. The plans of the house, which we gave from Walker's "Examples of Gothic Architecture," clearly explain its original arrangements. The banqueting hall measured 40ft. by 20ft., and it was 20ft. high. The porch is richly groined, and has a peep hole into the refectory or dining-room. The oak screens in the big hall correspond, we are told, somewhat in detail with that at Haddon Hall. Beyond the hall leads the staircase, still existing, and so the buttery, called the dining-room (on plan), is entered; from here the rooms known as "the Priest's dwelling" were reached. At the east end of the hall two elegantly-groined bays, with heraldic bosses and carvings, are carried out to the north and south of the apartment in similar proportions to the entrance porch. The northern bay, to the left on entering the hall, leads to a massively-vaulted room, lighted by narrow windows; but now demolished, save the front wall, which stands as shown on the plan. The original domestic offices with which these rooms communicated have been pulled down. The hall had a rich ceiling, from which some large plaster bosses were stored in the crypt of the Palace at Wells, and the walls had several loop or peep holes, with quaint masks in front of the openings, communicating with apartments adjoining. The old music gallery over the screen has gone, and the interior has been entirely refitted for modern convenience, the hall being cut up into rooms in reckless ignorance and wanton destruction. The chief interest of the house as it stands is comprised really in the north and south fronts, with their many gables and two beautiful oriels. These are particularly good examples, and the carved figures forming the finials over the gables are especially good and massively carved. We gave drawings of some of them with our view of the house showing the front façade. The church, like the house to which it belongs, has been spoiled to a great extent by alterations, but still it is very interesting with a picturesque bell turret over the western gable, a hooded west doorway or porch, and a traceried window of Henry VII.'s time. The original chapel existed here as early as 1308. The builder of the manor house erected a richly-treated stone screen to divide the south chapel from the nave (which is only 13ft. wide and some 25ft. long), but this now stands in front of the chancel, and has been cut down rather and scraped considerably. Mr. J. D. Sedding described the churches of Steeple Ashton, Edington, and Westbury, which were visited in this order. Steeple Ashton (properly Staple Ashton) Church is a large, lofty, and imposing building internally, with a high clerestory and wooden groined nave, the aisles being vaulted in stone, having rich corbels massively carved with figure sculpture supporting the ribs of the groining. These aisles were built by two wealthy clothiers named Long and Lucas, and their work is of a singularly bold and massive kind. Externally the church is unquestionably important looking, but its detail is excessively coarse, and the composition bristles again with pinnacles and buttresses, while, to give an idea of the scale adopted, the battlement cornice is 3ft. deep. The chancel was built entirely from the plans of Mr. H. Clutton about 20 years ago. The south porch is groined, and has a parvis over it, and a huge sundial painted outside. The western tower commands the country round, and attracts the inquirer after ecclesiology, who will, on visiting Steeple Ashton, be chiefly rewarded by a study of the planning of this church, which is no doubt its main feature. The village has a quaint market column, and stone-built lock-up with a high roof situated in the main street on a green. Of Edington Church, illustrated the week before last, little need here be said, seeing that we then printed Canon Jackson's comprehensive paper on its history and leading points of design. Mr. Ponting met the party and exhibited his clever drawings, showing the church, and the work which he has in progress for finishing the restoration now in hand. Considerable discussion ensued between Mr. Sedding, who delivered a lecture on the church, and the architect in charge of the fabric, because the former took exception, amongst other details, to Mr. Parker's opinion respecting Bishop William of Edington's work in this church, Mr. Ponting taking the side of Canon Jackson and Mr. Parker. The lecturer likewise remarked upon other points concerning the dates and character of the windows and roofs; but on the architect for the restoration explaining by direct reference to the features themselves, the lecturer admitted his remarks were based upon a hasty visit to the church some few days previously. Mr. Ponting seems to be executing the work of restoration both carefully and thoroughly without needless repair. Passing the great White Horse on Westbury Down, where the party was photographed by Mr. J. L. Robinson, A.R.H.A., the excursionists reached Westbury Church, which is a large Perpendicularised Norman building, with a central tower of plain design rising boldly from the midst of great chestnut trees well dominating the town. Internally the edifice is spacious, but it lacks interest as compared with the beautiful design at Edington, and the fabric has been restored out of all knowledge of what it once was. There is a good modern window in the Willoughby de Broke Chapel south of the chancel; but the other stained glass in the church is exceedingly poor. In the south transept is a "Corinthian" monument of free design and refined detail, with effigies of Sir James Ley, Earl of Marlborough, and his wife—

"That good Earl, once President
Of England's Council and her Treasury"—

which is worthy of a pencil note. The new vicarage in red brick and tile adjoining the churchyard seems a comfortable and well-planned house. This visit finished Thursday's proceedings.

The conclusion of the programme on Friday was to some extent marred by a heavy storm and intermediate showers during the day. The first halt, after a ride over the Lansdown Hills, commanding an extensive panorama extending into Wales over Gloucestershire, Wilts, and Somerset, was made at Hamswell Manor, celebrated as the residence of Dick Whittington, the memorable Lord Mayor. The house scarcely retains any features of architectural interest, save a projecting entrance bay of unusual plan and a roomy, comfortable hall. The gardens and terraces are notable, however, and cleverly arranged. Marshfield is a characteristic Gloucestershire village with a long rambling main street, commencing with a range of quaint almshouses, having a stone-built spire and clock turret in the centre of their front, and terminating with the parish church. The latter building is only of ordinary interest, with a bold western tower, now in course of restoration. Several houses in the street are decidedly typical, while in a way the place, by reason of its unaltered, old-world aspect, reminds us of Burford in Oxfordshire, one of the most delightful ancient villages in the country. In the rear garden of St. Catherine's hostelry there is a summer-house, entered by a refined doorway worthy of a note. Cold Aston was seen next, and here a lengthened stay was made at the handsome Court-house now occupied as a farm. Inside there are some extremely good ceilings in plaster-work, and the old hall screen still divides the entrance and the kitchen. The front entrance and also the first-floor doorways are original, including their elaborately-framed and many-panelled doors. The dignity of the exterior front façade is enhanced by a handsome gateway, reached by a flight of circular stone steps leading to others within its spacious portals. The central part of the elevation is surmounted by a stone balustraded balcony overlooking the beautiful valley on the south. The church of Cold Aston deserves a visit, on account of the richly-canopied pulpit, which is recessed in the north wall of the nave, having an entrance-doorway by the side of it, which likewise originally led to the rood loft, the stone staircase still remaining perfect, though the loft has gone. The pulpit itself is of wood, elegantly traceried and carved, the canopy and other parts being of stone. Some drawings of this pulpit are given in Dollman's "Ancient Pulpits" (Plate 17). A long and very hilly walk through a by-road brought the excursionists to St. Catherine's Church and Manor, placed on the side of one of the most romantic and picturesque glens in Somersetshire, on the declivity of Holt Down. Here it was that Prior Cantlow in 1499 built the Grange, which in a modified form still stands, with its delightful terraced gardens and holy well of the saint from whom the estates obtained their name. The house contains a good collection of old English furniture, and also a rich selection of works of art. Its hall is divided by the ancient Jacobean screen, and the original fireplaces are *in situ*. Everything about the house reminds one of George Eliot's graphic descriptions of an ideal home; while its architecture, without aiming at specialities of elaboration or detail, is eminently suitable and interesting. The church has been restored with loving care and good taste. It contains a fine wooden pulpit, which is original. The chancel east window contains some particularly good old glass representing figure subjects, cleverly repaired by Messrs. Powell, of Whitefriars, who also are responsible for the mosaic and mural tile work at both ends of the nave as well as the chancel. The tiles are most satisfactory, both in colour and design, the surface being finished in an overglaze, which gives great variety and beauty of tone, without loudness or loss of harmony. St. Catherine's, though the last place visited on this excursion, will be remembered with by no means the least interest. Our illustrations to-day show Hinton Abbey, from measured drawings by Mr. Wallace Gill, of Bath. This building was mentioned in our report of the excursion last week. The characteristic view of St. John's Church, Devizes, which we print in this same connection, is one of the late Fred. C. Deshon's pen-and-ink studies, lent us by Mr. J. G. Gaudy. Some of the party on Saturday visited Devizes, which originally was intended to have been included in the week's programme. St. John's Church, situated near the Castle, is one of the most interesting in the county. The original cruciform Norman church was enlarged in 1450, the N. and S. chapels being added at a still later date. The massive central tower rests, like that of St. Bartholomew, Smithfield, on two semi-circular and two pointed arches, the transepts being narrower than the nave. Major Davis, the city architect, conducted those members of the excursion party who remained in Bath on Saturday over the Abbey buildings there, the Roman Baths, which he has assisted in bringing to light, the Circus, and Royal Crescent, showing also the other features of interest in the town.

PICCADILLY CIRCUS.

As we lately remarked, the alterations at Piccadilly-circus have not exhibited any architectural design in the arrangement of the lines of frontage of the surrounding buildings. At present the open space, though bare and unadorned, is a boon, as open spaces always are in crowded cities; but the triangular plots of vacant ground at present idle and wasted are anything but happily disposed. The Metropolitan Board of Works evidently do not know what to do with them. Attention has been drawn to the subject again by a letter in the *Times* by Mr. William Woodward, in which the writer directs attention to the schemes that have been in contemplation for dealing with the site in question. One of these plans, as our readers know, was to construct underground conveniences—a very useful way of turning the site into account; another suggested the erection of a statue, a third that of a fountain, both agreeable modes of adorning the vacant space. Lately the Metropolitan Board of Works have had under consideration another plan, that of building on the open spaces, and plans and models of these schemes have been prepared and discussed. These we have had an opportunity

of inspecting. Mr. Woodward is perfectly justified in thinking that the last proposal of the Board will be condemned by all who desire to preserve intact the reclaimed open area. Nothing surely can be more absurd than to obtain such an open space and then to sacrifice it for a building site, thereby cutting off the unbroken view of the buildings that surround the Circus. The space contains two triangular plots, forming as it were, the entrance to Shaftesbury-avenue on the north side. Upon these it has been proposed to build blocks of offices above arches which will give access to the space of ground. Models have been prepared in cardboard representing the effect. Each triangular block is of two stories above the arcaded story, and has canted corners. Another model is a more extensive scheme: the two triangular plots and the intervening entrance are proposed to be covered by one large structure or block of shops and offices. In plan, this building would form an irregular elongated hexagon. Towards the Circus there would be a circular or concave side, forming the entrance from the Circus to Shaftesbury-avenue, and on each side straight receding fronts facing the Quadrant and the Criterion respectively. On the north, the building has a straight front towards Glasshouse-street and the London Pavilion. Transversely from Piccadilly-circus, and in a line with Shaftesbury-avenue, the block is pierced by two arcades, scarcely "triumphal arches or tunnels," as Mr. Woodward has called them, the two archways being separated by piers and arches in the direction of the avenue, probably intended for the two lines of traffic in opposite directions. These archways are about 25ft. each. As Mr. Woodward remarks, the arched entrance would be askew to every thoroughfare, and would only accommodate one line of route, Shaftesbury-avenue. The Quadrant on the west, and Coventry-street and Haymarket on the east, it would not help in the least, and were such a building erected, the breathing space where seven thoroughfares discharge themselves, as the same writer says, would be gone for ever. But we may further regard the effect of so huge a block of building at this juncture. The only thing it would do would be to complete the circus, and bring it back to its original circular shape; but the high, steep roof, which is shown in the model, would harmonise with no other line in the neighbourhood. At the time the old buildings on the east side of the Circus were pulled down, we remarked upon the inadvisability of destroying one quadrant of the Circus and throwing open an awkward-shaped area of ground. This view of the case is no longer tenable; the block has been demolished, and the area thrown open to light and air, and any rebuilding will be virtually returning to the old plan. We hope the Board will reconsider the earlier scheme of inclosing the area by a balustrade, turfing and planting it, a model for which was made some time ago. This model, which represents the Circus laid out with a quadrangular-shaped inclosure, with entrances at the sides and a column or fountain in the centre, is far more feasible and desirable a means of utilising the area and of overcoming a difficulty which has given rise to much uncertainty and hesitation. Trees, and fountains, and statuary are the only agreeable modes of dealing with our great urban inclosures, as they least rob us of air and sunlight, and give us something green to look at in this wilderness of bricks and mortar.

NOTES FROM EDINBURGH.

THE Royal Scottish Academy has for the second time opened its galleries for an autumnal exhibition, and which will prove, doubtless, an attraction to the many visitors who come to Edinburgh at this season. The collection is composed principally of water-colours, but room is made for some sculpture pieces, and for works in white and black. There are no architectural exhibits, properly so-called, although architectural subjects, forming the groundwork of pictorial effects, make up a large percentage of the drawings, in this respect making a conspicuous contrast to the works in oil exhibited in the spring.

The sculpture exhibits are distributed through the galleries, and look better and more attractive than when ranged together in regimental order in the south room. There are 852 exhibits altogether, filling four apartments, and all are within range for easy and accurate inspection. The collection is an interesting one, apart altogether from the circumstance that it contains no water-colours of any very high exceptional merit. In this respect it does not differ much from its predecessor of the spring, but it forms a fair representative of the present state of water-colour art, and of its characteristic excellences in purity and brilliancy of colour, sharpness of outline and details. There are no very large exhibits; the bulk of the collection is made up of delineations of homely studies, ranging from notes or sketches of pictorial effects to the most highly-finished water-colour. Many, but not all, of the artists contributing to the earlier exhibtion have samples of their works in the more humble vehicle, which adds interest by the comparison to the collection. Studies or first sketches of well-known pictures are to be found, and in addition to the interest attaching to the works of living artists, a small loan collection has been added, containing some studies by Turner, Williams, De Wint, Cox, Prout, &c., and some very characteristic specimens of the late Sam Bough, R.S.A., and others.

Among the larger pictures the most noticeable are two portraitures of children by Otto Leyde, R.S.A. In 173, "A Day at the Seaside," and 379, "Through the Harvest Fields," he has depicted some youthful rovers with doubtless due fidelity, and all that could be desired in the way of life-like attitude and expression to mark the sprightly vigour of life's gay morn. The same brilliancy of colour and beauty of expression is characteristic of his other and smaller contributions, and they are all, if not preferable, at least fully equal to anything he has produced in oils. Another larger work arrests the eye, also a figure subject, by J. Denman Adam, entitled, "In Wonderland," A lady, lying at ease under shade of a large Japanese parasol, is so absorbed in the wonders of her novel as to be unconscious of the close proximity of some calves, attracted by the colours of the parasol. The picture is a brilliant piece of colouring, with sunshine all around on the grassy lawn, and a church tower of homely architectural pretensions in the distance. The landscape and the lady, however, are both inferior in finish of details to the portraiture of the animals, which are excellent specimens of the artist's skill. There are also two portraits of youthful heads by W. E. Lockhart, R.S.A.; but they do not bear the stamp of the same excellence as the artist's work in oils, and, though brilliant in colour, they lack the finer shadows of a finished portrait.

Gourlay Steele has a large collection, of which the most noticeable is the finished sketch of his well-known picture, "Ever Faithful, Ever Sure"—the collie watching in faithful attendance on its sick or dying master, with a lively terrier amusing itself on the floor. 389, "The Pick of the Flock," is a finished picture of two rams' heads, painted with the most scrupulous attention to details. They give less advantage for judging of the pick of the flock, being only heads; but they make a very pretty picture.

Clark Stanton, R.S.A., has also a large contribution—figure subjects, mostly fanciful. They are all interesting in colour and draughtsmanship and drapery of the figure. The largest (136) is entitled, "Dropping Her a Line." The lady, represented in the act of receiving a letter, which has been mysteriously dropped over a high wall, is somewhat stiff, and apparently afraid of accidental injury to the missive as it came into her hand. R. McGregor has a number of small studies of larger pictures in oil, full of expression and details. 446, "Pastime," by J. D. Michie, may be taken as a sample of perfect draughtsmanship, colour, and perspective. In the foreground are the children, with a youth exhibiting a splendid soap bubble, whilst the mother, with her cares, is seen soberly walking in the distance.

There are two strikingly peculiar pictures by Arthur Melville which arrest the eye, in virtue of the contrast they present to the generally gay aspect of their neighbours, and the somewhat original method of manipulation. 144, "Funeral Service in an Arcadian Cottage," is an extreme type of Rembrandtesque. The funeral service has brought together a large company, who are engaged in prayer. The cottage interior, in primitive style, is lighted only by the opening in the roof for escape of the smoke from the fire burning dimly on the hearth below. The fire is parted from the company by a broad, high, massive stone. In the foreground, close to the fire, is placed the patriarch of the family—ancient and paralytic. The force and power of the painting consist in the great amount of expression given to the countenance of the officiating clergyman, the grandfather, and others on whom the light is made to fall. The only unpleasant feature is the bald head of one of the company, which is bowed down on the stone, and presents the aspect of a globular mass too forcibly. 642, "Ghosts of the Past," is a picture of the standing stones of Stennis, a Druidic circle, in twilight or some stormy darkness. The light is like that of an eclipse, and is powerfully suggestive of the mystery surrounding these monuments of the past. The workmanship seems to be effected by blots of colour skilfully disposed.

Passing on to landscapes, we find Mr. Beattie Brown, R.S.A., in great force with water-colours, not inferior in any respect but in their size to his works in oil. They have the same characteristics of vigorous and truthful colour, and many pleasing varieties of light and shadow with careful and elaborate detail in the foreground. J. Smart, R.S.A., has also a large number depicting the beauties of Scottish river, glen, and mountain. Walter Paton, R.S.A., sends eleven pictures, all representative of sunshine, or the repose of a calm evening light. They much resemble the works in oil, familiar to the public, and are all remarkable for their delicate manipulation of details.

As might be expected, the picturesque aspects of architecture form the subject of many of the pictures; indeed, of a very large proportion. 303, "The House of Castor and Pollux, Pompeii," by W. E. Lockhart, shows the atrium and its pillars, with the red dado decoration on the walls, disclosing one of the pillars, to be built of brick encased with the cement or plaster work, which receives the colour. Pollok Nisbet sends three views in Tangier. C. M. Hardie has a view in the Alhambra, with corridor passage and small basin fountain. The arcading is excellently rendered, but has none of the florid decoration associated with the building. T. Scott, along with other foreign subjects, sends a view of the ruins at Rome, with the arch of Titus.

There are many sketches of Old Edinburgh; several also of the interior of St. Giles. The artists cannot be complimented on their rendering of this interior, and the sketch of the Thanksgiving Ceremony of the Jubilee service (306) is dark and dismal. By far the best subject of this sort is "The Grave of Livingstone," by James Cafe. It is really a view of the interior of Westminster Abbey, and stands alone in the excellence of its draughtsmanship and the play of light and shade throughout the picture, the apparent accuracy of every line and the natural aspect of the whole. It gives a most impressive idea of the old architecture and its lofty and graceful composition, although but a small portion is delineated. John D. Michie has a pretty sketch of Jedburgh Abbey, very truthful in its colour, although great liberties are taken with the accessories. John Lennie's "Prentice Pillar, Rosslyn Chapel," is a beautiful piece of careful drawing, with all details, and they are not few, very clearly shown, and without any attempt to vulgarise the interior as a picture by representing it in all the colours of the rainbow.

The North Room contains three large water-colour drawings by the late T. Hamilton, R.S.A.—the one 716, "Front Elevation of the High School, Edinburgh," of which he was the architect, and a perspective of the same; and 780, his design for the Royal Scottish Academy and the National Gallery buildings, which was rejected as far too expensive, with its peristyles. The absence of the columnar decoration at the sides of the existing building by Playfair is its great defect.

Not the least interesting part of the collection, thus briefly noticed, is found in the South Octagon — a small monochrome by Turner, about 4in. by 5in., of Berwick-upon-Tweed, and another of the coast above Shore-

ham. They are samples of the great accuracy of draughtmanship and skill in selection of the points necessary to bring out a definite representation of the most important characteristics of the subject. 439, "Crombie's Court, Edinburgh," by the late James Drummond, R.S.A., is a wonderful example of his draughtsmanship and colouring. The old wooden stairs and picturesque confusion of the narrow close are given with the most minute attention to details. 462, "A Highland Stream," is a piece of high art, soft and pleasant in its colour, by the late W. S. Leitch.

Three views of Grecian temples, by the late H. Williams, are hung in this room—all marked by great accuracy of drawing and purity of tone. The view of the Parthenon is taken from a point of view which gives only an impression of the magnitude of the columns, and but a poor idea of the building as a whole. Two fine windmills by De Wint, a view in Wales by David Cox, and an old building in Chester by Prout are interesting samples of the artists' works. There are also several pictures by the late Sam Bough, almost all exhibiting the greys and neutral greens and rather dirty skies which he loved to paint.

Interesting studies for larger pictures by Sir Noel Paton are in this room and the North Room, and many aquafortis etchings by Hole and others give pleasant variety to the collection, which is receiving a fair measure of patronage.

THREATENED LONDON CHURCHES OF THE RENAISSANCE PERIOD.

IN a letter to the daily press, Mr. T. G. Jackson, F.S.A., expresses his satisfaction that public attention is awakening to the architectural value of churches erected during the English Renaissance. Only a few years ago, Gothic fanatics might, he points out, have carried away, not only the steps of St. Martin's-in-the-Fields, but the church itself without much opposition; but no sooner are our fears for the maintenance of the dignity of Gibbs' façade removed than another church by the same architect is threatened with destruction. "It is now," Mr. Jackson remarks, "the graceful church of St. Mary-le-Strand which is in danger, a building which for the actual beauty of its architecture and the unrivalled advantages of its position has scarcely an equal in Europe. Were the Strand in Rome instead of in London, the glorious series of its three steeples, and the front of Somerset House, with its portal, which is not unworthy of comparison with that of the Farnese Palace, would have been the theme of every idle tourist, and have made the street famous throughout the world." He continues: "One English church, indeed, of this class has won European fame, and St. Stephen's, Walbrook, is known and quoted as an authority in Rome. A few months ago this exquisite little church, Wren's acknowledged masterpiece, was perfect as it came from his hand. It retained its original dark oak pewing carved with emblems of civic companies, its Communion table, rails and reredos, its lofty pulpit overshadowed with a sumptuous sounding-board, its exquisitely carved font-cover, and the west end was filled by an imposing loft and organ case of the same rich dark oak as the rest, splendid with gilt pipes, cherub musicians, scrolls and wreaths, and all the picturesque adornments proper to such structures. How much of this now remains I do not know; but the organ case and loft are gone; the pews are cut down to suit the fashion of the day; the bases of the columns, which were stilted to the original level of the pews, now stand exposed and naked—much, apparently, to the surprise of the building committee, who do not know what to do with them, and who will probably next find out that the pulpit is too high, and will cut it down to their own standard; and thus an invaluable example of a noble style and a great master has been wantonly sacrificed to the genius of parochial incompetence." While it is now too late to save St. Stephen's, Walbrook, public discussion which has protected St. Martin's will, he trusts, also preserve St. Mary-le-Strand.

Mr. W. Butterfield declares that the panic as to the assumed unsound condition of St. Mary-le-Strand is needless and unworthy. He refers to the similar outcry made nine years ago, when careful examination showed that only a few repairs were required, and suggests that, instead of raising the extraordinary erections which now disfigure the church, it would have been better to have instructed a good mason to put up a useful scaffolding to the cornice for its examination and repair.

Mr. Henry Poole, mason to Westminster Abbey, writes:—"In 1878 the parapets and vases of St. Mary-le-Strand Church having been declared to be dangerous by the report of a surveyor, Mr. Butterfield requested me to examine them for the satisfaction of the late rector, whose leave had been asked for their removal. Before my report, which was strongly in favour of their stability, was sent in to the rector, Mr. Butterfield met me on the church roof, and went through my report with me carefully on the spot. The question of the cornice was not then raised by anyone. There was no excuse for speaking of the vases and parapets as otherwise than perfectly secure—as secure against falling, under fair treatment, as they ever had been. I examined them as a mason, with the help of my son. I have dealt with masonry, and nothing else, all my life. I never called myself a 'builder,' which is a term which may or may not include a real knowledge of masonry. I am nearly ten years older than I was in 1878, and I have retired from active work; but I feel so surprised at what is now taking place at St. Mary's that I trust you will allow me to speak to what I know. I do not impute motives to anyone; I can only feel sorry for the kind of treatment which I see that this church is now receiving. After the repairs which this work received from me in 1878 I do not understand how it can be necessary. If these vases are to disappear, as the four vases did some years since, from the angles of the tower, the work becomes one of mutilation. A piece of cornice has now fallen, and the removal which is going on of other vases seems to me to imply a great want of judgment on the part of somebody. The cornice could be examined and repaired without interference with the vases or parapets. It is much easier to kill than to cure. I think the course which is being taken shows panic rather than knowledge of business. Mr. Butterfield took no part after the sending in of our report to the late rector. From that time we were overlooked by the local surveyor. In consequence of my report in 1878, certified to by Mr. Butterfield, the late rector refused to give his permission for the removal of the parts then proposed."

We may remind readers that illustrations of the west front and circular church of St. Mary-le-Strand, from measured drawings by Mr. Thomas E. Pryce, were given in the BUILDING NEWS for June 16, 1876; and several sheets of measured details from St. Stephen's, Walbrook, by Mr. H. D. Walton, in our issues for Jan. 2, 1885, and April 23, 1886.

ROMAN NECROPOLIS AT CARMONA, NEAR SEVILLE.

MR. GEORGE BONSOR gives some interesting particulars of the excavations made by Don Juan Fernandez and himself on the site of the Roman necropolis at Carmona, near Seville. The Roman tombs were found to have been made on the site of tumuli of the Prehistoric era. Round these mounds the Romans had for centuries hewn small chambers out of the rock to serve as family tombs. These are from four to five yards square and the height of a man. In the walls are small cavities or niches for the cinerary urns, each of which last generally contains, besides the ashes of the dead, a coin, a mirror, a lachrymary, needles, a stylus and tabula, and a signet ring. The walls are mostly painted in fresco or distemper in the Pompeian style with representations of birds, dolphins, and wreaths of flowers. Near the entrance of each tomb is the crematorium, a curious oven, also hewn out of the rock, on the sides of all of which signs of fire are still visible. So far, about 320 tombs have been discovered. Contrary to what was previously believed, Mr. Bonsor finds that the funeral pyre in Spain was not square, but oblong, the body, with its bier, being laid on it, as was proved by the presence of the nails and iron fittings in the ashes. Among the more important discoveries are those of a columbarium and three large triclinia for the funeral banquets, with the peculiarity that in each a deep channel is cut all round the mensa into which the guests threw the libations. The largest funeral triclinium discovered contains three tables, with their couches round. In addition to these there is an altar, a tomb with its cinerary urns, a kitchen, a bath, a well, and a sanctuary, in which is a stone statue. Fifty yards from this triclinium is a Roman amphitheatre also hewn out of the rock. During the course of the excavations over 3,000 objects of interest were found, including many inscriptions, fragments of statues, glass, marble, and earthenware urns, lamps and mirrors, rings and coins, and other valuable articles, all of which have been placed in a museum in the town. The excavations are still being continued.

SIZE OF BRICK PIERS.

DATA and rules as to the strength of brick piers are very scanty, though tables of the crushing strength of bricks abound. The United States Government have laid down certain rules which may be worth mentioning. Brickwork laid in cement mortar, which is always used in Government works, is calculated to sustain nine tons to the square foot, which weight is assumed to be safe up to 10 or 12ft. high. Thus a pier of only 12in. square should not be more than that in height. Brick piers, like iron and wood pillars, are liable to break by bending as well as crushing over a certain height. A table calculated upon this basis has been published, from which we gather the following proportions. A pier the smallest diameter of which is contained three times in its height can safely bear per square foot in tons 9·5, with a factor of 5. When the diameter is 6 times, the safe weight is 8·; when 9 times, it is 6·3; when 12 times, the weight is 4·8; 14 times, it is 3·5; 18 times, the safe weight is 2·1; 20 times, 1·7; 25 times, 1·1; and 30 times, ·8. The above calculation of 9 tons per square foot appears rather high. One author gives the crushing strength per square inch as 5201b. per square inch, which amounts to about 5½ tons per square foot safe load—a figure which is nearer the mark for brickwork such as we ordinarily meet with in piers. Dr. Bindon Stoney observes: "The working load on rubble masonry, brickwork, or concrete rarely exceeds one-sixth of the crushing weight, and this seems a safe practical limit." A pier is generally sufficiently massive not to yield by bending. It is very easy, however, on a lofty building of several stories, with small piers between the windows, to exceed the limit of safety, or five and a half tons per foot square. In many warehouses of several stories, where the openings are large and the piers very small, architects ought to be careful to give increased depth where width cannot be obtained, or they may be on the safe side by using stanchions of cast-iron between the openings, with skewbacks for the abutment of the arches. Every brick wall with windows ought to be regarded as a series of piers whenever the apertures exceed the width of the piers, and the walling above the piers is heavy, and has to carry iron girders, in addition to the weight of dead brickwork. The strength of bond cannot be reckoned upon when the horizontal walling is not of any great depth.

OVERFLOWS.

HOW entirely inadequate the ordinary provisions for carrying off rainfalls in our roadways are for such an emergency as that of the recent storm can be only judged by the appearance of the roads in South London during the deluge of rain which threatened the inhabitants of that part of London. The sudden and visible rising of the flood within the few minutes the storm was at its fury was baffling to all who witnessed it. Traffic and tramway cars were stopped before their journeys were completed, the pathways rapidly disappeared as the road became a wide river, flowing into adjacent house basements, and destroying much property. The main thoroughfares at Brixton became a torrent of water, which threatened to swamp all the basements, several of which were inundated. We may particularly point out the fact that the side entrance flaps along the thoroughfares were burst open by the over-gorged sewers, and poured out volumes of dirty water, rendering the



THE ANCIENT HOUSE, IPSWICH.

pathways impassable. Two things are obvious. The sewers were quickly filled and began to overflow through the house-drains and gratings in the roadway, and the existing gratings, even where they could be of use, are too small to allow the water to escape quickly enough. Storm overflows are the only means of obviating the mischief and danger of storms of this kind; the few provided are inadequate to any emergency. Although several have been completed at great cost at Deptford and Wandsworth, and other parts, they only relieve their immediate districts. Others are called for at intervals to relieve low-lying localities of surplus water that may accumulate in the sewers and thereby prevent what occurred in several parts the other day—an inundation of basements by backflow.

SHEET-METAL DECORATIONS.

SHEET metal is largely employed in America for architectural decoration. We find it used for cornices, crestings, statuary, terminals, and other details. The manufacture has become a large and profitable one in the States, and employs a number of designers and modellers. The effect upon architecture is more or less disastrous; the architect is reduced to a builder of carcases, upon which the sheet-metal worker can arrange his details according to certain patterns specified. Cheap ornamentation is the great inducement of those who build (*sic*) in this manner. Luxuriant cornices, balustrades, and roofs are the necessary result. Zinc is extensively used for roofing and ornamentation on account of its cheapness; but brass and copper are also employed. There is one advantage in metal-work—it is often more durable than stone and wood, and is less liable to get cracked and fall about. The crestings and finials and the metal roofs protect the building from lightning. Looking over some recent designs, we find that considerable care is bestowed in the designing and modelling of detail: the statuary is modelled and securely fixed on a framework of iron; the cornices are supported on brackets in the same manner. A consideration in favour of the use of sheet metal is the reduction of weight — thus a statue of Justice, 8ft. high, one firm advertises as weighing only 130lb. Taking an ordinary façade to a building with cornice and trusses, balconettes, pediments over windows, and main cornice and balustrade, the saving of weight between stone and zinc would amount to many tons. The material is also impervious to the weather, and keeps clean. The sheet metal is largely used in the interior decoration of theatres, churches, and other public buildings.

THE ANCIENT HOUSE, IPSWICH.

SOME of your readers, perhaps, may be curious to see the house at Ipswich referred to by Mr. Owen. I send you—from my note-book—a sketch of part of it. The drawing shows only one of the three bays to the street front; the other two bays are substantially similar to the one shown. Those who may take the trouble to compare this sketch with the drawing of the post-offices at Knutsford, and of the New Zealand Chambers, illustrated in the BUILDING NEWS of Sept. 5, 1883, will be able to judge how far his "ardent admiration" of Mr. Norman Shaw has carried Mr. Owen.

HALSEY RICARDO.

CHIPS.

New board schools, erected for the Nottingham School Board in the suburb of Lenton, are approaching completion. Mr. Vickers is the contractor.

The Improvement Commissioners of Wellington, Salop, have adopted a scheme by Mr. Stooke, M.I.C.E., for improving the water supply, by enlarging the reservoir, and other works, at an estimated cost of £1,800.

In commemoration of his 50 years' service at Belton House, Grantham, Mr. G. A. Lowe, clerk of the works, has been the recipient of a present from the Belton workmen employed by Earl Brownlow, under Mr. Lowe. The testimonial took the form of a table epergne with four frill tubes of tinted glass and plate foundation, two vases to match, and also a silver pencil case.

A third well is being sunk for the Barnet District Water Company, which it is expected will raise the total supply per diem to the district to two million gallons. Messrs. Docwra are the contractors, and the undertaking is expected to cost about £6,000.

CONTENTS.

The Modern Architect and his Requirements. 309
Churches Struck by Lightning... 310
School-Workshops 311
Works in Water.—XXXIII.... 312
Building Materials.—II. 313
Architectural Association Excursion, 1887, Wilts ... 315
Piccadilly-Circus 316
Notes from Edinburgh... 317
Threatened London Churches of the Renaissance Period 318
Roman Necropolis at Carmona, near Seville... 318
Size of Piers 318
Overflows 318
Sheet-Metal Decorations 319
The Ancient House, Ipswich 319
Our Lithographic Illustrations 320
Marble Altar and Reredos from the Newcastle Exhibition... 320
An Improved Window Sash 320
Raleigh House, Brixton 341
A Steel Roof of Great Span... 341
Wayside Notes 342
Books Received 342
Competitions 342
Building Intelligence 343
Engineering Notes... 344
Architectural and Archæological Societies 344
Archæological... 344
Correspondence 345
Intercommunication 346
Legal Intelligence... 346
Parliamentary Notes 347
Water Supply and Sanitary Matters 347
Stained Glass 347
Our Office Table 348
Tenders 349

ILLUSTRATIONS.

THE CATHEDRAL, CHIHUAHUA, MEXICO.—SELECTIONS FROM THE ROYAL ACADEMY, THE GROSVENOR GALLERY, AND THE ROYAL INSTITUTE OF PAINTERS IN WATER COLOURS.—NEW SCHOOLS, NEWTON-LE-WILLOWS. — RIVERSIDE RESIDENCE, MAIDENHEAD.—ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE CATHEDRAL, CHIHUAHUA, MEXICO.

Among the many notably large and interesting photographs of buildings collected together in the Art Galleries at the American Exhibition at Kensington, none is of more architectural importance than that of Chihuahua Cathedral, which we illustrate to-day by the kind permission of Messrs. Chain, Hardy, and Co., of 1,609 to 1,615, Arapahoe-street, Denver, Colorado, agents to Messrs. W. H. Jackson and Co., photographers. Chihuahua is the capital of the State of the same name, and has a population of about 16,000. The cathedral, or parochial church, is one of the most picturesque edifices in Mexico. It is built of cut stone of a light colour, and has two towers and a dome. It cost 800,000dol., about £160,000; it occupied 150 years in building, and was finished in 1741. The work throughout was designed and superintended by architects sent over from Spain. It is also stated in Chihuahua (with how much truth we do not know) that, in the absence of derricks and all hoisting machinery, as the church rose in height, it was buried in the earth, and the stones hauled up the inclined plane thus made to the top of the church. The top of the church is now reached by a dark and dismal winding solid stone staircase, situated in one of the main towers. One of the huge bells is pierced by a large cannon ball, but this does not impair its usefulness. The stone steps in the tower (about 8in. thick) are in many places worn nearly through by the feet of "climbing pilgrims." The cost of the church was sustained by a tax of one real (12½ cents, or about 6d.) in each mark of silver (8dols., or about £1 13s.) produced from the silver mines of Santa Eulalia, 15 miles distant.

SELECTIONS FROM THE SUMMER EXHIBITIONS OF THE ROYAL ACADEMY, GROSVENOR GALLERY, AND ROYAL INSTITUTE OF PAINTERS IN WATER COLOURS.

This sheet of illustrations includes some of the pictures which have deservedly attracted considerable notice during the summer season which is now drawing to a close. Sir James D. Linton, the President of the Royal Institute of Painters in Water Colours, is represented by his work of the year, "The Emperor Maximilian Visiting the Studio of Albert Dürer," the subject being the same as that which the painter selected for his tableau in 1885 at Prince's Hall. "Hesperia" is the title of Mr. Frank Dicksee's Royal Academy painting, rich in colour and style, delicate in execution, and graceful in idea. From the Grosvenor Gallery, we have selected Mr. Philip Burne Jones's "Shadow of the Saint," showing a street in a Mediæval city, with two passing maidens staying to notice the shadow, possibly, of St. Simon Stylites praying on his column. "Mist-Capped" is one of Mr. Charles Stuart's masterly studies of air-and-water effects amidst the wildness of nature. "Driving the Ducks" brings us home again to domestic quiet in a primitive village and tumble-down old fishing place situated some 10 miles north of Whitby, called Rumwick. The old cottage to the right of the sketch since the picture was made has been pulled down. The painter has fully realised in his drawing the spirit and detail of the scene. "Kettleness" is the title of Mr. W. Gilbert Foster's other picture, which graphically speaks for itself.

NEW SCHOOLS IN YORKSHIRE.

The school we illustrate this week is about to be commenced in Yorkshire. The architects are Messrs. Clark and Moscrop, of Darlington.

RIVERSIDE RESIDENCE, MAIDENHEAD.

This house is being erected on the Maidenhead Court Estate for Mr. C. Gervaise Boxall, of 22, Chancery-lane, W.C. The site, a beautiful one, about one-third of a mile above Boulter's Lock, and easily accessible from Maidenhead or Taplow, comprises over an acre of land and faces Cleveden Woods, the garden, with lawn tennis court, running down to the tow-path. Externally, the house is built of red bricks, hung tiles, and framed timbering in oak. The ground-floor, raised 3ft. above the general ground-level, has the following accommodation:—Drawing-room and dining-room, with large inner hall between, directly facing the river, the partition between the drawing-room and inner hall being a framed and panelled partition, and easily removable at will, thus enabling these two rooms to be thrown into one for dance or theatrical purposes. The ground floor also contains entrance-porch and vestibule with staircase hall, kitchens, and usual offices. The first floor contains six good bedrooms, dressing-room, and bath-room, with hot and cold water supply, the principal bedrooms opening by means of French casements on to a projecting balcony facing the river. From this balcony a most beautiful view is obtained up and down the river—the weir and backwater behind the island that carries the water to the mill below. Mr. J. H. Margetts, of Reading, is the builder, and is executing the work from the designs and under the superintendence of the architect, Mr. E. H. Bourchier, A.R.I.B.A., of 32, Great George-street, S.W., the quantities having been supplied by Mr. Alex. Pope, of 5, John-street, Adelphi.

ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES.

For description see p. 315.

CHIPS.

A new Roman Catholic church in Glossop, built in memory of the late Mr. Francis Sumner, cotton manufacturer, was opened on Friday. The structure has cost £12,000, and has been erected from designs by Mr. A. Dempster (Messrs. Dempster and Heaton, Birmingham), in the Early English style. It is situated in the parish of Whitfield. The nave measures 120ft. by 30ft. in clear, side aisles (north and south) are 5ft. wide each, and height to ridge 70ft. The contract was executed by Mr. J. L. Ward, of Manchester.

The Fishermen's School and Institute at Baltimore, near Cork, just completed at the sole cost of the Baroness Burdett Coutts, has been built from plans by Mr. Dominick J. Coakley, by Mr. Sisk, contractor, of Cork. The schoolroom is 28ft. by 26ft. A glass screen shuts off the hall from the other portion of the buildings. The chapel measures 28ft. by 28ft., the dining-room 12ft. by 26ft., and the kitchen 24ft. by 26ft. The large dormitory is 100ft. by 28ft., and there are also attendants' rooms, lavatories, baths, &c.

The Leeds town council have raised the salaries of Mr. E. J. Lloyd, manager of the York-street gasworks, and Mr. G. Tooley, manager of the Meadow-lane gasworks, from £200 to £250 a year.

The will of Alderman John Pearson, of Newton-le-Willows and Liverpool, the well-known railway contractor, has been proved, the personal estate being sworn at £188,866.

MARBLE ALTAR AND REREDOS FROM THE NEWCASTLE EXHIBITION.

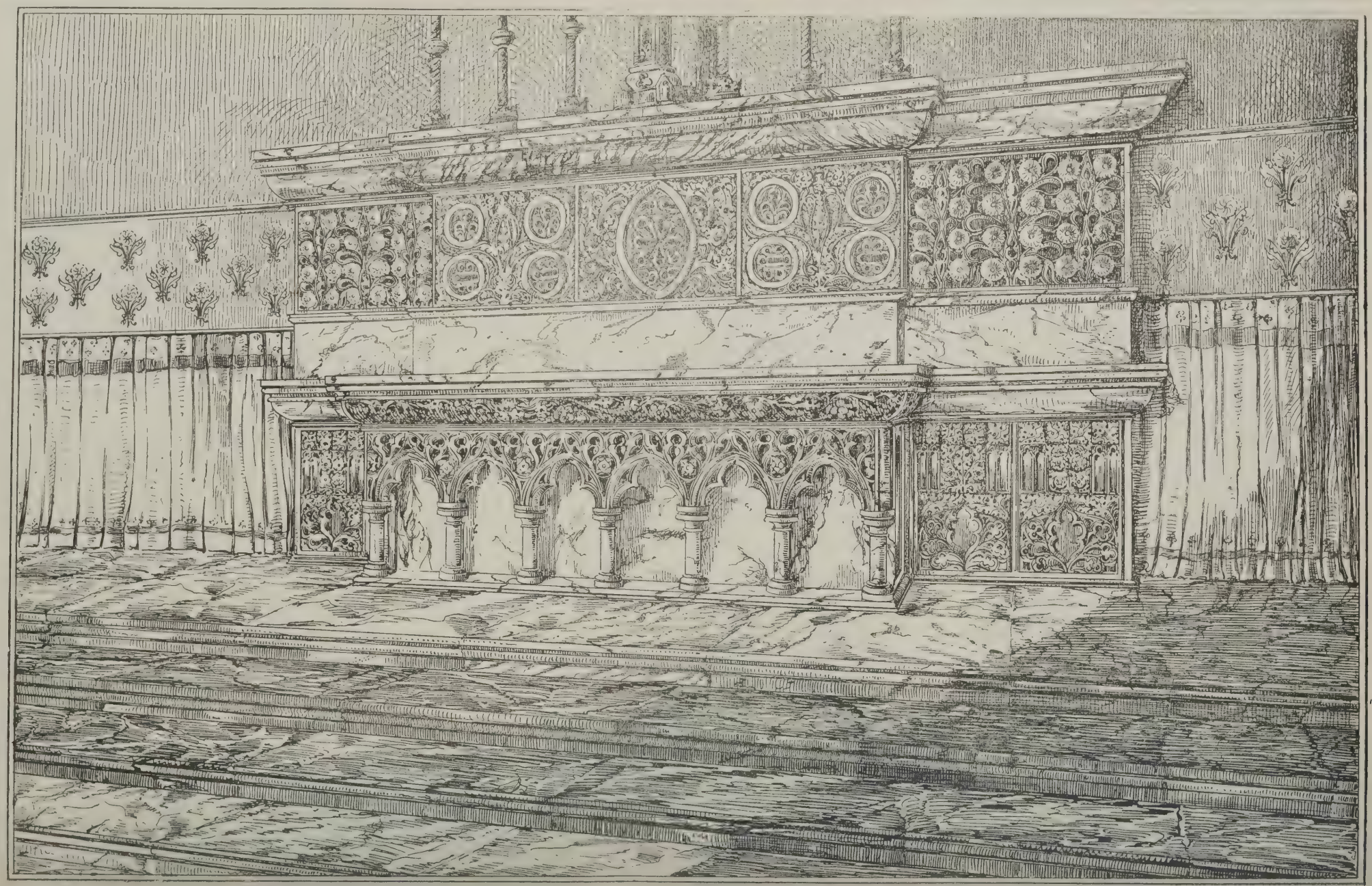
Messrs. Emley and Sons, Limited, of Westgate-road, Neville-street, and Grey-street, Newcastle, and Bothwell-street, Glasgow, have stands in the east and west courts. The section of the east court stand, which will attract most attention, is that in which are fixed the altar, reredos, and a section of the steps and flooring of the sacrarium (all in marble) for St. George's Church, Osborne-road, Jesmond, which Mr. Charles Mitchell, of Jesmond Towers, is building, from designs by Mr. T. R. Spence, London. The carved oak-work of the pulpit upon alabaster bases has been executed in the studio of Mr. Ralph Hedley, New Bridge-street. The altar is executed in Pavonazza marble, which has been very carefully selected, and its colours, by delicate gradations of yellow and rosy tones, melt into the grey-blue markings. Marble work, as a rule, is treated by flat surfaces and shallow sinkings; but here, notwithstanding the extreme difficulty of working so hard a material, are deeply-shadowed sinkings and clear bold outline mouldings. The front of the altar is formed of a detached arcade, composed of elaborate and deeply-pierced tracery, moulded columns, and boldly-carved crown mould. Over the super-altar are richly-carved panels, the detail of which is a novel treatment of tracery forms, following the undulating lines of conventional foliage, thus keeping clearly marked the main elements of the cusped forms, and adding interest to the smaller ornate surfaces. Flanking these panels are wings of a more conventional type, evidently intended to give greater value to the central portion. The whole composition is surmounted by a crown moulding, giving an appearance of great dignity to the design, and forming a substantial base for the superstructure of proposed arcaded recesses under the east window of the chancel. Some care and thought have evidently been expended in giving variety and interest to all the details of carving, and at the same time preserving the unity of bold carving lines throughout the whole design. Much additional effect is gained by placing the altar table on a number of steps made of Pavonazza, rouge, jasper, and Sienna marbles. The work has been executed by Messrs. Emley and Sons.

AN IMPROVED WINDOW SASH.

An improved window sash has been recently patented by Mr. R. A. Lowe, of Chislehurst, which while facilitating the ventilation of a room by allowing the air to enter between the meeting rails, yet leaves the window as securely fastened as when closed. The fastening acts on the principle of the parallel ruler, and two slots are provided in the lower rail into one of which a slip of brass or other material enters when it is desired to fasten the sash in position. The ordinary fastening at the meeting rails is dispensed with, and the upper sash is supported by a catch at the top, which is released by pulling one of the cords, and gentle traction on both then pulls the sash down or returns it to its place, where it is automatically locked. Neither of the fastenings can be reached from the outside without breaking the window, which can thus be left to admit air while as securely fastened as when closed. The patent fastener acts as a draught preventer, and also holds the sashes tight enough to prevent them rattling, while sashes of any size are easily manipulated.

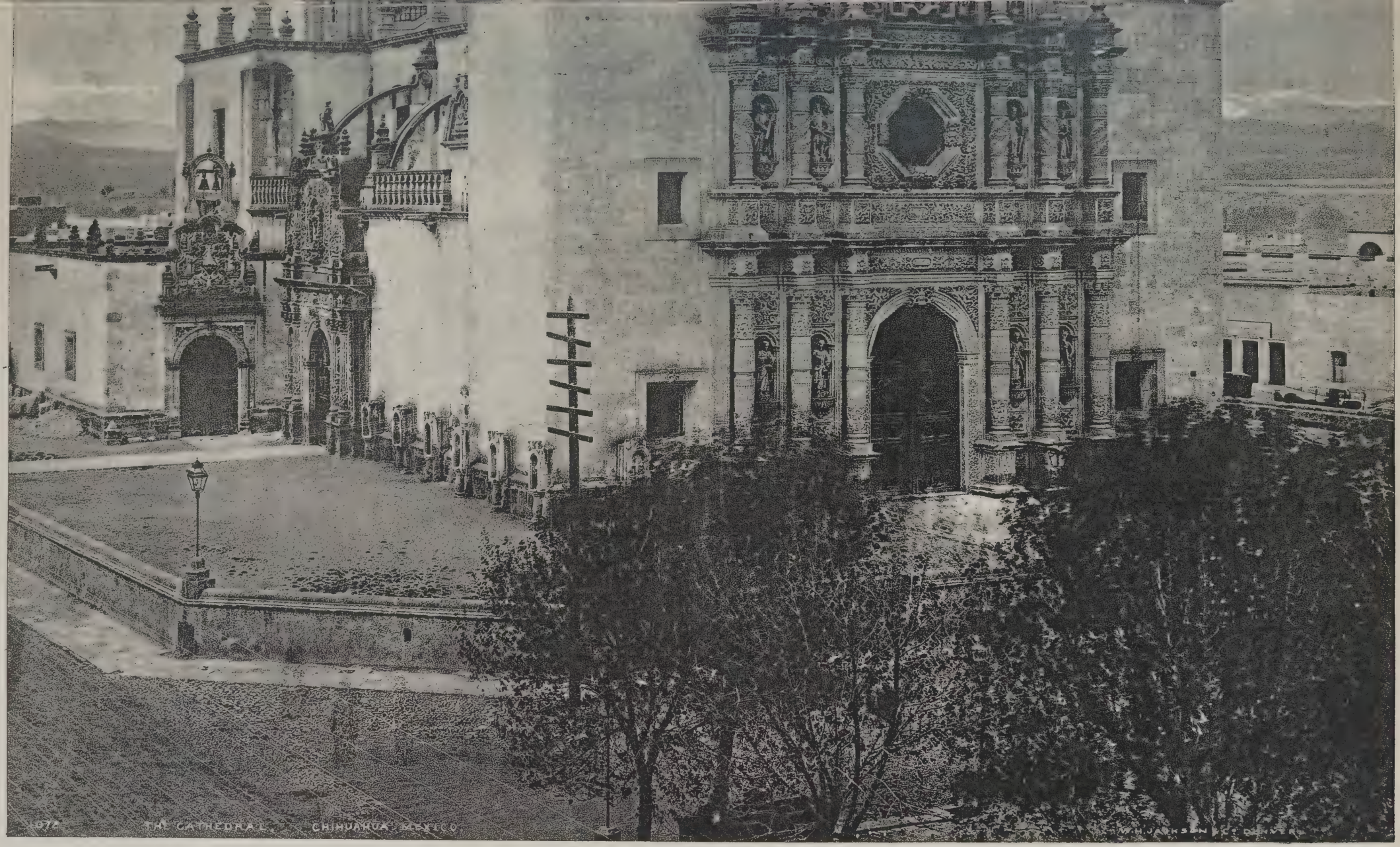
A movement is on foot to purchase Carron House, South Lambeth-road, and secure its grounds of some eight or nine acres for a park. The freeholder (Mr. Cobeldick) has offered to sell the estate for £47,500, and the matter has been some time under the consideration of the Lambeth Vestry, who have referred the question of the purchase back to the Open Spaces Committee. A public meeting was held on Saturday to urge upon the vestry the desirability of accepting Mr. Cobeldick's offer, provided the Metropolitan Board of Works would contribute half the amount.

A presentation portrait of Sir James A. Picton, F.S.A., F.R.I.B.A., is being executed by Mr. W. B. Boadle, for hanging in the board-room at Wavertree. It is to be presented to Sir James by his friends on his retirement from the chairmanship of the Wavertree Local Board.



MARBLE ALTAR AND REREDOS FROM THE NEWCASTLE EXHIBITION.





"PHOTO-TINT," by James Akerman, 6 Queen Square, London, W.C.

ARCHITECTURAL ASSOCIATION EXCURSION

WILTSHIRE

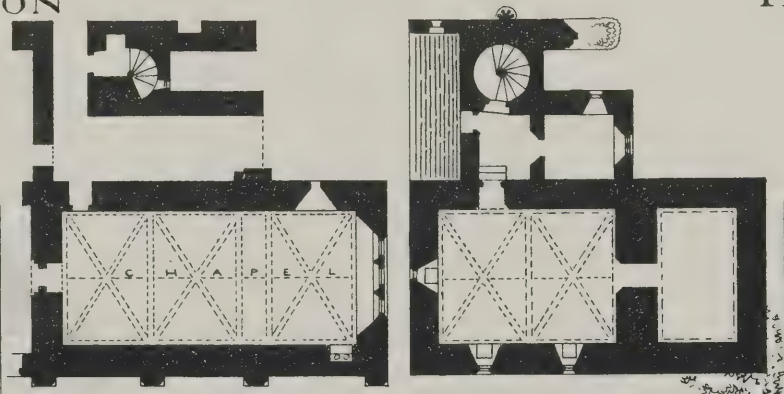
1887

HINTON ABBEY

The Chapel

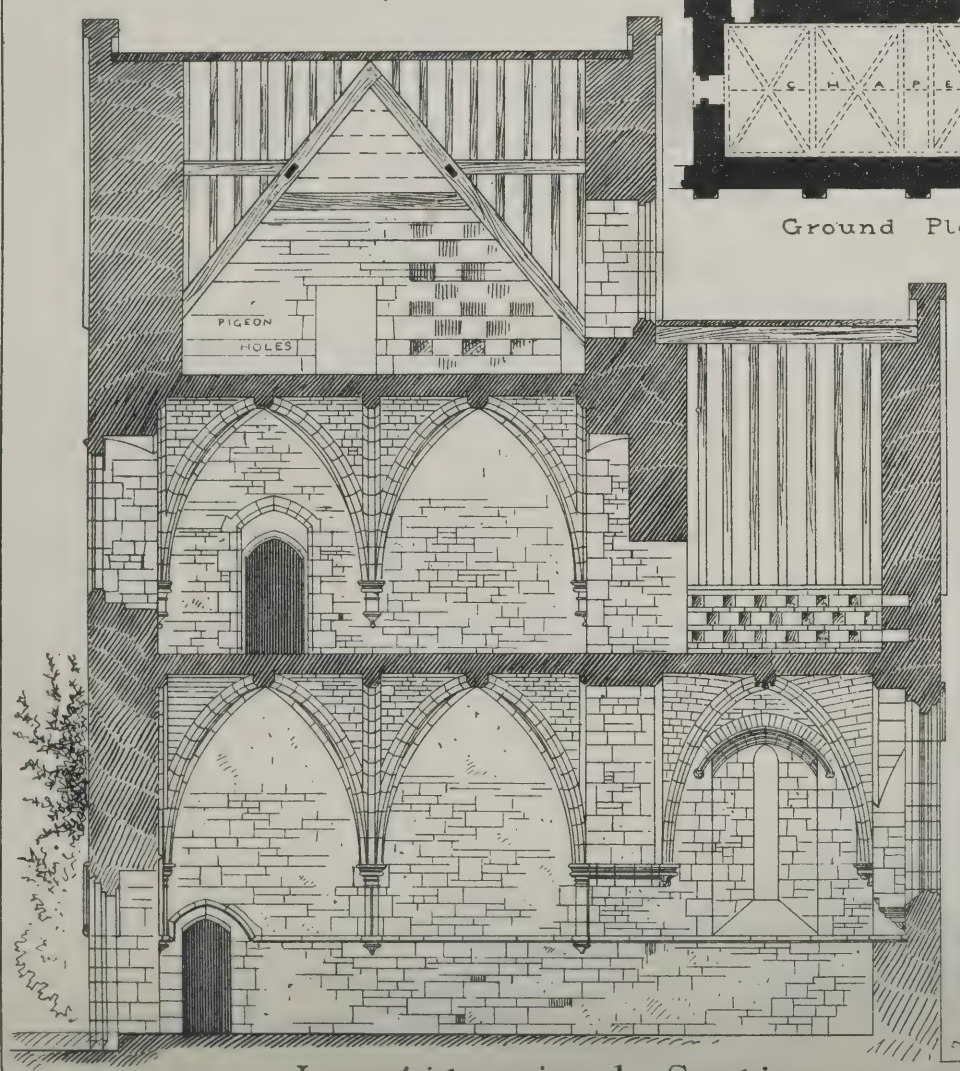
FROM MEASUREMENTS & SKETCHES BY

WALLACE GILL



Ground Plan

Upper Plan



Longitudinal Section



Crofs Section

Scale of Feet

0 5 10 20 30

MAURICE B. ADAMS DEL.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



"KETTLENESS," W. GILBERT FOSTER

SELECTIONS FROM THE SUMMER EXHIBITIONS OF THE ROYAL ACADEMY, GROSVENOR GALLERY AND ROYAL INSTITUTE OF PAINTERS IN WATER COLOURS.

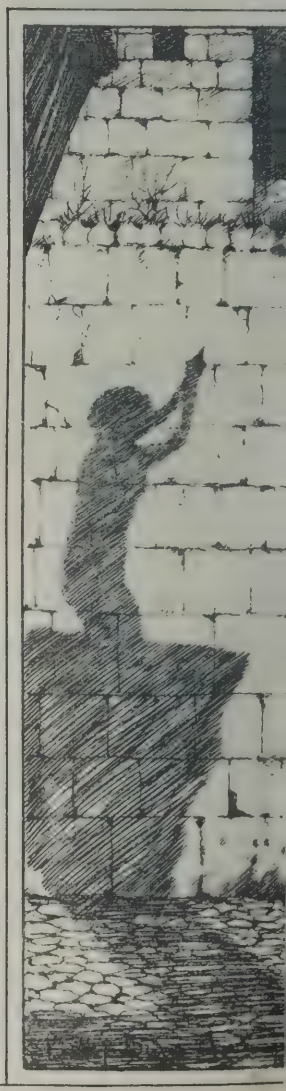


"THE EMPEROR MAXIMILIAN VISI

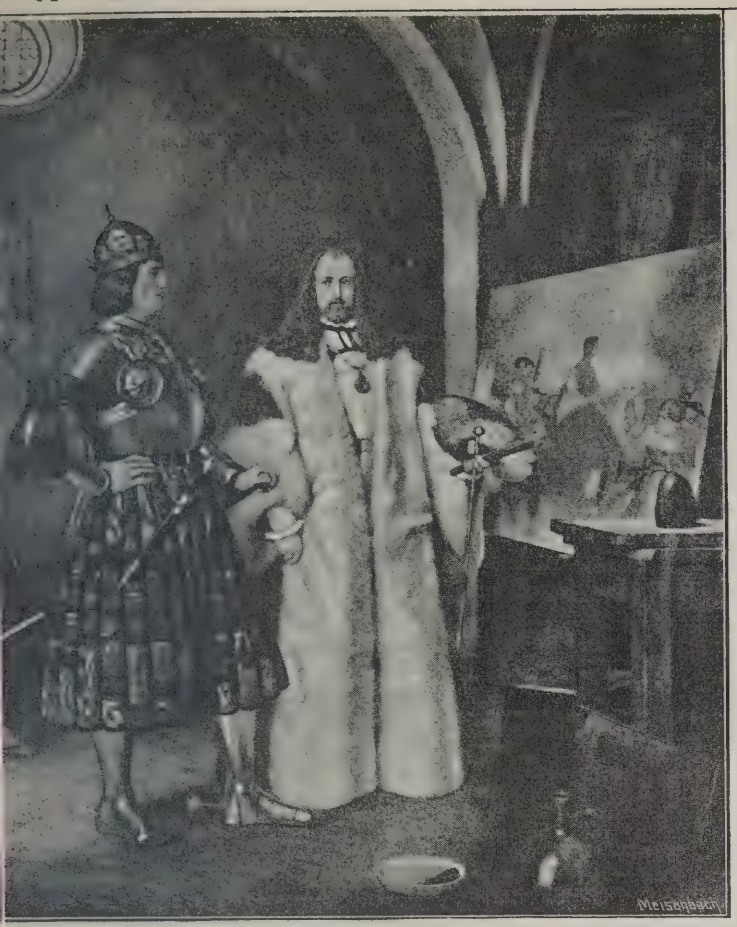


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"HESPERIA," FRANK DICKSEE, A.R.A.



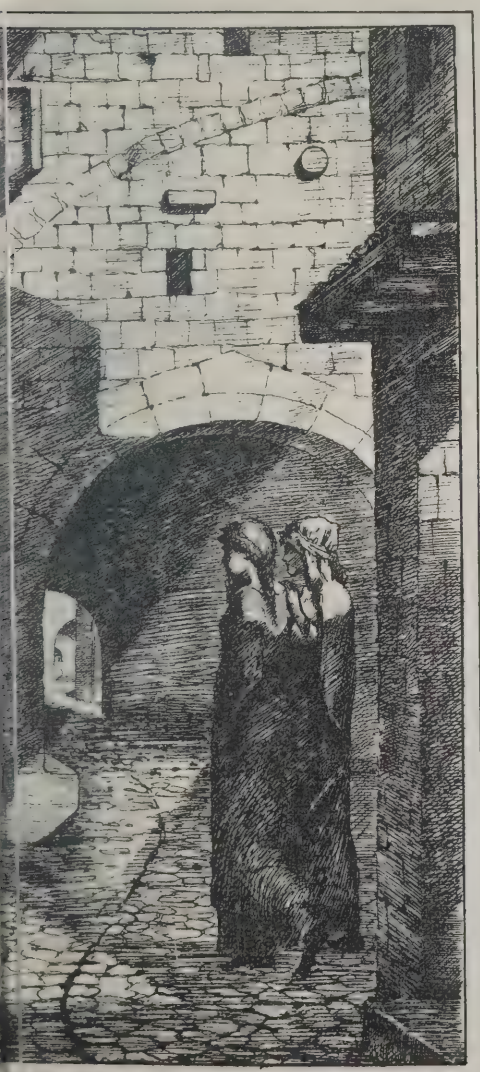
"THE SHADOW



HE STUDIO OF ALBERT DÜRER," SIR JAMES D. LINTON, P.R.I.



"MIST CAPPED," CH. STUART.

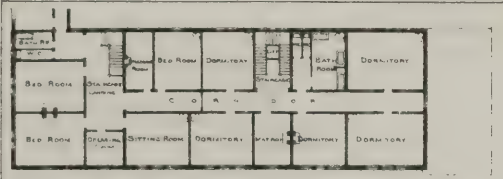


TH SAINT," PHILIP BURNE JONES.

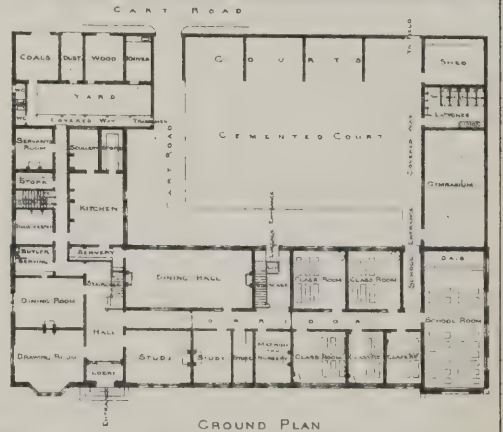


"DRIVING THE DUCKS," W. GILBERT FOSTER.

New : Aysgarth : School : Newton-le-Willows : Yorkshire



FIRST FLOOR PLAN



GROUND PLAN

for the Rev. C. T. Hates : M.A.

Clark & Moscrop. Architects.

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.



GROUND FLOOR PLAN.

RIVERSIDE RESIDENCE AT MAIDENHEAD · E H BOURCHIER ARCHITECT

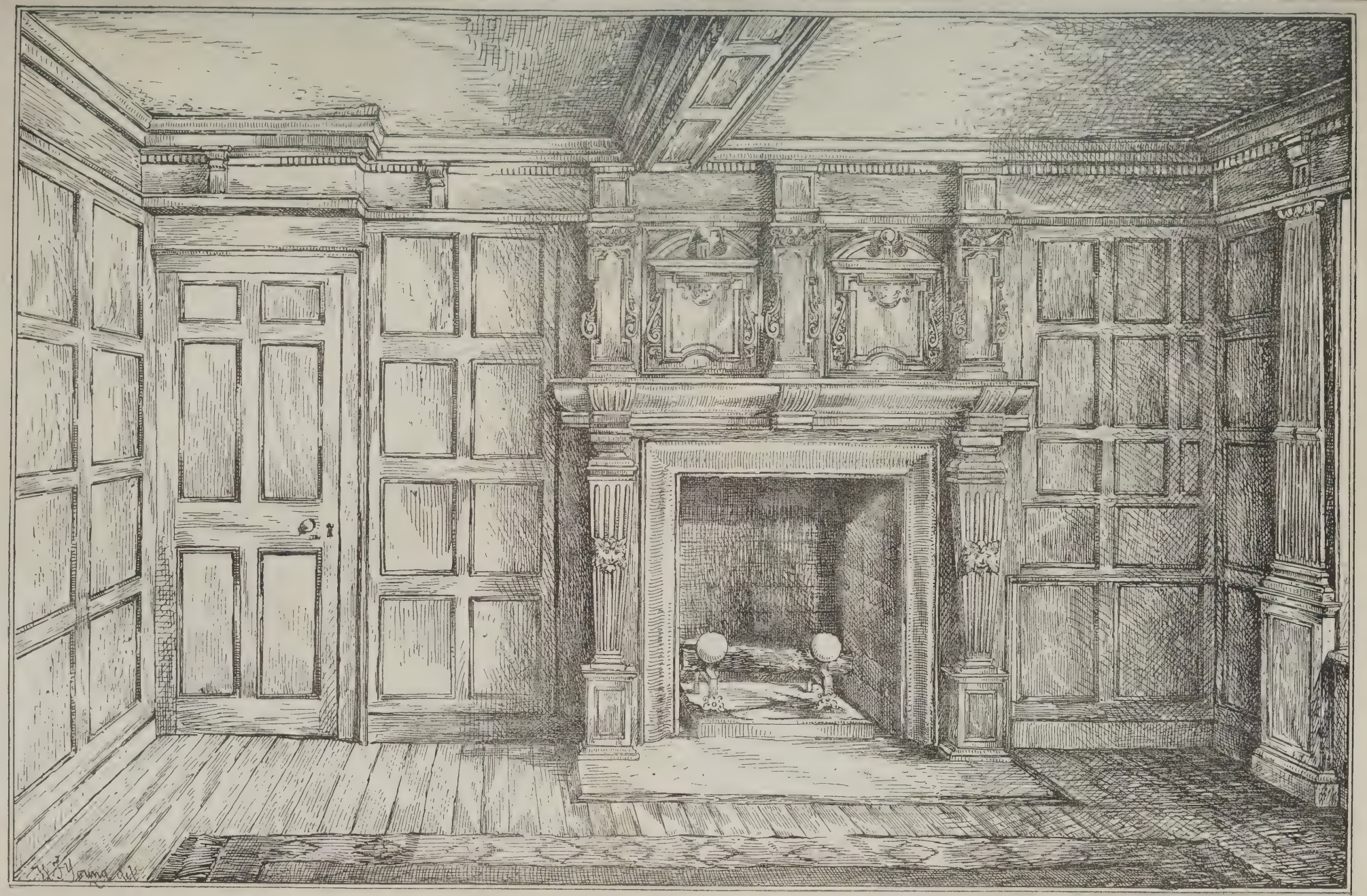
Photo-Lithographed & Printed by James Akerman, 6 Queen Square W C



Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

ARCHITECTURAL ASSOCIATION EXCURSION 1887

DRAWING BY THE LATE FRED. C. DESHON ARCHT.



LIBRARY, RALEIGH HOUSE, BRIXTON.



RALEIGH HOUSE, BRIXTON. VIEW FROM THE LAWN.

RALEIGH HOUSE, BRIXTON.

ANYONE with his eyes about him, on walking up Brixton-rise, will surely have noticed, through the trees, on the left-hand side of the way, a couple of old Elizabethan gables and a few chimney-pots mellowed by the hand of time, and standing far back from the bustling road. That is about all that can be seen from the Rise; but on turning down the lane, and past the lodge, a better view can be obtained of the house, or rather a part of the house, in which the great navigator lived, and whose name it bears. The reason we give our illustration to-day is because the house and grounds, "some twelve and a half acres," with fine timber on it, has been put up for auction, and fortunately, no bid sufficiently high being reached, it was withdrawn. We also give an interior sketch of the drawing-room, which now does duty for a library. The quaint old chimney is the best feature in the room. The panelling is somewhat irregular, and we regret to say that numerous coats of paint have covered the wood, which we find is mostly oak. The door is modern. The room above this (a bedroom) is quite as interesting, and would well repay restoration. We show the old dogs and open hearth, but a modern fireplace cumbers the present opening. It is stated that Queen Elizabeth often visited Sir Walter in this house, coming in her barge up the now hidden Effra; and rumour also states that it was here Raleigh spread his cloak over the pool for her Majesty to step on. However this may be, we sincerely hope that the old house and grounds may long be preserved from the speculating builder.

A crowded meeting was held on Wednesday evening at Brixton Hall, Mr. Fowler, member of the Metropolitan Board of Works, in the chair, when resolutions were unanimously passed as to the desirability of the Metropolitan Board of Works and Lambeth Vestry acquiring the grounds of Raleigh House for £40,000 for the purpose of a public park for Brixton, and that a committee be formed to enter into negotiations with the Board of Works and the vestry for that object.

A STEEL ROOF OF GREAT SPAN.

ROOFS of great span are not uncommon in England. Till the construction of the iron roof over the Olympia at Addison-road, St. Pancras station roof, which has a span of 239ft., held the reputation of being the greatest. But these roofs are to be exceeded by one designed in connection with the Machinery Palace being erected for the French Exhibition of 1889. The project of a machinery gallery was decided upon in May last, and the work was submitted to contract. M. Dutort is the architect of the machinery palace, and, with the aid of MM. Contamin, Charton, and Pierron, the details of the metallic pieces have been arranged. The gallery is constructed entirely of steel—the first great exemplification of the value of steel for structural purposes of this kind, and when finished the structure will embody the progressive developments made in the art of the engineer. The gallery will be of rectangular shape in plan, having a length of 1,387ft. and a width of 492ft., or an area of 672,404 square feet. The main span will be 362ft. clear of tie rods. Each truss forms a four-centred arch of bold springing curvature, and will consist of two half arches resting at their bases and apices upon pivots. Each rib is on the open lattice principle, with long and short panels. These are connected by vertical purlins, four on each side of the apex. The maximum height from the ground to the apex or upper pivot is 147·5ft., which height would allow the Vendome column to stand beneath. Open spandrel pieces of iron fill up the ribs at the haunches, by which the roof covering is continued straight to the outer guttering. There are nineteen bays. The centre bay is 76ft., and the others 70ft. each in width, and the end ones each 83ft. Projecting pavilions roofed on a lower level abut against the central hall, thus adding greatly to the total superficial area. By the employment of steel, M. Contamin and his colleagues have been able to obtain strength with extreme lightness, so that the trusses will not exceed 24lb. per square foot. If this be so, the gallery will possess the lightest metallic roof of any exhibition. The former exhibitions had metallic frameworks, weighing from 30lb. to 34lb. to the square foot. Though it is not safe to compare structures of different design, it would appear the experiment at the Machinery Palace of the Paris Exhibition of 1889 will confirm the opinion of engineers that steel can be used for roofing with economic results that cannot be obtained in iron.

The foundation-stone of a new church at Overstreet, Dodderhill, two miles from Droitwich, was laid on Friday. The church, which will accommodate 348 persons, will be in the style of the 14th century, from the designs of Mr. L. Sheppard, of Worcester. It will cost £3,000, the contractor being Mr. Jonathan Brazier, of Bromsgrove. It will be built of Malvern Hill stone, with Bath stone dressings, and the interior will be of red bricks, with similar dressings. The floors will be of wooden bricks, and the passages of encaustic tiles. The dimensions are—nave, 70ft. by 28ft.; north and south transepts, 13½ft. by 15¾ft.; and a chancel, 31ft. by 19ft., together with organ loft and vestry. The church, which will be a chapel-of-ease to Dodderhill, will be called St. Mary de Wych.

The memorial stone of a new Free Presbyterian church now in course of erection in the village of Grant's House, was laid last week. The church is to accommodate 250 worshippers, and is being built from plans by Messrs. Chalmers and Robson, of Glasgow.

WAYSIDE NOTES.

IT is quite impossible, whilst hastening over the hills of Normandy, to keep pace with any current topics of the architectural world in old England. Possibly I have been a little negligent in not having any papers forwarded me here—not even the "B. N." It is true I did get a glimpse at some London journals one day old whilst at Trouville a day or so back, but did not learn much excepting that there had been a perfectly marvellous display of natural electric lighting in the metropolis. This, doubtless, was coincident, or nearly so, with a heavy thunderstorm that favoured us at Evreux. The darkening cloud and vivid lightning gave some curious effects of light and shade in the cathedral of that peaceful Norman town; but I did not observe any eccentricity on the part of the electric fluid, and feel certain that there was no exhibition of fireballs or thunderbolts after the manner of the London storm. But as regards current architectural topics I must confess complete ignorance, and crave the reader's pardon for dilating herein on a small portion of the old architecture of Calvados.

After leaving Rouen I visited Evreux, aforementioned—a town doubtless known to many and by everyone who professes to know Normandy at all thoroughly. A very typical town is Evreux, nestling amongst beautiful hills and surrounded by the ubiquitious, though very pretty, apple orchards, and possessing a fine cathedral and an interesting church. The choir of the cathedral is being restored (at the rate of two stones and three-quarters a day, I should think), and, consequently, admission to the same is only to be gained by winning the heart of the stately "Swiss" who here reigns supreme. His stern countenance relaxes considerably at the sight of one franc, but if this amount be doubled a pleasant smile plays about the corner of his lips, and you know that there is little to prevent your sketching what you may choose in the choir and portions of the building where the restorers are at work; and it is only in the choir of Evreux Cathedral that one can see the fine stained glass in the clerestory. The apse contains some windows absolutely jewel-like in splendour, and there is a peculiar-tinted green that glows in small fragments with the brilliancy of an emerald. Yet this is nothing to the magnificent effect of Chartres. As regards the exterior of the cathedral, there is a wonderful piece of Flamboyant work in the north transept.

The church of St. Taurin at Evreux is, in some respects, more interesting than the cathedral. It has a very pleasing lantern tower, the external effect of which is very good. But what one cannot but admire most about this lantern is its peculiar plan. The choir and transepts were evidently rebuilt with the lantern, in the 13th century. Not finding the original width of the church sufficiently great to please them, the builders of the lantern extended the east side of this feature by making the chancel arch some 2ft. 4in. wider than the arch into the nave. Consequently the walls of the lantern are thrown out of the square. The effect is very quaint, and the bold frankness of such a proceeding and total disregard of precedent seem to me very admirable. St. Taurin's is now being restored at the west end, though the work in hand only comprises a very commonplace sort of Renaissance portal.

Conches is not many miles from Evreux, and is a quaint Norman market town with an interesting church and ruined stronghold. The church has many points of interest to the sketcher, and possesses a beautiful unrestored west portal with excellent Flamboyant carving. A gem of a door in the chancel would alone be worth going to see. There is some work being done in the church at present—a number of new side altars are being erected from plans by M. Darcy, of Paris. I really do not think I have ever seen such excellent modern Flamboyant carving as is now being turned out by two sculptors in Conches church. But on my telling them it was as good as the old work they modestly declared that such a thing was impossible. At any rate, however, it was next door to the old carvers' work. There is a little town or village between Conches and Bernay, called Beaumont-le-Roger, which I believe has some most interesting architectural remains; but I could not find time to visit the place. There is (perhaps unfortunately) a powerful loadstone tempting me to hurry through the Norman towns, and leading me in the direction of the Brittany coast; and that is the desire to behold the mass and outline of Mont St. Michel.

Bernay, on the Charentonne, possesses a peculiarly interesting church—St. Croix. On entering the building it almost has the effect of a large English parish church. This is chiefly because of the absence of side chapels to the nave aisles. Both this building and the church of Notre Dame de la Couture have typical quaint Norman "slate-hung" spires or belfries—that of the latter edifice especially being most quaint in design. Not very far west of Bernay is the pleasant town of Lisieux, with its magnificent church of St. Pierre. The interior of this building is the finest perspective view I have seen since leaving Rouen. The choir, lantern, and transepts are exceedingly chaste in design; and, as if to be in harmony with the architecture, the decorations of the church appear to be always in the best taste, either when the high altar is neatly draped or when it is resplendent with flowers. The west front of this building will be familiar to all with its towers of varied design — the one with a pleasing spire, and the other with a tiny pyramid of tiles glowing with the golden hues of many-coloured mosses and lichens. The market-place is most interesting in the mornings, and together with the cathedral forms a charming picture. Of the old timber houses, it will be unnecessary for me to speak. They are well known. I note, however, that there are several reproductions of them in the marine residences of Trouville, though the modern French architect is not to be seen at his best in such work.

It is difficult to know what and when to sketch at some places and times. Very frequently it would be pure waste of time; there is so much to see. Here, at Caen, there are some eleven or twelve old churches, including the magnificent Abbaye aux Dames—a beautiful building. It is evident one cannot make views of each from the due north, south, and east. Perhaps the best course is to take photographs to show the composition and outline, and to make sketches only of strikingly beautiful features and detail.

GOTH.

BOOKS RECEIVED.

First Lessons in Science, by the Right Rev. John William Colenso, D.D., Bishop of Natal (London: William Ridgway), is a series of easy lessons on astronomy, and drawn up for the use of a class of natives in the late Bishop Colenso's diocese a quarter of a century ago. They have been republished with suitable diagrams, and are presented to English readers. The late Dr. Colenso's mathematical treatises, notably his school arithmetic and algebra, are familiar textbooks to every schoolboy, and even now are acknowledged to be unsurpassed for clearness and accuracy. The present lessons begin in very simple language to explain the form of the earth, the proofs of its sphericity, its original composition or molten state, the formation of the crust, the strata, and then go on to describe the laws of matter, the planetary worlds and stars. The mathematics of the subject are very clearly conveyed, and the author's little book is a better introduction to the science, in explaining the meaning of meridians, poles, orbits, ecliptics, &c., than half the elementary books published.——*English Carpenters and Foreign Competition.*—Mr. Banister Fletcher, F.R.I.B.A., has published (through B. T. Batsford, 52, High Holborn) as a compact pamphlet his lecture on this subject, delivered at Carpenters' Hall on March 2nd last, and given in our columns the same week. It is illustrated with woodcuts of carved hall stands, a picture frame, chairs, &c., executed by carpenters, and contains much information as to the state of trade and many suggestions and hints put in a readable form.

The new Commercial, Industrial, and Ethnological Museum at Antwerp was opened on Monday.

COMPETITIONS.

DEPARTMENT OF SCIENCE AND ART.—The list of successful candidates for Royal Exhibitions, National Scholarships, and Free Studentships for the present year have just been published. The Royal Exhibition has been taken by Geoffrey Marshall, of Glasgow. National Scholarships (twelve) have been awarded to Samuel H. Studley, of Bradford; David Wilkinson, Preston; Sydney Wood, Bradford; William S. Jarratt, Bradford; George N. Huntly, Richmond (Surrey); Henry Stanton, Bristol; Samuel W. J. Smith, Newcastle-on-Tyne; Frederick W. Jones, Nottingham; John Smith, Belfast; William G. Robson, Newcastle-on-Tyne; Ernest G. Coker, Wolverton; and Henry C. Riley, Manchester. Royal Exhibitions (six) have been gained by Frederick W. Dunn, Bristol; Jacob Marshall, Sheffield; Samuel Parrish, Manchester; Joshua Holden, Todmorden; Mr. T. M. Ormsby, London; and Samuel Pickford, Stockport. The six Free Studentships are awarded to Arthur W. Widdop, Bradford; George W. Moreton, Crewe; John B. Jaquet, London; Malcolm Roberts, Bradford; Herbert H. Balme, Halifax; and George J. Wells, London.

"OWEN JONES" PRIZES, 1887.—This competition was instituted in 1878, by the Council of the Society of Arts, as trustees of the sum of £400, presented to them by the Owen Jones Memorial Committee upon trust to expend the interest thereon in prizes to "Students of the School of Art who, in annual competition, produce the best design for Household Furniture, Carpets, Wall-papers and Hangings, Damask, Chintzes, &c., regulated by the principles laid down by Owen Jones." The prizes are awarded on the results of the annual competition of the Science and Art Department. Six prizes were offered for competition this year, each prize consisting of a bound copy of Owen Jones's "Principles of Design," and a bronze medal. The following are the successful candidates for the present year:—(1) Gertrude M. Ginn, School of Art, Hertford, design for floor tiles. (2) Jane B. Glanvill, School of Art, Cavendish-street, Manchester, design for carpet; design for cotton print. (3) Robert H. Slowan, School of Art, Glasgow, design for printed hanging. (4) Fanny Roylance, School of Art, Cavendish-street, Manchester, design for printed cotton (5) James West, School of Art, West London, design for wall-paper. (6) John Macfarlane, School of Art, Cavendish-street, Manchester, design for table-cover.

THE WHITWORTH SCHOLARSHIPS, 1887.—The following are the successful competitors for the Whitworth Scholarships:—James Whitaker, of Burnley, £200; John Calder, Glasgow; John Smith, Belfast; Nicholas K. Turnbull, Glasgow; James C. Talbot, Southampton; Arthur F. Horne, Moreton-in-Marsh (formerly of Glasgow); Edward J. Duff, Glasgow; Robert N. Blackburn, Liverpool; and William Thomson, Glasgow, each £150. William W. F. Pullen, Cardiff; Edwin Griffith, Glasgow; Frederick C. Tipler, Crewe; Thomas H. M. Bonell, Swindon; Richard J. Redding, Plumstead (Woolwich); Arthur W. Sisson, Lincoln; Arthur H. Abbott, Great Yarmouth; George Hough, Wolverton; Harry G. Christ, London; Harry D. Griffiths, Cardiff; Denholm Young, Edinburgh; Benjamin G. Oxford, Liverpool; Bernard H. Crookes, Liverpool; George J. Wells, London; John Eustice, Camborne; and Augustus H. H. Bratt, Plumstead (Woolwich), each £100.

During the clearing out of a well at Westwood Farm, near Peterborough, a large piece of carved stone was brought up from the bottom. It turned out to be a triple wash-basin from the ancient lavatories in the cloisters of the Benedictine monastery, now the cathedral. It was no doubt purchased, after the destruction of the cloisters, to form a sound bottom to the well.

In pursuance of the plan of restoration of the parish church of Witheridge, Devon, another of a series of stained-glass windows has been placed in the south aisle. Being opposite the font, the design is that of a baptismal window. In the three large compartments are the Children of Israel crossing the Red Sea; Our Lord's Baptism by John; and Naaman at Elisha's door being ordered to wash in Jordan. The window is by Mr. F. Drake, of Exeter, and the stonework by Messrs. Young, of Barnstaple.

Building Intelligence.

Armley, Leeds.—The new cemetery at Armley was formally opened on Saturday. Having secured a site of ten and a half acres, the board invited designs for laying out the ground and for the erection of a chapel and lodge, and Mr. J. P. Pritchett, of Darlington, was unanimously selected, out of forty-three competitors, to carry out the work. The ground is laid out on the rectangular plan, as far as possible, so as to economise space, though a curved road and paths occupy the front portion, which will not be used for interments. At the entrance there is a pair of carriage gates, with foot gates at the sides and an iron railing to correspond, relieved by the introduction of stone pillars at intervals. The lodge, in addition to the dwelling-house, contains board room, waiting room, and other offices. The structure is Domestic Gothic in character. The chapel is approached by a curved road, and is in the Perpendicular style. The entrance-porch is surmounted by a lantern and spire, 73ft. high. The chapel is 40ft. by 20ft., and has sitting accommodation for 120 persons; the east end is apsidal. Adjoining is the mortuary, 10ft. by 10ft., separated from the chapel by a glazed screen. The windows are glazed with muffled cathedral-tinted glass, with coloured margins, bands of roundels at intervals, and devices in the heads. The cost of land was £275 per acre; on the buildings £2,780 were expended, and the wall round the cemetery, road making, and drainage, cost £1,330.

Budleigh Salterton.—Considerable improvements have of late years been made in this town by the pulling down old and dilapidated properties and erecting in their places good and substantial business premises. One of the most recent, and certainly one which entirely differs from any other building in the town, is a butcher's shop and dwelling-house erected by Mr. John Walters. The shop, which is about 22ft. square, is lined with white-glazed bricks, and has marble show slabs supported on turned legs around three sides, and the whole of the fittings are in accordance with the latest improvements. The design is executed in red brickwork; the carved portions from Messrs. Lawrence and Son, Bracknell, and for moulded cornices and strings from Mr. James Brown, London. The carving was done by Mr. S. Allen, Upper Holloway. The style adopted is Queen Anne, and the building has been carried out by Mr. J. G. Stephens, of Exeter, under the superintendence of Messrs. Wilkinson and Warren, architects, of that city.

Bovey Tracey.—Reopening services were held at the parish church of Bovey Tracey, Devon, on Thursday week, after restoration. The church is in the Perpendicular style, and comprises a chancel, nave, two north aisles, a south aisle, and western tower. The floor of the nave has been lowered to its original level, somewhat below that of the chancel, and there has been a rearrangement of seats. The columns of the arcade have been renovated and the font dechiselled, the traceries of the windows also receiving attention. The floor of the chancel is entirely relaid with Devonshire marble; the walls have been relieved of the dingy plaster, and a new east window of stained glass has been inserted. Choir benches will shortly be fixed. The screen, which contains some very rich work, and the lower panels of which contain painted figures, which have been said to typify the union of Church and State, has been restored. The church is heated by a new system, by Messrs. Longden and Co., Oxford-street, London. The general work, which also includes the erection of a vestry on the north side of the chancel and external renovations, has been carried out by Messrs. Trask, of Norton, Minster, from the designs of Mr. J. D. Sedding, of London. The cost was £1,500.

Glasgow.—Satisfactory progress is being made with the erection of the Exhibition buildings in Kelvingrove Park. The prospectus of the Fine Art Section has just been issued. It is stated that special care will be taken in the construction of the Fine Art Galleries to insure their being thoroughly damp-proof and fireproof. The walls will be of brick, the roof of steel or iron, and the building practically isolated from the other parts of the Exhibition buildings. The galleries are ten in number, occupying an area equal to 3,200 square yards, and affording about 2,450 lineal feet of hanging space. It is proposed that objects illustrative of Scottish history and archæology should be placed in a separate building specially constructed for the purpose. Special attention will be given to the safety of the Fine Arts Galleries. Electric light will be used throughout the Exhibition, and the mode of its application in the Fine Arts Galleries will obviate the risks incidental, under other conditions, to the use of artificial lights.

Manchester.—Another section in the restoration of the only genuine inhabited relic of "Old Manchester" remaining — Chetham College and Library—has just been completed from plans by Mr. Medland Taylor—viz., the cloisters. They are situated on the north-west and south sides of the great hall or refectory, forming a miniature quadrangle, and remain almost exactly as they were when Thomas Lord de la Warre, the last rector of Manchester, founded the college at Hunt's Bank between 1421 and 1426. As Mr. Henry Taylor, in his "Old Halls of Lancashire and Cheshire," remarks:—"The cloisters here are two-storied, a somewhat rare occurrence in buildings of this character; in the Oxford Colleges, for example, there are rooms over parts of the cloisters, but in no instance that I am aware of are they built on the two-storied principle." New mullions in the windows have been introduced where absolutely necessary, the greater part of the old masonry and tracery remaining intact. In the restored masonry Runcorn red stone has been introduced, and harmonises with the original Collyhurst stone of which the cloisters were built. At the east end of the cloisters an old retiring-room has been cleared away, opening out the original entrance to the audit-room, in which apartment a whitewashed plaster ceiling has been removed, showing the original solid oak rafters. The cloister windows north and south sides of the quad are being glazed with white cathedral glass in the Elizabethan style, as seen at Agecroft Hall and Bramhall Hall. At the south end of the cloisters, near the entrance to the library, a grille of hammered iron, designed by Mr. M. Taylor, containing the initials and coat of arms of Humphrey Chetham, the founder of the hospital, is being fixed. In the large dining hall a stove has been removed and the original fireplace opened out; also a window has been opened out into the cloister court. Further improvements and restorations are contemplated. The masonry restoration has been carried out by Messrs. Ellis and Hinchliffe, of Manchester. Some 300 members of the British Association have intimated their intention to visit the college on Tuesday week, Sept. 6.

Mainstone.—The parish church was reopened last week after rebuilding from plans by Messrs. Nicholson and Son, of Hereford. The church was previously little better, as regards the fabric, than a ruined barn. The walls were bulged out, leaning over, and very irregular, being only upheld by modern additions of the rudest kind of masonry, applied as buttresses, not only externally, but within the chancel itself. Over the nave, however, though concealed by plaster, was an oak roof of great beauty and elegance, both as regards design, construction, and finished workmanship, and it was accepted as the motive for the entire reconstruction of the church. The church, as rebuilt, consists of nave, chancel, south porch, sacristy, and a parish room. The length of the nave, 55ft., was determined by the proportions of the ancient roof. This roof, which has been restored, is constructed of arched principals, intricately moulded, stopping upon bases, which themselves set up stone corbels. Intermediately between the arched principals are moulded rafters; and moulded purlins, three in each side of the roof, form a series of panels, 84 in number, each adorned with quatrefoils, behind which are seen the ordinary rafters. To keep this roof intact the old walls were taken down, one at a time, the roof cradled and shored, and the new walls built under. The chancel, 24ft. long, is covered with a new oak roof, similar to that over the nave, and is separated from the nave by a chancel arch. The style adopted in the rebuilding is that of the latter part of the 15th century. The south porch is timber-built. The west wall of the nave is surmounted by a double bell-cote, in which are hung the ancient bells. There are new floors, sittings, stalls, pulpit, and lectern. The bowl of the Norman font has been remounted upon a new base and kneeling step, and set in the old position. The whole of the work has been carried out by Mr. W. C. Bright, of Bishop's Castle.

Sutton Coldfield.—The new building of Bishop Vesey's Grammar School was opened last week. The building is a block 60ft. by 56ft., and three stories in height. It adjoins the old house of the head-master. The style adopted is 17th-century Renaissance. The ground story comprises a chemical laboratory, a hall, lavatory, assistant master's room, and dining-room, with serving hatches from old kitchen. On this floor are also the chamber for heating apparatus, china closets, &c. The corridors are lined to half their height with white glazed bricks, and are panelled with brickwork. A stone staircase leads to the upper floors, the first of which contains the school-room, 58ft. by 27ft. 6in. and 20ft. high, lighted by ten windows. The room has a large recess near one end, making the ground-floor an L-shape. This room is warmed by hot water, and has also a fireplace at each end. At the back of the schoolroom, divided from it by a corridor, are three class-rooms, each 17ft. 6in. by 15ft. 3in. Over the class-rooms, included within the height of the school-room, are three bedrooms, corridor, bath-room, and other conveniences. Over the schoolroom are a large dormitory, a linen-room, infirmary (heated by hot water), bath-room, and housemaid's closets. Improvements have also been made to the old buildings to adapt them to the new arrangements. The cost of the new buildings and alterations to old premises, will be about £4,500. Mr. J. A. Cossins, of Corporation-street, Birmingham, was the architect, and Messrs. J. Bansley and Sons were the contractors.

CHIPS.

Mr. Percy Gardner has been elected to the chair of archæology at Oxford, vacant by the transfer of Professor Ramsay to Aberdeen. Mr. Gardner will resign his post in the medal-room at the British Museum, also the Disney professorship at Cambridge, which he has held since the resignation of Professor Babington.

The death is announced of Mr. William Rains, chief sanitary inspector of the parish of St. George's-in-the-East, and one of the originators of the Association of Public Sanitary Inspectors, on the council of which body he had served.

The ceremony of laying the foundation-stone of the new public buildings of West Hartlepool was performed on Thursday, the 18th inst. The building, which will be of red brick, with terracotta facings, will provide accommodation for the school board, the sanitary inspector, the overseers, and the collector. There will also be a board-room, 45ft. 6in. by 25ft., extending along the entire front. It will be in the Queen Anne style, and the cost will be about £6,000. Mr. Joseph Howe, of Newcastle, is the contractor, and Mr. Freeman, of Manchester, the architect.

A group of public buildings is about to be built at the corner of High-street and Bridge-street, Lockerbie, from plans by Mr. Frank Carruthers, of that town. The buildings will comprise market hall, large and small public halls, town clerk's offices and committee rooms, and the proposed outlay is £4,000, exclusive of site.

The office of Keeper of the Royal Academy, rendered vacant by the resignation of Mr. F. R. Pickersgill, R.A., was at the general assembly last week voted to Mr. P. H. Calderon, R.A.

The vicar and churchwardens of St. John's Church, Chester, a church formerly of cathedral rank, have taken a step which will be welcomed by the citizens of Chester, and by the architectural students and other visitors. They have arranged to have the church open for a great part of each day, so as to afford full opportunity for the study of this interesting building. Sketchers will be pleased to hear that they will not be "expected to give" the largest sum the personal appearance of the visitor warrants the doorkeeper in demanding as at St. Bartholomew the Great, Smithfield.

Dr. G. W. Marshall, the author of "The Genealogist's Guide," has been appointed to the post of a Rouge Croix in Her Majesty's College of Heralds.

The Huddersfield town council have raised the salary of Mr. Stainway, the waterworks manager, from £360 to £400 a year.

Engineering Notes.

Association of Municipal Engineers and Surveyors.—The fourth examination by this Association of candidates for the offices of municipal and local board engineers and surveyors will be held at the Town Hall, Manchester, on Friday and Saturday, the 7th and 8th of October next. Intending candidates must send their applications on or before Monday week, September 5th. A Midland District Meeting of the Association will be held at West Bromwich, on Saturday, the 3rd prox. A meeting will take place in the Council Chamber, Town Hall, and visits will afterwards be made to Messrs. J. and S. Roberts' foundry (pipes, &c.) at Swan Village ; and to Mr. Joseph Hamblet's brick and tile works, and the works in progress at the boating lake and swimming bath, Dartmouth Park. On the return to the Council Chamber in the afternoon, Mr. Chas. Jones, Assoc.Inst.C.E., of Ealing, will read a paper on "The Destructor," to be followed by a discussion.

Alum Bay, I.W.—The new pier at Alum Bay is now practically completed. Mr. James Lemon, M.I.C.E., of Southampton, designed the structure, and Mr. H. I. Sanders, of the same town, was the contractor. The total length is 377ft., being 30 or 40ft. longer than the old one. The promenade is 273ft. 6in. long by 12ft. wide, and the head 103ft. 6in. by 44ft. The depth of water at the head will be 10ft. at low water springs, and accommodation is afforded for a steamer on each side, with necessary landing stages. The only parts of the pier not of iron are the bollards, fender piles, and flooring. The entire length of the promenade is arranged for seating.

Northern Municipal and Sanitary Engineers.—On Saturday, a Northern Counties District meeting of the Association of Municipal and Sanitary Engineers and Surveyors was held in the Council Chamber, Newcastle, Mr. G. W. Laws, City Engineer, in the chair. Mr. Dawson, of Benwell, was eventually unanimously elected to the position of district secretary, in succession to Mr. Thompson, who has retired owing to illness, and to whose family a vote of sympathy was passed. The Chairman then read a paper prepared by himself on "The Floating Hospital of the Tyne Port Sanitary Authority," describing the hospital in detail. A discussion followed.

Roath Dock, Cardiff.—The new Roath Dock, Cardiff, is now completed, and was opened on Wednesday by the youthful Earl of Dumfries. It is filled to a depth of 30ft., and is 35 acres in area. The dock is 2,400ft. long and 600ft. wide, giving quayage accommodation to the extent of 7,920ft. in addition to that at the Roath Basin, which is 1,000ft. long and 550ft. wide, with an area of 12 acres. The contract for constructing the dock was taken by Messrs. Neilson and Co., of Carlisle. The masonry was done by them, and 250,000 cubic yards of solid stone have been supplied from the quarry of the Marquis of Bute at Rwllypant. Nearly 3,000,000 tons of earth were removed in making the dock, most of which was tipped on the foreshore for railway sidings leading to the dock. The new dock is at present the largest in England. Calculating the value of the stone supplied by the Marquis of Bute, the dock has cost over £500,000.

The Barry Dock and Railway.—The engineers, Messrs. Brunel, Forster, Browne, and Co., report that about 1,600,000 cubic yards of earth remain to be excavated at the dock, and this at the present rate will occupy about 10 or 12 months. The masonry of the dock will occupy about the same time to complete. The railway works are proceeding satisfactorily. The two headings of the Wenvoe Tunnel have joined, and the work of cutting the tunnel itself is proceeding well. The Pontypridd Tunnel has been begun, and it may be expected to be completed in the early part of 1888. The contract for the dock gates has been taken by the Thames Ironworks and Shipbuilding Company, and they are in progress. It appears that the dock will be ready for opening in 1888.

The partnership between Messrs. Littlewood and Aston, Great James-street, Bedford-row, W.C., architects and surveyors, has been dissolved.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Cambrian Archæological Association.—The forty-second annual meeting of the Cambrian Archæological Association began on Monday at Denbigh, when a museum containing Welsh relics and valuable articles of historic interest, one of the finest collections ever witnessed in the Principality, was opened at the County Hall. Major C. S. Mainwaring, the president for the year, gave the opening address. On Tuesday excursions were made to the ruins of Denbigh Castle, the Burgeos tower and walls, the ancient church of St. Hilary, and Leicester Church. Drives were also made to Whitchurch Abbey, Llandyrnog Church, and Penycloddian Camp, after which papers were read on Welsh hut-dwellings and other subjects. Lieutenant-Colonel Mainwaring presided, and Mr. Stephen Williams, architect, of Rhyadyz, gave an interesting account of his recent explorations at Strata Florida Abbey. The Rev. Trevor Owen, the general secretary, in presenting his report, said that at the last annual meeting a small grant was made to Mr. Stephen Williams, of Rhayader, to trace out the ground plan of the abbey church at Strata Florida, and the results of his explorations had already been so encouraging that it was proposed that the association should undertake the entire clearing out of this, the greatest abbey in Wales. Bodfari church and camp, Caegwyn and Ffynon Beuno caves, Tremeirchion Church, St. Beuno's College, Dyserth Castle and church, and Rhuddlan Castle, the Priory, and Church, were visited on Wednesday.

Midland Institute, Archæological Section.—The last excursion of the season was arranged for Saturday afternoon, and thirty-four members and friends proceeded to Kingswood Station for a walk to some of the famous but unfamiliar archæological attractions of the neighbourhood. The ancient and picturesque moated fortance of Baddesley Clinton, the home of the Ferrers family for many generations, and a fine example of a house of the fourteenth-century, with many of the marks of later days, leaving much of the old work unchanged, was first visited. The party was received by Mr. and Mrs. Dering and conducted through the rooms and galleries of the moated mansion, crowded with fine old paintings, china, and other works of art of great interest and value. The armorial shields of the Ferrers family, the old portraits, the ancient shovelboard, and the family chapel were examined with care. Every room and corridor had some curious memorials, books, pictures, old tapestries, antiquities from Italy, &c. A short stroll led to the old Baddesley Church, where many generations of the Ferrers family repose in peace, and whose tower was built by Nicholas Brome as a penance, and the party went on to Wrayhall Priory and Hall. The Priory was once the property of the Wren family, and the mansion was built and occupied for some years by the famous surveyor of St. Paul's Cathedral. The ruins were extensive and interesting, and some of the old walls still remain to mark the sites of the various buildings. The church itself was "restored" some years ago by the present owner, and the glass has been preserved ; but the venerable look of the old fabric has been lost. On the walls of the dining-room of the hall are examples of art by Ary Scheffer, Webster, Cox, Linnell, Nasmyth, Eastlake, &c. Another walk across fields led to the Shakespeare House at Rowington, where tradition asserts that the poet wrote some of his plays, and which, at any rate, was found to be a very picturesque half-timbered house of the fifteenth century, and a visit to Rowington Church closed the proceedings.

The Sydney Institute of Architects.—A meeting of the Institute of Architects of Sydney, N.S.W., was held at their rooms on the 7th July, when the following gentlemen were elected Fellows:—Messrs. W. W. Wardle, J. S. Edwards, G. A. Mansfield, J. Sulman, A. Blacket, W. L. Vernon, J. E. Kemp, J. J. Sheering, E. H. Buchanan, J. F. Hennessy, H. S. Thompson, J. E. Holland, R. E. Holland, R. C. Backhouse, J. B. Holson, and G. A. Morrell. The Hon. Secretary, Mr. T. Fletcher Watson, presented the report and balance-sheet, both of which were highly satisfactory. Mr. Thomas Rowe, F.R.I.B.A., was appointed President for the ensuing year. The annual dinner of the Fellows of the Institute took place at Günsler's Café the same evening, when about forty gentlemen sat down. The chair was occupied by the President of the Institute (Mr. Thomas Rowe), and amongst those present were Sir Edward Strickland, K.C.B., Mr. Edward Combes, C.M.G., Professor Anderson Stuart, Mr. E. Du Faur, Mr. J. R. Ashton, Major Parrott, Mr. T. E. Rivers, Mr. P. Fletcher Watson, Mr. W. Gardner, Mr. W. Kenwood, Mr. W. Martin, and Mr. E. J. Jackson. Mr. G. A. Mansfield, in proposing "The President of the Institute," alluded to the services which Mr. Rowe had rendered to the Institute and the profession during the past sixteen years. Their members had been engaged for some years past in the work of rebuilding the metropolis of New South Wales, and there could be no doubt that the work being done to-day would make its mark upon Sydney for all time. The President, in responding, referred to the difficulties which he and others had experienced in the formation of the Institute, and to the hard struggles which had taken place before it was raised to its present honourable position. He alluded to the great alterations which had taken place in the city during recent years, and that in 1886 there were 510 new buildings erected and in the course of erection, whilst for the first half of the present year (1887) the number of new buildings erected and in course of erection was 365. Very numerous alterations, additions, &c., are also being made. The foregoing new buildings include two theatres, three arcades, nine hotels, two public halls, public baths, and several large offices, stores, and dwellings. Sir Edward Strickland, K.C.B., proposed "The Engineering Association," which was responded to by Major Parrott. Mr. J. Sulman submitted the toast of "Art." In the course of an excellent speech he said that in leaving England for the colony he thought he would, most probably, leave all art behind; but much to his pleasure and surprise he found art well represented, some of the men in their own department of it doing excellent work. He also dwelt at some length upon the probable future of the arts in these southern lands. With their lovely climate and splendid surroundings they had a future before them which he believed they might make as glorious as that of Italy. He coupled the names of Messrs. Combes and Du Faur with the sentiment. Both gentlemen replied, as did also Mr. Julian R. Aston as President of the Art Society, N.S.W. "Science" was proposed by Sir Edward Strickland, and was acknowledged by Professor Anderson.

ARCHÆOLOGICAL.

Roman Remains at Kirkintilloch.—In the summer of 1879 a section of the Roman vallum of Lollius Urbicus, erected by him between the Firths of Forth and Clyde, was laid bare by the excavations in connection with a sand-pit at Bellfield, and a number of human bones were unearthed. For some time past Mr. Thomas Ferguson, sand merchant, Kirkintilloch, has been cutting into the ridge on Westermains, along which the Roman wall and military way are known to have been constructed. On Thursday the workmen came upon a chamber in the earth, in which were found some bones and a bronze spear-head. Cutting, at right angles, into this sand ridge, which some believe to be the southern shore of what was once a great inland sea, running from the Forth to the Clyde, the workmen have exposed a section of the wall and military way, formed of large-sized gravel and freestone rubble. The angle of declivity of the wall towards the fosse is perfect in outline, and the disturbance of the sand strata in the formation of the ditch, wall, and military way is strikingly apparent. Close by the military way, and at a depth of about 6ft., was found the chamber already referred to. It was about 6 or 7ft. long, 2ft. broad, and about the same in depth. The spear-head, when entire, was about 8in. long. The point is missing, but the remaining 6½in. are in a fair state of preservation. It is 2½in. broad at the head, and the thin, sharp blade is strengthened by a narrow band of thicker metal running down the centre of each side, and tapering, like the blade, from head to point.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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RECEIVED.—A. C. and Co.—J. K. and Co.—H. and Co.—W. W. and Son.—G. W. Ry. Co.—H. and G.

Correspondence.

THE ARCHITECTURAL ASSOCIATION EXCURSION.

To the Editor of the BUILDING NEWS

SIR,—Permit me a few words in respect to the paragraph relating to Allen and Wood in your description of the Architectural Association excursion.

Allen, of course, needs no apology from me—every literate person knows of his deserved position amongst the great men of his time, and, moreover, from the reference to him as "the stone quarry owner who erected Prior Park as an advertisement for Bath stone," I conceive that the notice is written in a kind of humour, though I am not able to appreciate the jest.

But I should be sorry to think that an artist of such great ability as Wood displayed should be referred to in your paper as if he were merely a commercial architect with a turn for advertisement.

Wood was a man of unusual breadth of mind and grasp of the salient conditions given him: he could design not merely a house, but a street—a city.

To few has been given to lay out a town, and but few of those have risen to such a task—Wood used his chances to the full. In all England there is no city comparable to Bath for beauty and grave dignity; and for this it owes little to its locality.

Built in a valley that is wide, but not impressive, and fed by a sluggish and muddy river; and on the hills that rise steeply on all sides, but without grandeur, compelling the fatigues of long stiff ascents without the reward of fine outlines or noble shapes, Wood planted the hillside town with such appreciation of site and such power of concerted arrangement that the main, and almost the first obvious characteristic of Bath is its noble dignity and the simple beauty got from great breadth of design and the direct co-operation of mass helping its fellow mass.

And this, too, is done in a style essentially stubborn, yet under Wood's hand it melts and bends till there is no limit to its capacities. The genius that laid out Pulteney-street, with its perfect proportion and imperial regularity, with its perspective fittingly connected with the block of Sidney College terminating the vista, could plant Queen-square in sunny quiet, and drive thence Gay-street up an almost impossible slope, to reach the elaborated charm of the Circus, had the scenic and comprehensive qualities of mind that should give him a place beside Michael Angelo, Palladio, and Wren. I could wish your critic to give another and a longer look to Prior Park (a really noble building), and then, if he would not grudge the toil, climb to Camden-crescent, and look at the perfect way "the dismal piece of building" is made to ride on its hillside, and he will grant, I think, that such a site and such a building were incapable of being conjoined with beauty and fitness, and yet that Wood has undertaken this problem, and answers it with complete success. I did not know that Wood had written a book, "The Beauties of Bath"—he created them.—I am, &c., HALSEY RICARDO.

THE IMPERIAL INSTITUTE.

SIR,—As I read, the Imperial Institute design is modified and settled upon by, or with the aid of, H.R.H. the Prince of Wales and Sir F. Abell, I wish you could and would enlighten those who take an interest in the subject what the improvements are to be, as I am afraid the glorious opportunity of a second noble dome in London is passing away, as also the smaller domes or cupolas contemplated for the Admiralty Offices and Liverpool Cathedral, not so much for lack of means as want of admiration; as the comparative expense of what I venture to call the tower treatment does not seem so considerable in a large structure to—Yours, &c.,

JAS. PULHAM.

SCOTTISH ARCHÆOLOGY.

SIR,—I beg to thank you for inserting my letter in your issue of the 5th inst., and Mr. Reid for endorsing it by his note published on the 12th. I feel convinced that little progress can be made in Scottish archæology unless the society in Edinburgh can be induced to descend from the scientific throne it has usurped, and on which it sits with such an air of intolerable arrogance and self-assumption, and modestly assist those who go into the field and do the real work, or unless it can be persuaded to disband and leave the course open to all competitors. At present its very existence handicaps outsiders. Living itself in an element of sham and humbug, it does its best to embarrass and discourage earnest inquirers. This is not a question affecting Scotland alone, for the three kingdoms are so related that the light thrown upon one illuminates all. For this reason I trust Englishmen will feel some interest in the subject, and that you will once again be able to spare me a little of your precious space to call their attention to it.—I am, &c.,

J. SANDS.

Vadlure, Walls, Shetland, Aug. 20.

THE "PLAN OF CAMPAIGN" FOR THE ARCHITECTURAL STUDENT.

SIR,—The architectural pupil invariably commences his career with a singular indifference to the great mass of work that lies between him and success in his profession; he might well discover a mine of revelation in the contemplation of the energy and patient labour of the efficient architect. At present he has seen little beauty in his future goddess; Solomon on wisdom, knowledge, and wasted opportunities is as yet an undigested textbook: when so much that is venerable has failed, it is not desirable that smaller men should "rush in"; but there are still fortunately those to whom the engineering of a future career is of deep and serious import; to whom it is a serious matter that efficiency should be accomplished within a reasonable number of years.

How many of these, alas! of the most earnest set forth full of energy without a definite plan to plunge into the indefinite maze of architectural studies, often to find themselves wearied out at the end of years of hard work because so much energy has been misplaced and their efforts spread over too wide a field, as though they had sown the good seed of labour in patches over a wide area which at harvest time they could not find and reap. It is impossible, then, to over-estimate the value of such help as is offered by the lately-instituted committee of advice of the London Architectural Association—for here the "plan of campaign" may be fully discussed by men who have themselves trodden the path. A moment's glance at the subjects for architectural study will convince us that they are so wide and varied that only careful economy of time can facilitate a reasonable proficiency in the important branches.

First and foremost comes the making of drawings for client and contractor; next, constructional knowledge of all building trades, strength of materials, sanitary science, shoring and drainage. Then the making of specifications, method of estimating cost; following on with the history of architecture, the study of style, and an intimate acquaintance with one style, and, finally, what is known as professional practice, under which head are required knowledge relating to contracts, light and air, surveys, dilapidations, valuations, and Building Acts. The study of perspective and colour decoration must not be omitted.

Undoubtedly, the best method of attempting this mass of work is to master each subject almost by itself with perfect thoroughness, taking care that what has once been studied is reduced to clear, concise notes to make up a text book for future review. Let us suppose a plan of work for a model pupil articled for three years, and a member of the Architectural Association. For the first year, then, he should certainly be engaged in the copying of drawings, and making of studiously accurate tracings, in thoroughly examining works in progress, and studying the first and second volumes of Rivington's "Building Construction." With regard to the study of books, one good book on the subject should be selected under good advice, and epitomised, reduced to short but full crisp notes; these may be carefully copied out, and form the basis of study and review, and a separate book kept for future notes on this subject. In the second year he would take up the elementary class of design, and the lectures in connection therewith; should take part in the duties of his office, and study the third volume of Rivington's "Building Construction." In the third year he should be thoroughly useful in his employer's office, should work on the higher grade of the elementary class of design, attend the class of construction, and also the lectures of that class. The "notes" taken at these classes and lectures should be entered in their respective permanent note-books.

In the fourth year he should seek employment as an improver, and devote his spare time to sketching old examples, to the class of design, and the study of the history of architecture, and in this last subject care should be taken to choose a textbook of reasonable dimension, such as those by Professor Roger Smith; and then an intimate knowledge of one style should be gained by the aid of larger works. In the fifth year the student could take specifications, nature of contracts, and the method of estimating.

If our model pupil be not in London he would, of course, require a different programme, and the whole of his work might be embraced as follows:—During the first year he should learn to trace accurately, and to copy drawings; he should study the first and second volumes of Rivington's "Building Construction," the copying of old architectural examples from drawings or their enlargements from books, and endeavour to see as much as possible of work in progress.

In the second year he should take an earnest part in the office work, study the third volume of Rivington's "Building Construction," and commence to design simple things; he would also do well to join the BUILDING NEWS Designing Club.

In the third year he should devote himself to design and the sketching of old examples.

In the fourth year he should continue the

same course, and add to it the study of the "History of Architecture," with an intimate study of the style in which he is designing.

In the fifth year the study of specifications could be taken with the study of contracts, methods of estimating, &c. In this way, supposing our pupil to have been seventeen years of age at the commencement of his articles, he would still have three years to review and perfect his work, to study shoring and drainage, to enter for travelling studentships before entering for examination at the age of 25. By hard work he would have acquired the habit of rapidly digesting the other studies required of him at any age when, alas! many architectural students are beginning to contemplate seriously the work that lies before them. One very common error it is very necessary to avoid: when too much work is undertaken, the work suffers in quality what it gains in quantity; the programme had much better be lengthened out than the work hurried over, for architectural work badly done will inevitably have to be done again.

To sum up, then, the points of the greatest importance in architectural study, there should be a thoroughly definite, well considered plan of action; there should be the reduction of the main features of the studies to such a form as will render them easy of review, then such a regard for thoroughness as will free us from the consciousness of haziness in any subject once studied; and, lastly, such a periodical review of our work as will enable us to retain what we have once grasped.

It is a matter of great congratulation that the work of the architectural student is rendered day by day less difficult—his task will never probably be light; but, thanks to the patient care of a thousand lovers of our art, most of the thorns have been removed from what should certainly be a path of roses to the true student of architecture.—I am, &c.,

CHRISTOPHER M. SHINER.

A CORRECTION.

SIR,—I notice in the BUILDING NEWS of the 19th inst., on page 304, a paragraph headed "Chips," stating that "Mr. Willis Wigg, of Lynn, has been elected assistant surveyor to the York City Council with a salary of £180 a year."

This statement is incorrect in two particulars—viz., 1st, Mr. Wigg is not assistant surveyor to the York City Council, but third assistant in this office; 2nd, his salary is £80, not £180 per annum.

I may say that when Mr. Mawbey commenced his duties as city surveyor here, he divided the office, appointing Mr. Dickenson chief assistant of the surveyor's department, and myself chief assistant of the engineering department; this arrangement is still in operation, and Mr. Wigg will consequently be an assistant under me.

You will greatly oblige by inserting this letter (with the contents of which Mr. Mawbey is fully cognisant) in the next issue of your valuable journal.—I am, &c., H. C. CRUMMACK.

City Surveyor's Office, Guildhall, York, Aug. 23.

[The paragraph was taken from a Stamford paper, and is in all probability the result of some printer's error. Mr. Wigg did not send it, and is in no way responsible for the error.—ED. "B. N."]

A work which will become memorable in the history of the church of St. George at Stamford was begun last week—the addition of transepts. The present wooden gallery, which occupies the sides, and the west end of the nave will be pulled down and removed. The aisles are to be lengthened to within a few inches of the western face of the tower, an alteration which will materially alter the appearance of that feature. When all is done, accommodation for about 30 additional people will be gained, after making room for the displaced seats of the gallery. Mr. Hilliam is doing the stonework, and Mr. Wyles, also of Stamford, the woodwork.

One of the ornamental fountains which the English Waterworks Company at Antwerp has presented to the town was unveiled on Monday in the presence of the local authorities. It has been erected on the Grande Place, is the work of the Belgian sculptor, Jef Lambeaux, and represents the history of Antigonus. Part of the cost has been met out of Baron Nottebohm's legacy for the embellishment of the public squares at Antwerp.

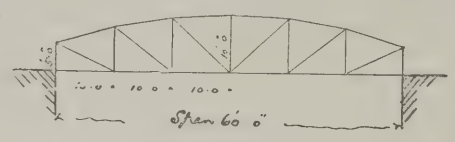
An oak reredos, the work of Messrs. Cox, Son, Buckley, and Co., of Southampton-street, Strand, W.C., has been placed in the chancel of St. Giles's Church, Newcastle-under-Lyme. It is Early Decorated in style, and cost £300. Messrs. Chapman and Snape, of Newcastle, were the architects.

Intercommunication.

QUESTIONS.

[9375.]—**Tall Column or Chimney Shaft.**—What book will give me method of working out the stability of a column like the Monument in King William-street, or Nelson's Column, Trafalgar-square, or a very high chimney-shaft?—J. CHURCHILL.

[9376.]—**Girder Strains.**—I should be much obliged if someone well acquainted with the subject would give me their opinion as to the amount of strain on the members of the truss below. Live load = 1 ton per ft.; dead



load = ½ ton per foot.; radius of top member = 90ft.—R. B.

[9377.]—**Dimensions of English Cathedrals.**—Great diversity appears in the statements of length and other dimensions of cathedrals. The question as to which is the longest cathedral is still scarcely a settled point. St. Alban's is now considered to be the longest church in England, being a few feet longer than Winchester. Ely and Canterbury follow in order; but what I desire more are the general dimensions of nave, aisles, transepts, presbyteries, &c., in the following order: Length of nave (internal) from western door to transept, width of nave, width of aisles, height of both, transepts, length and width; choir length and width, presbytery length and width, also of processional paths, heights, &c. I find on looking through the published lists for instance that one authority, Walcott, gives the length of Canterbury as 517ft., and another puts it down at 524ft.—G.

[9378.]—**Salisbury and Exeter.**—Can any of your readers inform me what objects of architectural interest there are in the neighbourhoods of Salisbury and Exeter?—T. C.

REPLIES.

[9310.]—**Half-Timbered Walls.**—If "Jack Mortise" and "G. H. G." will fully illustrate (either by sections or diagrams) what they term "timbers well framed," and show the connection between the wood and the brick filling-in, &c., and the connection of both with the inner wall, I will show that they are only contending for a distinction without a difference.—JAMES THORNELOE.

[9333.]—**Ventilation and Prevention of Down-draught in Churches.**—Relative to the correspondence in the columns of the BUILDING NEWS respecting the heating of churches and large buildings, I have heard it asserted frequently that there is considerably more danger in the use of the high-pressure small-bore pipe system than in that of the larger bore. The advantages of the small bore are considerable, especially in old buildings, where they can be so easily adapted to existing conditions. Moreover, the first cost is less, and heat can be generated more quickly and with much less fuel. I had several buildings heated with this small-bore system, and though on the whole I regard it as satisfactory, I have felt the air at times over hot and oppressive. This no doubt might have been, under more skilled hands, corrected by better management on the stoker's part; but I confess I like the sensation of the milder heat created by the larger pipes under the old boiler system better. Probably some of your readers of greater experience would say something as to the comparative safety and merits of the small bore, especially after a few years' wear, and if, on the whole, it is more satisfactory. After this exceptionally dry and hot summer we may have a very wet and cold winter, and this is a good time to keep the question aired. It is claimed as one of the great advantages of the small-bore system that coils can be so easily run through the roofs without being an eyesore, and thereby warming the air and preventing down-draughts of cold air. References might also be made to buildings satisfactorily treated for heating and ventilation.—RUSTICUS.

[9348.]—**Boundary Line.**—"G. H. G." is in error when he states "the centre of the hedge where there is no ditch is presumably a boundary." The hedge belongs to the owner of the land on one side or other, and must stand on his land, and the rule is, where no ditch, to allow one foot from or beyond the centre of hedge, as a hedge, when properly trimmed, is supposed to occupy 2ft. of space. There was no difficulty fifty years ago on these points—old surveyors were thoroughly acquainted with the practice; but now surveying is taken up by anyone, there are never-ending disputes.—Z.

[9354.]—**Gothic.**—"Student" will do well to study "Paley" carefully; but if he has not already read them he had better go through Parker's "A. B. C. of Gothic Architecture" and "Introduction to Gothic Architecture" first.—A. GOTH.

[9356.]—**Wood Staining.**—I found by experience the other day the proper way is to stain first and then twice size and varnish. If the wood is sized first, the stain does not enter the pores, and it turns green in parts, in fact, is no good whatever. I trust to see the rest of the question answered by another practically experienced.—WILLIAM WAGHORNE.

[9365.]—**Adjustable W.C.s.**—If "T." will write to me, I can supply him with a plan I have designed to meet the above want.—W. LENLEY, Surveyor, 158, Strand, W.C.

The adjudications in bankruptcy announced in Friday's *Gazette* include the names of James Ford (trading as James Ford and Co.), Pitfield-street, Hoxton, and Carteret-street, Westminster, contractor; Geo. Broom, Hoxton and Kingsland, timber merchant; and Charles Huxley, Wrexham, builder.

LEGAL INTELLIGENCE.

A WELSH SLATE QUARRY LITIGATION.—An arbitration suit, in which the Welsh Slate Quarry Company were sued by Mr. W. E. Oakley for the recovery of damages originally laid at a quarter of a million, for not working the quarries according to the terms of the lease, by taking out unfairly the "eye" of the quarry, and leaving the unworkable material, has been decided by Mr. Gully, Q.C., who sat as arbitrator, against the company. The damages are assessed at £90,000, and the costs, it is expected, will reach about £30,000. Nearly every quarry proprietor and manager in North Wales was examined, the arbitration, which took place in London, occupying several months.

IN RE CUMING AND BARNETT.—A CAUTION TO SPECULATING BUILDERS.—The bankrupts, who were builders and contractors, of Westminster-chambers, Victoria-street, and Homerton Bridge, recently applied for their discharge; and Mr. Registrar Lankaster gave judgment on Tuesday. The failure occurred in December, 1885, the liabilities being returned at £4,652; and the trustee, in his report, dated the 18th ult., certified that nothing had then been realised from the assets, and that it was uncertain whether there was any value attaching to the equities of redemption of the mortgaged properties. His Honour said that the bankrupts, after the experience of a previous failure, commenced business as speculative builders about five years prior to the date of the receiving order. Although they had only a capital of £200, they engaged in very extensive operations, and mortgaged the property from time to time to a capitalist who had assisted them with advances. They had, in the words of the late Lord Justice James, "played the game the chief principle of which is 'Heads, I win; tails, you lose.'" Not only was their course of business rash and hazardous, but, in the language of the late Lord Westbury, it was positively dangerous. They had in the course of their speculations contracted debts to a large amount without reasonable or probable expectation of payment, and had continued to trade with knowledge of insolvency. They had also committed other offences, and the discharge must be suspended for a period of five years.

CHIPS.

On Sunday week the first service was held in the Chapel-of-Ease at Birchwood, two miles from Buckland St. Mary, Devon. The chapel is built of native stone, with Beer-stone dressings, and is lined with red brick. The windows are of the lancet type, with stained glass. The builder was Mr. E. J. Symes, of Coombe St. Nicholas, who followed his own designs, and the cost was about £300.

A vestry and mission room have just been added to St. Mark's Church, Battersea, from the designs of the architect of the church, Mr. William White, F.S.A., of Wimpole-street, W.

Bampton Church, Devon, was reopened after restoration on Sunday. The works completed include reopening of south porch, which had been closed for twenty years; removal of west gallery, and renewal of seating.

The new cemetery for the parishioners of New Shoreham, Sussex, was opened on Thursday last, the ceremony of consecrating a small portion of it by the Bishop of the Diocese taking place at the same time. In shape, the ground is like a leg of mutton or a pear, and is inclosed with hedges and a wrought-iron fence. At the entrance is a solid-looking lodge and oak lych-gate, both covered with red tiles, and with walls of red kiln bricks, and panels of large flints in random work. Mr. Arthur Loader, of 54, Old Steine, Brighton, was the architect.

On Saturday, the 13th of August, the Crown Princess of Germany, with Sir Henry and Lady Ponsonby and others, visited Sir J. Chas. Robinson at Swanage. The party, on arrival from Cowes, drove through Durlston Park to Durlston Head, where they inspected the pavilion designed by Mr. Reginald Pinder, F.R.I.B.A., and other works now being carried out there by Mr. George Burt, J.P. (ex-sheriff of London), of Purbeck House, Swanage, to whom the property belongs. The Princess afterwards visited the caves at Tilly Whim, which are close by.

Mr. H. T. Margetson, of Chelsea, has been commissioned to execute the carving of the new town-hall, Portsmouth. Mr. W. Hill, of Leeds, is the architect of the building, which has been illustrated in our pages.

St. Lawrence's Church, Chorlton, Staffs, was reopened last week after restoration from plans by Mr. Charles Lynam, of Stoke-on-Trent. The altar, pulpit, and prayer-desk of 1827 have been replaced by new fittings from the architect's designs, the oak pews have been converted into open sittings, and the passages have been laid with tiles supplied by Messrs. Minton, Hollins and Co., of Stoke.

PARLIAMENTARY NOTES.

Messrs. Leeming and Leeming's Claims for Compensation.—In reply to Mr. Shaw-Lefevre, Mr. Plunket said: The proposal in the Supplementary Estimates to pay Messrs. Leeming and Leeming £8,000 in full satisfaction of their claims has resulted from the report of the Select Committee on the Admiralty and War Office Sites, which sat this year, and by a very large majority recommended that the scheme known as Messrs. Leeming's should be abandoned, and the additional sum of £500 will be asked for the preparation of plans for extending the existing Admiralty buildings, as also recommended by the Select Committee. Messrs. Leeming have acted with perfect propriety in the matter, and from the communications which have passed between them and my department I have no grounds for supposing that we shall have any difficulty in dealing with them. Under these circumstances I see no reason for laying on the table of the House the correspondence which has taken place, but I shall willingly show the letters to the right hon. gentleman should he wish to see them.

Industrial Dwellings and House Duty.—Mr. Hobhouse asked the Chancellor of the Exchequer on Friday if he was aware that in blocks of improved industrial dwellings, wherever two or more single-room tenements were let together, the Commissioners of Inland Revenue required the payment of inhabited house duty, although the aggregate annual value of the tenements let together was below the limit of £20; whether such a practice was in accordance with the concession explained by the Secretary to the Treasury and the Chancellor of the Exchequer on the 29th of February, 1884, in the House of Commons, that such blocks of industrial dwellings were to be exempt from duty "provided only that the conditions were satisfied, that the block consisted of tenements each of which was under £20 value"; and whether, since the result of such a practice must be to discourage the proprietors of improved industrial dwellings from letting more than one room to poor families, he would consider how far the directions given by the Treasury to the Commissioners could be modified. The Chancellor of the Exchequer: The exemption from house duty which the Inland Revenue is empowered to give in the case of tenements forming part of improved industrial dwellings is limited by two conditions—namely, (1) that the tenements should be under £20 in value; (2) that they should be structurally separate from the rest of the buildings. In the exceptional cases referred to by the hon. gentleman the second of these conditions does not exist, inasmuch as the two rooms, though each by itself structurally separate, are not, when occupied together, so separate. The condition with respect to structural separation is, in strict accordance with the promises of the member for Edinburgh, as Chancellor of the Exchequer, in the debate of February 29, 1884. At the same time the effect of the rule about structural separation is in exceptional cases somewhat anomalous, and I am prepared to consider whether the rule cannot be modified in such a way as to meet these cases and to provide for exemption from house-duty of all tenements under £20 in *bonâ fide* industrial dwellings.

Coldbath Fields.—The Home Secretary, on Monday, in answer to Mr. Pickersgill, said that the Treasury had arranged that the Post Office should have at least five acres of the Coldbath Fields prison site. No part of the site had been sold to the London School Board. The Clerkenwell site was not yet sold to the School Board; but negotiations were in progress. About four acres of the Coldbath Fields site were undisposed of; but some portion of that might be wanted by the London School Board. Endeavours had been made, by negotiations with the Metropolitan Board of Works and with private individuals, to utilise part of the site for the erection of artisans' dwellings at a low rent, but without effect. The appropriation of part of the Clerkenwell site by the School Board would avoid the removal of houses and the eviction of occupiers which might be necessary if the Board purchased another site. The Clerkenwell Vestry were of opinion that additional artisans' dwellings were unnecessary.

The new free library at Folkestone is on the point of completion, so far as the external fabric is concerned. Mr. Brightwen Binyon, F.S.A., of Ipswich, is the architect, and Mr. Webster the contractor. The cost of the building will be between £4,000 and £5,000.

Extensive alterations and additions are about to be made to the workhouse at Cheltenham, from plans by Mr. Darby, of that town.

An extension of the London Southern Tramways Company from the "Swan," Stockwell, to Vauxhall Bridge, viâ South Lambeth-road, has been opened for traffic this week.

WATER SUPPLY AND SANITARY MATTERS.

Bury St. Edmunds.—The new sewerage outfall works, constructed by the corporation of Bury St. Edmunds at West Stow, were formally opened by the mayor on Thursday, the 11th inst. The sewer is egg-shaped, and is 30in. in diameter. It is built of 4½in. brick, laid in cement, and surrounded by concrete. The total length is a little over three miles one furlong. It has a uniform gradient of 1 in 642, or rather more than 8ft. per mile. At the end of the brick culvert there is a steel pipe rather more than a mile and a half in length, which carries the sewage under the river and through the marshy land on to the pumping station. At ordinary times the sewage will flow on to the sandy soil, which forms the irrigation farm, without any pumping whatever. About 22 acres of land have been laid out on two levels, and only when the sewage has to be deposited on the upper level the pumps need be used. Near the pumping station is a large overflow tank, with concrete walls. In the engine-house are two engines, driving two centrifugal pumps, each of which will deliver between 500 and 600 gallons per minute. The engineer employed was Major Fosberry, of Warwick; the contractor was Mr. Mackay, of Westminster. The cost of the works is about £25,000.

Dundee Water Supply.—Some time ago Mr. Hawksley, C.E, London, on the invitation of the Dundee Water Commissioners, made an inspection of the Dundee waterworks from Lintrathen to Clatto, for the purpose of enabling him to report respecting the improvements proposed by Mr. Watson, the engineer. He now reports that on the principal question, whether the duplicated portion of the main pipe should extend only from Pitnappie to the tank at Shanzie, or should be continued to the Loch of Lintrathen, he has no hesitation in expressing a decided opinion that the latter course ought to be adopted. The consumption of water in Dundee was so rapidly increasing that the comparatively small difference of expense—estimated by Mr. Watson at £18,000, or, at most, £20,000—ought not to stand in the way of the greater volume and greater safety of the supply, which the duplication of the main conduit between the loch and Pitnappie would effect. He had, therefore, no hesitation in recommending that this work be forthwith undertaken.

Water-closet Construction.—The town commissioners of Bournemouth have adopted a report by their surveyor, Mr. G. R. Andrews, recommending the provision of w.c. accommodation for both sexes, and of urinals and lavatories in various parts of the district. Eight groups of structures will be erected, three being reserved for ladies. The commissioners have since accepted the tender of Messrs. F. Hoare and Son, of Bournemouth, at £2,178 for the execution of the works, Mr. Andrews's estimate having been £2,368. Some of the details of construction of the four underground structures, based upon Mr. Andrews's observations in London and other towns, are worth notice, and the plan is especially suitable for watering-places. Each of these buildings will be entered by a flight of steps, closed at night by gates, and situate entirely beneath the street level. The structure will be lighted by prism pavement lights let into cast-iron frames, and ventilated by perforated iron panels and gratings laid at the road level. Ventilation will be also obtained to the water-closets by open fanlights over each of the doors to the same. The whole of the metal-work of the urinals will be of brass. The drains throughout are to be kept clear by means of hinged inspection-boxes, manholes, and covers, and have ventilating pipes carried up the gas-standard in the entrance. The floors throughout of the closets and the passage-ways are to be of Portland cement paving. The whole of the internal walls will be faced with white glazed bricks, with coloured borders and dado. The woodwork throughout, excepting the seats of the water-closets (which will be of polished hard wood) is to be of pitch-pine varnished.

Water Supply for Liverpool.—During the three months ending the 30th June last the amount expended on the Vyrnwy Waterworks was £53,497 9s. Appended is a return of the expenditure since the operations commenced:—Llanwyddyn embankment works and works connected with the reservoir, £444,835 7s. 4d.; Llanwyddn quarry, £163,304 8s. 8d.; aqueduct, £710,646 17s.; and land and easements, £265 330 12s. 9d. The total amount expended so far is £1,584,167 5s. 9d.

A memorial window representing St. Lawrence giving alms to the poor was unveiled last week at the parish church of Winslow, Bucks. The architects are Messrs. Burlison and Grylls, of London.

The death is announced of Mr. John Edward Lee, F.S.A., of Newport, Mon., the author of several works on archæological subjects. Mr. Lee was 74 years of age.

STAINED GLASS.

Cheltenham. — At St. Gregory's Roman Catholic Church a new stained-glass east window has been erected in place of an older window which was found not to harmonise with those recently placed in the transept. The principal subject of the new window is "The Assumption and Coronation of our Blessed Lady." In the lower portion of the side lights are represented, in circular medallions, "The Blessed Virgin's Life on Earth" and "Man's Redemption through the Incarnation of her Son." Between the subjects in the lower part of the centre light is seen the tomb in which the Virgin was laid after her death. This is represented as unoccupied, and lilies spring from it; while above, an escort of angels, some with censers and some with musical instruments, accompanies the Virgin into the presence of the Holy Trinity. In the dexter central light is the figure of God the Son, on the right hand of the Eternal Father, seated on a golden throne. Between these figures is our Lady about to receive the crown of glory seen above her head. About the throne attend saints of the Old Law. On the dexter side are Adam, Eve, Rachel, Miriam, Ruth, and David; while on the sinister side are St. John the Baptist, Isaias, Judith, Esther, Solomon, and Bethsabee. The background of the throne is filled with a cloud of Seraphim. In the sexfoil tracery above the centre light the Third Person of the Trinity is seen hovering as a dove. The work has been executed by Messrs. John Hardman and Co., of Birmingham.

CHIPS.

The death has just taken place at Melksham of the Rev. Edward Lowry Barnwell. He was the life and soul of the Cambrian Archæological Society, and it was mainly owing to his influence that the pre-Norman Church at Bradford-on-Avon was preserved. He was the author of several monographs on the megalithic remains of Great Britain. The deceased was the third son of Mr. F. Barnwell, formerly keeper of the coins in the British Museum, and graduated at Balliol College, Oxford, in 1834.

A life-size portrait of the Rev. Canon Pitman, who has since 1828 been Vicar of St. Mary's, Old Eastbourne, and who is now 85 years of age, was publicly presented to the corporation of Eastbourne on Monday, and will be hung in the new town hall.

A Baptist school-chapel is about to be built at Honor Oak, S.E., at a cost of about £1,100. Mr. George Baines, of Great Winchester-street, E.C., is the architect, and Messrs. F. and H. F. Higgs, of Loughborough Junction, are the contractors.

A new Wesleyan chapel is being built at Walbottle, near Newcastle-on-Tyne, from plans by Mr. B. H. Frampton, of that city. It will be Gothic in style, faced with local stone, and fitted in pitch pine, seats being provided for 220 persons.

In spite of the elaborate works carried out last winter in improving the drainage beneath the Houses of Parliament, complaint is still made that the atmosphere of the Palace of Westminster is vitiated by disagreeable smells, and the explanation offered by Mr. Bailey-Denton, who maintains that the noxious odours are due to the escape of "ground air" from the subsoil of the palace, is probably the correct one.

The Norwich school board have elected Mr. John Brown as clerk of works at the Bull Close road schools, about to be built at a cost of £11,000.

A Victoria Cottage Hospital is now in course of erection at Kingston, Herefordshire, Mr. Henry Winslade, being the contractor. Mr. Kaynes Purchase, of the same town, is the honorary architect.

A stained-glass window, designed and supplied by Mr. Rambart, Kentish Town, N.W., has been erected in the Congregational Church, Kirkcaldy. It occupies the three lights above and behind the pulpit.

The East London Water Company have advised the local board of health for Waltham Abbey that it is intended to ask the Local Government Board to put a stop to the continual flow of sewage into the Lea at Waltham Abbey.

Mr. Greville Chester, when visiting Asia a short time since, met with a quadrangular hæmatite seal which had been found near Tarsus. The seal approaches the cubical form, and is engraved on five sides. It is regarded as Hittite in character, and resembles in several features a circular seal from Yuzgat, acquired for the British Museum last year. On the base or principal face of the seal there are, within a border of interlaced pattern, two figures, of which one, seated, has in his hand some flower with a long root; while another, standing, presents a trident-like object. Two other trident-like objects occur in other faces, and also a number of equilateral triangles, a symbolical design also employed on the seal from Yuzgat.

Our Office Table.

Mr. E. de Lisle, M.P., little discouraged by the unfavourable reply he received in the House of Commons the other night from the First Commissioner of Works, appeals to the public for sympathy and support in his proposal to complete the mosaic decorations in the Central Hall of Westminster Palace. The existing mosaic of St. George, by Mr. E. J. Poynter, R.A., may not, he admits, be faultless, but Mr. de Lisle contends that the general effect is at least bright and splendid; and since it only cost £650, he hopes that the next estimates will provide that a sum not exceeding £3,000 may be devoted to the representation of the patron saints of Scotland, Ireland, and Wales, together with their appropriate heraldic emblazonings and badges. As to the alternative proposition to fill the four compartments with fresco paintings, Mr. de Lisle points out that frescoes would neither withstand the damp and chemical effluvia, nor would they be effective in a hall blazing with gold and colour, and lighted by stained glass windows.

Mr. Cavendish Bentinck's well-known irruptions into debate in his capacity of amateur art critic are always amusing, and more particularly so on Tuesday night. The vote was for the Science and Art Department, and in this connection Mr. Cavendish Bentinck waxed eloquent. The right hon. gentleman was contending that the knowledge of architecture among the working classes is of the haziest kind, because they have not examples and models before them. By way of exemplification, he remarked that many members of the committee would know that weighing machines had been set up at many of the metropolitan railway stations. "Well," he proceeded, "the tops of these machines are supported by two pillars. One of them is supposed to be Ionic, and the other Doric. But as a matter of fact, they are nothing of the kind; they are simply German." We shall have to offer a prize, when the Designing Club is resumed, for an architectural weighing machine in the German style.

The Manchester meeting of the British Association will be opened on Wednesday evening next, and will conclnde on the following Wednesday, September 7th. The President-elect, Sir Henry E. Roscoe, M.P.,F.R.S., will deliver an address, which is expected to take the form of a review of the progress of chemistry during the past fifty years. The sections under which the meetings will be held are: A, Mathematical and Physical Science, Sir R. S. Ball, president; B, Chemical Science, president, Dr. E. Schunck; C, Geology, president, Dr. Henry Woodward, whose address on the arrangement of museums is expected to give rise to some discussion; D, Biology, president, Prof. Alfred Newton; E, Geography, president, Sir Charles Warren; F, Economic Science and Statistics, president, Mr. Robert Giffen, L.L.D.; G, Mechanical Science, president, Professor Osborne Reynolds, who will probably deal in his address with the achievements in mechanical science accomplished since the Association last met in Manchester, 26 years ago; and H, president, Professor A. H. Sayce. Excursions to places of interest in the neighbourhood of Manchester will be made on the afternoon of Saturday, Sept. 3rd, and on Thursday, Sept. 8th.

Mr. Edward Armitage's picture representing "The Institution of the Franciscan Order" in 1209, which was one of the chief features of the recent Royal Academy exhibition, was unveiled on Sunday in the Roman Catholic church of St. John, Duncan-terrace, Islington. The new work, which was illustrated in our issue of the 17th June last, replaces a fresco of the same subject painted by Mr. Armitage in 1859, which has so far decayed that restoration was impossible. The general plan of the original fresco has been retained, but heads, hands, and draperies have been re-studied from nature, and the artist has aimed at giving greater individuality and precision to the new work. In the new work noteworthy points are the grey dress selected for the Franciscan monks, the brown garments not having been adopted for some time after the establishment of the order, the domical form of the Papal tiara, encircled by a single crown at the base, and the low mitres of the attendant bishops. Mr. Armitage has previously been a munificent donor to St. Duncan's Church, having presented it with his picture of "The Meeting of St. Francis with St. Dominic," and also restored the side chapel at his own cost.

We published on July 1, page 37, particulars of the prizes offered by the Council of the Society of Arts to art workmen, and may remind those who propose to compete that all articles must be sent into the society's house at John-street, Adelphi, W.C., by to-morrow (Saturday). The prizes are offered in the following eight classes:—1. Painted glass, £25, £15, £10. 2. Glass blowing in the Venetian style, £10, £5, £3. 3. Enamelled jewellers' work, £25, £15, £10. 4. Inlays in wood, with ivory, metal, or other material, with or without engraving, £25, £15, £10. 5. Lacquer, applied to the decoration of furniture or small objects, £25, £15, £10. 6. Decorative painting on wood, copper, or other material, applied to furniture and internal decoration, £25, £15, £10. 7. Hand-tooled bookbinding, £25, £15, £10. 8. Repoussé and chased work in any metal, £25, £15, £10. The prizes will be awarded to workmen only, and the works will remain the property of the competitor. Prices may be attached to articles sent in, and sales effected no charge be made in respect of any such sales. Each work sent in competition must be marked with the workman's name or that of the manufacture, or, if preferred, with a cypher accompanied by a sealed envelope giving name and address.

By a happy thought, the lines of Liverpool Castle were marked out in limewash on the pavement of St. George's-crescent and Derby-square, in that city, for members of the British Archæological Association, who inspected them on Friday morning. A notice in the Exchange Newsroom attracted many of the merchants and brokers on 'Change, who went during the day to see the site. The keep was drawn out on the north side of St. George's-crescent; the gateway barbican, with two towers, projected into Castle-street; the north-west tower came close up to the National and Provincial Bank; and the south-east tower was on the south side of St. George's-crescent. Other towers were covered by the site of St. George's Church. The castle was not removed till the early part of last century, so that plans dating back to 1660 enabled the site to be ascertained with absolute precision. The plan for these lines was made by Mr. E. W. Cox from old records and plans, and was marked on the ground by Mr. Samuel Phillips.

CHIPS.

A new organ, built at a cost of over £400 by Mr. Alfred Kirkland, of Holloway, N., was opened on Tuesday at the New-street Baptist chapel, Burton-on-Trent.

Mr. Enoch Clutterbuck, the contractor for the Quay improvement at Gloucester, having stopped the works, it was agreed by the city council on Tuesday, at the request of his sureties, that the contract should be completed by Mr. W. M. Colchester Wemyss, at the same price as Mr. Clutterbuck's, and with the same guarantees, but with an extension of time.

During the past week there has been erected at Weston-super-Mare a large beacon for the purpose of marking the line of the Atlantic cable, and to act as a warning to small vessels which anchor in the bay. The beacon consists of a wrought-iron tube 3ft. in diameter, and is fixed on the foreshore near low-water mark. The bottom part of the same is sunk about 35ft. below the surface of the mud; the upper part of the tube is diminishing, and on the top is fixed a large wooden mast 30ft. in length, and which carries an iron cage 5ft. 6in. in diameter upon its summit. The total height above the mud level is 51ft., and about 18ft. above ordinary high water. The whole has been carried out by Mr. A. Krauss, contractor, Bristol.

A town hall is proposed to be erected at Lewisham; estimated cost, £8,000. Mr. Albert L. Guy, 78, High-street, Lewisham, is appointed architect. The building is to contain shops, offices, large hall to seat 1,000, two small halls, &c.

The City Corporation have received a report from a committee recommending that the sum of £47,500 should, with the consent of the Charity Commissioners, be applied to the purchase of Clissold Park as an open space.

At the triennial visitation in his cathedral church on Monday, the Bishop of Bangor said the work of church building and restoration had been going on as steadily in the diocese as in the past. Since the last visitation new churches had been built at Dolwyddelan, Criccieth, and Llanberis; four churches had been well restored, and a tower and spire had been added to Christ Church, Carnarvon, the approximate cost of all these works being £16,500. Besides these, there was a new church in course of erection at Pwllheli, and another at Bangor.

By command of the Queen, the Society of British Artists will henceforth be styled "Royal."

Mr. Brougham Glaisher, of Spring-gardens, W.C., writes that the only damage occasioned by the recent fire at Knole House was the destruction of the roof and internal floors of the stone-built tithe-barn, an ancient structure measuring 150ft. by 50ft. and 50ft. high to eaves, and some injury to the carriage stables. As soon as the barn is reinstated, the building will have much the same appearance as before.

The autumn exhibition at the Manchester City Art Gallery will be opened to the public on Tuesday next. The Exhibition Committee have been assisted this year by Mr. Marcus Stone, R.A. The works number some 700 examples in oil and water colour, and are confined strictly to the seven regular exhibition galleries in the building. It is understood that the work shown is good, all the Academicians and Associates of the Royal Academy and other distinguished artists having sent examples.

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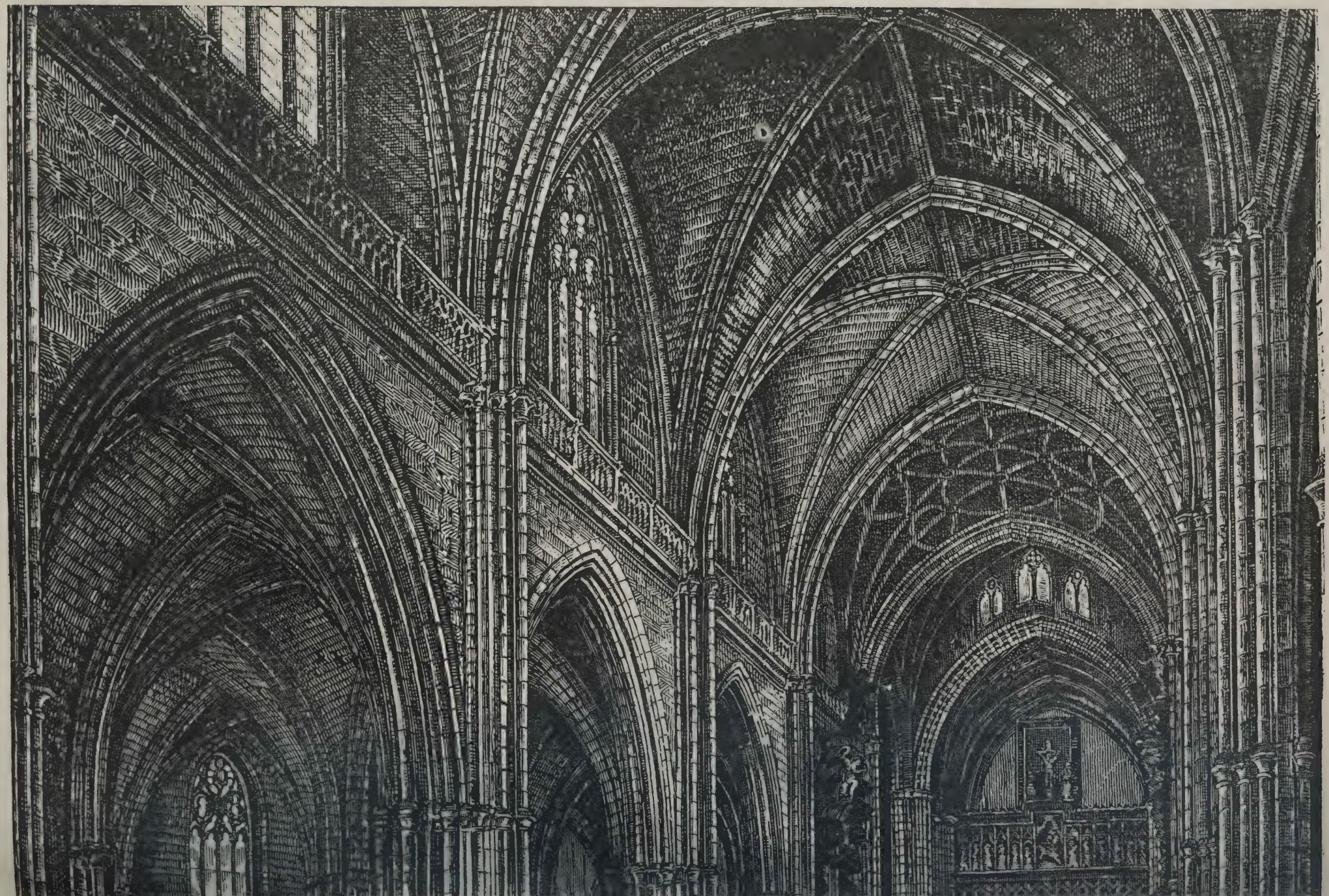
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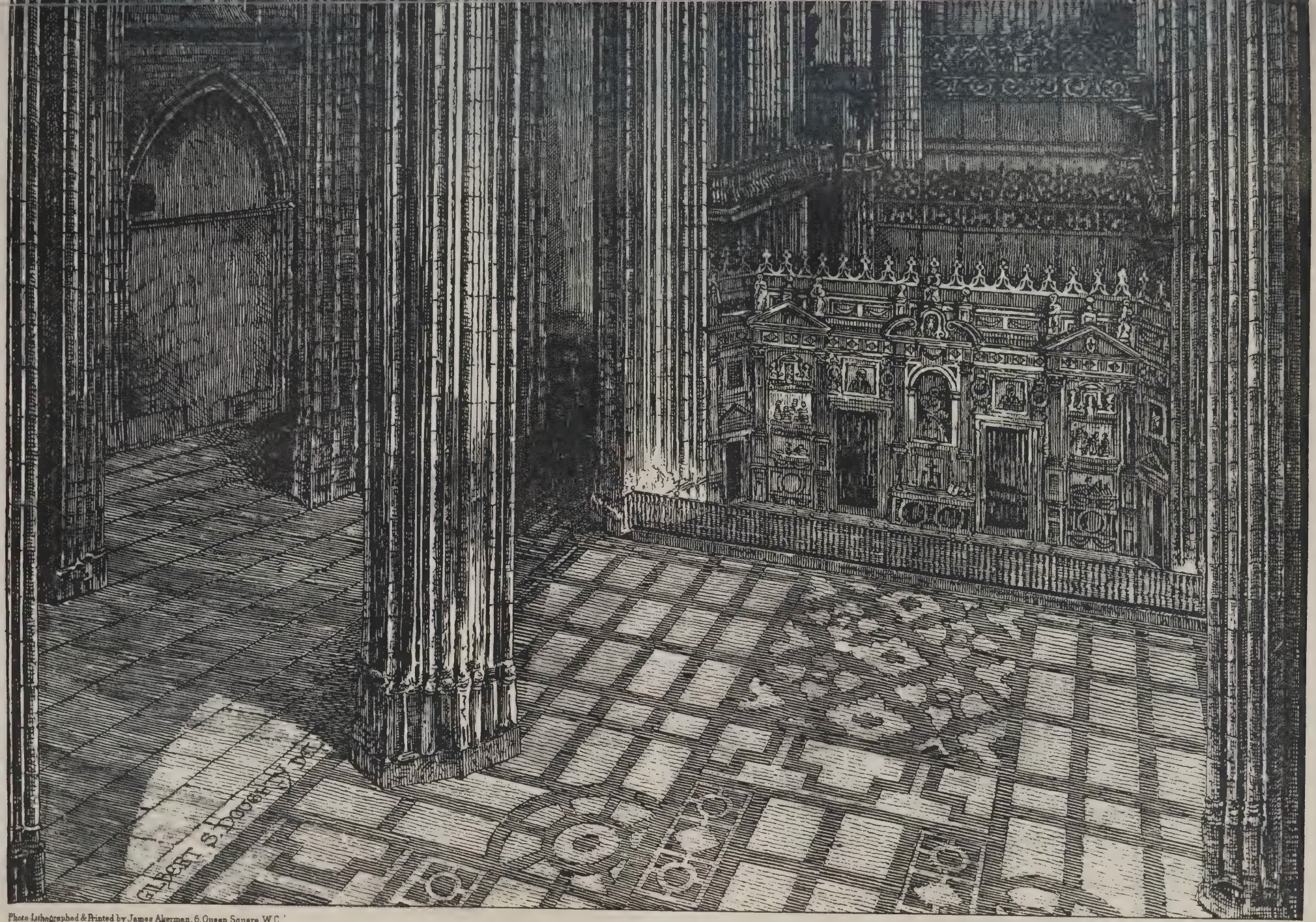


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FRIDAY, SEPTEMBER 2, 1887.

INTERNAL WALL SURFACES.

SOME years ago all architects were taught by many of the realistic preachers gainst shams that it was positively ini-uitous to plaster the walls of their churches id other public buildings. Mr. Ruskin was ne of the foremost among those who pro-sted against the imitation of natural sub-ances. In his "Stones of Venice, he says: There is not a meaner occupation for the man mind than the imitation of the stains id striæ of marble and wood." Many archi-cts, including the late Mr. Street, practised e same doctrine, and we know at least of vo or three churches where the plaster was ripped off the old walls and the rough stone ce was left. Puritan whitewash was no oubt an abomination, but it was only a vering up of dirt—it was cheap, and at any te cleanly. There were some architects, id amongst them the late Sir Gilbert Scott, no took a more reasonable view of the sub-ct. That eminent restorer boldly contended at an internal wall surface should not be ft rough, and pointed to the ancient build-gs of the greatest periods of art where the lls were carefully faced internally with rough stone or plaster and decorated. This mmon-sense opinion has at length over-me the feeble arguments of the ultra-alistic Goth. Mediæval buildings of un-phisticated purity, never tampered with by ritans and churchwardens of the 17th ntury, are to be seen, in which plaster is ill visible. We may point to the ruins of nventual buildings never touched by oderns where traces of plaster and stucco ay be seen on the walls as a covering to the ugher stonework. In many of the Cister-an abbeys, where rubble stone was used the clerestories and vaults, the plaster ay still be found hard and firm; on some them are found the remains of painting. et the absurd practice of which we speak as destined to find admirers and to become opted. In a paper read by the late Sir lbert Scott at Northampton in 1874 he uded to this custom in the following rms:—" . . . We now see churches ose interiors are faced with rough brick-rk, relieved, perhaps, with lines of red and ck, and others in which the modest rubble pointed with the blackest mortar, in-niously combining the harshness of barbar-n with the disingenuousness of civilisation. is a duty to protest against making our urches the field for the exhibition of such aries. Let those who, satiated with feeble inement, can find no relief but in still aker affectation of barbarism, confine their k to their own drawing-rooms; but let our urches be spared. Numbers of fine old urches have been stripped internally and luced to a nakedness compared with which ritan whitewash is decency." Another mpion against this affectation of truth is be found in Lord Grimthorpe, who, while notices Sir Gilbert Scott's strictures, nementy protests against the absurd rage. s attack is vigorous, and is well worth ding at this time, when all that can be id against it has come true. He says of s anti-sham sect that "they rage against nting deal to look like oak, and go about aning church interiors of their genuine ient Gothic plaster and exposing rough lls, such as you would not leave in the llery of a cottage, though at other times y will go and daub all this same plaster r with their own vulgar painting, making double sham, if plaster is one. And lately, by way of a specimen of consistency, we have had some of this school, headed by a Gothic architect of the straitest sect, wanting to cut off the stonework of St. Paul's in order to veneer it with marble," and the same vigorous writer goes on to accuse Mr. Ruskin of preaching against shams and still finding praise for the Italian builders who have veneered their churches with thin marble slabs.

The fact is, as we have said in another place, it is not dishonest to cover one material with another so long as we do not misrepresent facts. Now, making deal to look like oak or any other wood, or painting plaster to imitate stonework, is certainly an inexcusable sham, inasmuch as it purposely misrepresents the material. Plaster does not, it cannot be, mistaken for any other material if treated simply as plaster, or made the ground of painting upon; therefore plastering is allowable. We quoted Ruskin just now in reference to the meanness of imitating marble and wood, and he is perfectly right in denouncing all kinds of marbling and graining, for it is opposed to the principle we have enounced. But the anti-sham craze has at length given place to rational views of this matter. We see no more churches with rough rubble walls or rough brickwork. When brickwork is used internally, it is neatly executed; the bricks selected are of a uniform colour, or are disposed in diapers and bands. In several new churches the architects have introduced terracotta in the brick walling, and its use as a lining for walls of brick or stone is worth attention. The other day we saw a church designed by Messrs. George and Peto, where square terracotta slabs with ornaments stamped on them were arranged as a diaper round the walls of the chancel. The effect was admirable. For more decorative treatments, the "faience applique" of Burmantofts, manufactured by Wilcock and Co., can be employed, and this kind of lining or veneering, if it can be so called, is certainly more rational than a veneer of marble, which may misrepresent a solid wall of that material. So with all terracottas and glazed Doulton ware, which allow of ready fixing to the wall, and are impervious to dampness as well. Architects have no ground of excuse for employing shams when they have materials of this kind they can use, partially or wholly, for their wall linings when something more decorative than plain plaster is required. We are quite sure the rage for rough brick and rubble as a finishing is past, and if we cannot get wall materials better than these, there is no other plan so good as to plaster and relieve by simple patterns such as were used by the old architects, and have been discovered under the layers of whitewash at Salisbury, Worcester, and other cathedrals and churches.

PREPARING PLANS.

PREPARING plans! Every architect knows what this means, but how few are those for whom plans are prepared who understand the labour, the thought, and the cost involved in the work of preparation. There are many who think architects' designs are kept in stock and pigeon-holed; that it is easy for an architect when he once knows the extent of his client's pocket to go to a drawer and take out a set of plans that will exactly suit, much in the same way as a retail shoemaker, after measuring the foot, can bring half a dozen pairs to try on. Surely, they argue, the plan of one house will do for another, with slight alteration. If the elevations are not right for the roads, the plan can be turned round. To them the matter is easy and simple enough. Aspect and prospect are immaterial to such people, especially in towns, where those conditions cannot be chosen at pleasure. Besides which, modern art is supposed to overcome the necessity of a good aspect, as any temperature can be obtained all the year round by improved stoves and apparatus. These opinions prevail, and are increasing, and they have increased more since building houses has been taken over by the speculator who builds wholesale in the hopes of suiting all comers. But the architect has fostered the notion as well by building houses alike, by catering to ignorant and stupid clients, and by careless designing and copying. The art or science of planning buildings differs from the art of the shoemaker or garment maker in the fact that it is more than a mere mechanical art of fitting. It is one of creating pleasure and enjoyment as well. Yet a garment may delight and please as well as fit, the material and the style may be admirable for the wearer, and these constitute its claim to the rank of an art; but designing a building ought to be something more than this. A house cannot be so readily thrown aside as a dress; there it stands to give pleasure or pain to one generation after another. There is one thing that distinguishes the work of the architect from that of the tailor or *modiste*—viz., adaptation to circumstances. A garment has to fit the figure and the climate only, but a house has to suit not only the occupant and climate, but the surroundings, the prospect, the soil. If it does not do so it is a failure, and its rank is no higher than that of a garment. More than half the houses built in our towns are of this inferior class. They are "manufactured" to suit a by no means critical public, who are constantly shifting from one part of town to another. We cannot be surprised that the architect's labour is valued at a low rate, and that the practice of preparing plans for houses has very much fallen off. They are now to be selected from dozens already in the market. The practice of speculating builders and ready-made architecture has affected mainly the provision of dwellings and residences of a certain limited cost, and it has to that extent injured the prospects of the architect. His main chance will therefore be in using his best efforts to re-establish the old and only satisfactory system by showing the inferiority of such building.

The custom of preparing plans for structures, like other duties, has very much fallen into a groove amongst some architects. If it is not exactly the pigeon-hole routine, it is one very like it. The client wishes to see a number of plans of buildings, if he does not refer to an example he likes imitated. The architect complies. If he manages to "hit" his client's wishes, well and good; if he does not, he tries again, and after a series of compromises, in which the building owner gets the best share, a plan is agreed upon. A too ready compliance with the notions of the client is one of the pitfalls of the inexperienced architect. The client is a man of the world, has travelled and seen a good deal, possibly more than his professional adviser; and herein lies the difficulty. Though a man may be brimful of ideas and "fads," he may not have the slightest knack of arranging and putting them into form, the result of which is there is either a yielding or a struggle. The young architect is inclined to give in, and the building owner gets it all his own way. In nine cases out of ten the client is the first to grumble if anything is wrong. The architect gets the credit or discredit, and is further accused for not insisting upon what he considered to be the proper arrangement. His complacence has cost him much trouble and uneasiness; the very things to which he gave in have become sources of annoyance.

In the preparation of plans, say, for a gentleman's residence, the client's requirements ought first of all to be consulted; an idea of the size of rooms is important, bearing

always in mind that people unacquainted with dimensions make often egregious mistakes as to the size of rooms. The matter of arrangement should be left absolutely to the architect, and it is necessary that he should be firm in deciding which is the most desirable disposition. Once he allows interference on this point he will be landed into all sorts of difficulties; the client will assert his right to do this or that with the consequences we have foreshadowed. This should be undoubtedly the architect's prerogative, though, strange to say, it is the plan in which a client often tries to have a finger, and, as a purely technical representation, only a practised architect can really see the effect of this or that alteration. We have known a plan submitted to the whole family and relatives for suggestions, and returned with such sundry instructions that it has required the patience of a Job to incorporate all the ideas. It may in some things be true that in a multitude of counsellors there is wisdom; valuable suggestions are sometimes made in the matters of detail; but the final judgment ought to be left exclusively to the architect. In architecture at least "many cooks spoil the broth." In plans of other buildings interference is less common, the reason being that the architect is trusted whenever the employer feels his own ignorance. Great Government buildings in which intermeddling has been common are not successes. Then, again, in competitions for public edifices, like municipal offices, it is questionable whether the highest results have been obtained by requiring the competitors to design their work on a set plan. In short, if an architect is to be no more than a simple draughtsman of other people's ideas, he had better put himself up in that capacity, and not lay claim to the title. We do not hamper the sculptor or the painter with ideas; he is master of his own arrangements and conceptions; could we expect a work of sculpture or painting from one who was restricted as to form and treatment? Certainly not. Yet the architect is supposed to yield here and there; he is restricted in the requirements and cost. Many architects have little time for thinking over plans, which makes matters worse, and they introduce improvements and modifications as the work proceeds—a course that is never wholly satisfactory.

The preparation of plans for a new building involves more than even some architects imagine. A set of geometrical drawings is not the end but the mechanical means employed to render intelligible to workmen the architect's meaning, though they are thought by many to be the whole work, and that as soon as they are prepared the architect's labours are over. They are part of the instructions merely. The notion of the architect that he is the mere preparer of drawings is a modern one. If an architect's work was ended when his drawings were finished, and he had simply to draw them, the mere draughtsman could fairly call himself an architect. We all remember what the *Quarterly Review* some years ago had to say about architects, and how it offended many of the profession. The writer's theory was that a building designed by working men on the co-operative plan was perfect, though the example he gave shocked everyone possessed of taste; but the unfortunate illustration chosen did not make the idea wrong. We suspect all our great cathedrals were planned on the co-operative system, whatever may be said to the contrary. We gather from many sources what kind of architects were employed. Gervase, in his account of Canterbury Cathedral, tells us something about William of Sens, who rebuilt the choir, and who met with an unfortunate accident by the fall of the scaffolding in 1179. Being much injured, he was able only to direct the work from his bed by calling in a young monk whom he selected to carry on the works. This monk was the successor known as "William the Englishman," whose work is so well known. There is nothing to show that either of them were mere draughtsmen, but they clearly were constantly at the works. Drawings of some sort were prepared, though probably they were rough ones, such as are employed by foremen in the setting out of works; details were left to the master workman. After all there is a great deal in this view. The architect's work by no means begins with the drawings and ends with them, as many think. His labours ought to commence long before he puts a line on paper. Does he go and see the site for himself? We are inclined to think very few take this trouble; and yet how can sections be prepared and quantities taken out without knowing the soil and subsoil? These things are guessed at; a certain depth is taken, any increased depth being allowed as an extra. The natural levels and drainage are of the first importance before a plan can be devised. Hundreds of buildings and houses are either half buried, or do not take advantage of the natural fall of ground. Quite as great an omission is the adjustment of a building as regards aspect. Architects cannot now, as they did years ago, choose their own sites; but they can exercise their judgment. The monastic ideal was a low, sheltered valley, and the same notion has prevailed more or less since. The Elizabethan builders, who had an eye for picturesqueness, loved such spots; but modern sanitarians and physicians tell us to avoid all these low, sheltered sites, however charming, for, where morbific influences are, there lurks rheumatism, and fever miasms hang about the still air of these charming valleys. On the contrary, the high and dry site enjoys immunity from disease. Frequently the air on the mountain top, even in severe frost, is warmer and more genial than it is in the valley, for the cold air has a tendency to flow down the mountain sides. Gardeners find that the plants at the low levels and in valleys suffer more from frost than those on higher parts; but the elevated situation has the further advantage of being drier, of commanding finer views, and a more rarified atmosphere. In the preparation of plans, the first thing is to decide, if it is a house, the best aspect for the principal rooms. The south or south-east is, of course, preferable, though this may not always be obtainable without sacrifice of prospect. Here the architect's administrative skill is called into exercise. A few points to the east or west may make all the difference; but we often see houses built with the living-rooms due west, so that they get not only the hottest sun, but more of it, as the sun is lower in this quarter than when it is in the south, and, therefore, enters the room more when people can least bear it. And, after all, perhaps it was wiser to study aspect before prospect. Window openings are left to chance, though their width and height ought properly to have some reference to the extent of the entrance of the solar rays when they enter and leave, also to the position of bedstead and fireplaces.

In the planning and design of town buildings, the question of casements is one that ought to be ever present. Reference to adjoining properties which have dominant rights of light must determine heights of stories and the position of windows. But how few plans take the matter into account; the consequence of which is that the client is stopped by mandatory injunction, and damages or legal expenses are incurred. All might have been saved if the architect had at the commencement of his work found out the rights and obligations of the owner. Affecting also the preliminary work of the architect are points respecting boundaries, party walls, easements of support, involving careful inquiry and labour. So much for external conditions. There are various points concerned in the interior economy which ought to be considered at the outset. In designs for public buildings, a basement is always useful for heating apparatus, storage, or electric lighting. In plans of basements, we often find very little to indicate study of the requirements of this part; the walls of portions are simply carried down without any arrangement for flues or inlets for fresh air. In schools and public assembly halls the whole scheme depends on the proper proportion and arrangement for seating so many people or children. The entire plan ought, in fact, to be developed from the assembly hall or schoolroom, for which purpose the proper unit or floor area for every person and the distribution of the seats are of the first importance. A hall for speaking or concerts is much too often the replica of another or a modified copy of a similar room having no special reference to the position, aspect, currents of air, or surroundings. It is too late afterwards to find that no one can hear, that there is an echo, that the orchestra is at the wrong end of the room or ill-shaped, or that an error has been repeated. So with seating, the plan may fail owing to a trifling fault that could have been discovered by a few benches placed in position. Plan preparation, in short, ought to be considered in the light of an independent study—a study of particular circumstances under special conditions of locality, material, and use. Instead of which the design is looked upon both by architect and client as too much of a commodity, by the former as the choice of a precedent, and by the latter the acceptance of it, the result being satisfactory or not, according to the experience of the architect.

STONE STRUCTURES: THEIR DECAY AND PROTECTION.

THE apparently rapid decay of the stone of many of the older churches and public buildings in London is forcing itself upon the attention of the authorities. Unhappily, it is not always possible to pronounce a stone building safe or not, until the stonework is removed and various works undertaken; or we should not have to witness what looks like the mutilation of a church in the Strand regarded by all architects and admirers of Renaissance architecture to be one of much beauty and interest. Mr. T. G. Jackson, F.S.A., in a recent letter, to which we referred in our last issue, has raised a timely appeal on behalf of St. Mary-le-Strand and other churches of the Revival. Mr. Jackson points out truly enough that the church has particular claims; for the "actual beauty of its architecture and the unrivalled advantages of its position it has scarcely an equal in Europe." Englishmen are apt to run into ecstasies over buildings of hardly greater pretensions in European cities if they occupy positions of prominence; and it is chiefly for the eminently picturesque situation of the Strand church that admiration must be accorded to it. It forms one of the most pleasing of the series of etchings by Mr. Ernest George, and has been repeatedly made the object of the architectural landscape painter. Though the increase of traffic in the Strand has led many to view the edifice as an obstruction, in reality it is not so. If, as the accomplished and versatile Surveyor of Pictures to her Majesty, and other writers have suggested, the premises on the north side were set back a little, the church would fairly divide the two streams of traffic going eastward and westward; indeed, so long as the block behind it is allowed to stand, the church is a valuable mask to the unsightly premises in its rear, and the Strand would be a loser by the removal of the church. The unique steeple of three stories, as we lately pointed out, is an ornament that is seen a long way off both eastwards and westwards

n the Strand. In addition to its external fea-ures, the church possesses a finely modelled oof of characteristic interest, some good arving on the pulpit, and a very richly ecorated apse, all of which are of interest o architects who admire the English Renais-ance. The evidence of Mr. Butterfield and f Mr. Henry Poole, mason to Westminster bbey, whose letters on the question we eferred to last week, is satisfactory as eassuring the public of the stability of the abric. The only portions of the building ikely to become dangerous are the cornices nd the vases, and when these are properly ecured, as they doubtless will be, the struc-ure will be perfectly safe. Mr. Poole peaks from experience, having been requested o examine the parapets and vases in 1878 by Ir. Butterfield, and expresses his surprise at hat he considers the needless work being arried on at the church. We presume that he orders for taking down the vases would ot have been given had not their condition ustified their removal. To take them down ntirely would be to rob the church of im-ortant ornaments which add much to the utline and beauty of the façades; and we hould be sorry if such is the intention of he authorities. We believe, on the contrary, hat the architect to the vestry, Mr. Vicars, ill see fit to restore these accessories. Sir . C. Robinson and Mr. J. Knight Watson, hose letters we reprint elsewhere, support he retention of these features. One or two f the vases look as if they were broken in vo or three pieces, possibly through the orrosion of the iron bolts which hold the arts together.

We have alluded to these instances of ecay of stonework to point out the nger to which our stone edifices are posed. For there is the danger of cidental dislocation of stonework through ghtning discharges, such as we referred to st week, frosts, and other disturbances; d secondly, the danger arising from build-gs of historic interest being shorn of their tails and features. In these utilitarian nes, when everything is valued for its oney worth or its utility, there is a strong mptation to remove or to mutilate by lop-ng-off features that are considered in the y or are dangerous. The Metropolitan ard of Works cannot be expected to enter-n any sympathetic feelings for old build-gs, or any tender regard for architecture, ich less for archæological remains. Temple r was removed because it was in the y, and there was a reason, and similar sons will be found for the removal other buildings in the City if the rdians of our public edifices suffer them fall into a dangerous state of repair. cay of stone is the cause of all the mischief, ecially when the masonry is secured by n cramps or bolts. All our Portland stone ldings which have been erected a hundred rs or more show the marked ravages of e; the surface or original faces have in posed situations disappeared by a kind of sion which, while it does not affect in-ously the centre of the stone, has con-rably reduced or worn away the surface. is the stone vases taken down from St. y-le-Strand exhibit in a remarkable ner this kind of wearing down, though nd within. One of the vases is much inished in the upper part of the body, the ulated ornament carved upon its surface entirely disappeared on the exposed side, gh the surface feels hard. On other vases ornament is fresh and sharp, and can easily traced. This kind of erosion observable in all the old City ches of stone: the material is sound gh, and in some cases is hardened n outer skin; but generally an erosion on gradually on all the exposed faces, nouldings disappear or are nearly lost, he profile assumes a rounded shape just see in the worn pebbles of flint on the seashore, or what takes place in all cemeteries when white and veined marble monuments are closely inspected. The cementing or calcareous material is gradually washed away or dissolved by the smoky atmosphere and rain, leaving loose grains of shells or carbonate of lime, which is rough to the touch. In course of a few years this process is carried to such an extent as to break away the surface and arrises, and the surface, when scraped, is found to disclose the hard stone underneath. But decomposition varies in the stones of the same building. At St. Paul's Cathedral we may find the "pitting" or washing out of the mineral grains which compose the stone on the exposed sides, the cornices appear to have suffered much in this form; in other parts lamination is observed, or rather exfoliation of the surfaces; but generally it will be found the first process is the most general. The solvent action of the rain and acid in the atmosphere loosens the cementing material holding the grains together, and this pitting or erosion takes place leaving ridges or hard nodules of harder flinty substance. What have chemists done to arrest the process of disintegration? Very little. Chemistry has not helped the architect or mason to stay the action of acids which it can thoroughly explain, and while it has pointed out the causes of decay in stone with precision, it has signally failed to supply an antidote to the ravages of atmosphere and smoke, or to give the mason rules how to lay the stone. To fill up the pores with oleaginous substances has not been generally successful, and we have no positive evidence of the permanent resisting power of waterproofing by paraffin, sulphur, and oil. All that can be said is that these processes have done good for a time by arresting the action, and that they are harmless. If periodical examinations of our stone buildings were made, and the waterproofing solutions re-applied, there might be some chance of arresting dangerous decay. Architects have learned many things since these buildings were erected. One is the unreliability of iron. They now know that iron dowels and cramps are not to be depended on, and that if copper cannot be used slate dowels run with cement are to be preferred. The oxidation of iron when it is exposed to the moisture of the air is certain to become an agent of destruction, and we cannot insure protection to it long when the stone decays. The lead or cement with which it is run then becomes useless, and we should always recommend brimstone to be used in preference to lead for insertion into stone. The proper or natural bedding of stone is equally important as a condition of success.

BUILDING MATERIALS.—III.*

By W. Y. Dent, F.C.S., F.I.C.

Of all natural productions, there is not one of greater importance to the builder, or that is applicable to so many manufacturing purposes, as limestone, this being the general term by which all rocks may be designated which have carbonate of lime for their basis. These calcareous deposits belong to several geological formations, and differ materially from each other both as regards their chemical composition and their physical character, being sometimes in the form of a dense hard rock, as is the case in what is known as carboniferous or mountain limestone, many of the beds of which are of great thickness, consisting of nearly pure carbonate of lime. In the limestones of the Lias, on the contrary, the carbonate of lime is associated with silica and alumina in proportions varying from 10 to 20 per cent., of which we have examples in the limestone of Abershaw, in Glamorganshire, the Barrow limestone in Leicestershire, and the limestone of Warwickshire. These Lias deposits consist of comparatively thin layers of hard limestone separated by others of a more argillaceous character, or shales, containing various proportions of carbonate of lime. The Lias district extends from Lyme Regis, in Dorsetshire, to the north-east of Yorkshire, the limestone being worked chiefly in the counties of Dorset, Warwick, and Leicester, yielding, when calcined, the best description of hydraulic lime. In the chalk districts of Kent and Surrey, we have in the upper white chalk a soft description of comparatively pure carbonate of lime, and in the grey chalk which lies immediately below it, we have a carbonate of lime of a somewhat harder description, associated with a small proportion of argillaceous matter.

One of the most wonderful and curious formations of limestone is that which results from the agency of the coral polype, which possesses the power of abstracting carbonate of lime from the water of the ocean, and is thus enabled in warm climates to construct those enormous reefs which, in some cases, extend for hundreds of miles in the Pacific and Indian seas. The coral, as produced, is carbonate of lime, soft and porous at first, but it gradually becomes hard and compact, so much so that it is capable of being used as a building stone, as is the case in some of the South Sea Islands. In the course of its formation, all kinds of marine *débris* get mingled with it, which, when cemented together, produces a rock that bears a resemblance to some descriptions of the older limestones. The sediment resulting from the trituration of the coral when deposited in sheltered water channels produces a material similar in appearance to chalk, whilst the coral from reefs that have been upheaved by volcanic agency is found to be of a sparry or crystalline character. These coral reefs occur in every stage of development, from the coral that is daily growing to that of a compact solid mass resembling some of the softer marbles, and thus, owing to the changes that take place from the action of the waves, and to the elevation or depression of the ocean bed, a coral reef eventually becomes a more or less compact limestone, so that as the result of the labours of the coral polype, we have deposits which represent several varieties of limestone.

Carbonate of lime is found in a state of chemical purity in rhombohedral crystals, as Iceland spar, which (as is well known) possesses the property of refracting light in a peculiar and remarkable manner, and has hence received the name of double refracting spar. Carbonate of lime is also found in six-sided prisms, known to mineralogists as aragonite, so called from Aragon, where it occurs in large mackled crystals, in the gypsum deposits of that part of Spain. The form of crystal assumed by carbonate of lime depends upon the circumstances under which the crystallisation takes place, such as temperature (the tendency to the formation of aragonite being greatest when it crystallises from warm solutions), the degree of concentration of the solution, and the presence of foreign substances. Its purest form as a rock is that of white marble, the coloured marbles containing iron, manganese, and carbonaceous matter. The proportion which the carbonic acid bears to the lime is as 22 to 28, lime itself being an oxide of calcium. Calcium is a light malleable metal, somewhat harder than lead, tarnishing rapidly on exposure to the air by the absorption of oxygen; when heated to redness it burns with a brilliant, scintillating white light. It has not received any practical application in the arts, and is only capable of being produced in very small quantities for experimental purposes.

By exposure to a red heat, under ordinary circumstances, carbonate of lime is decomposed, the carbonic acid is driven off, and the lime remains in an uncombined or caustic state. The time required for completing this decomposition depends upon the character of the limestone, and the circumstances under which the "burning" (as it is termed) of the limestone is conducted.

If carbonate of lime be heated in a confined space, such as a close retort, where there is no possibility of the escape of carbonic acid, complete decomposition cannot take place, however high the temperature may be raised; the limestone becomes surrounded with an atmosphere of carbonic acid, and until this is removed its further decomposition is arrested. Chalk under such circumstances may assume a highly crystalline condition, and thus in nature we

* Being the Cantor Lecture delivered before the Society of Arts.

find dull granular limestones that have been altered in their character by the intrusion of an igneous rock; we have an example of such conversion in Rathlin Island, off the north coast of Ireland, where two basalt dykes ascend through the chalk, converting the latter into a fine granular marble. Experiments were made many years ago which proved that when the carbonic acid liberated was rapidly carried off by a current of steam or air, the rapidity with which the limestone was decomposed was increased, a fact which it may be well to remember in discussing the merits of different modes of calcining. The process of "lime burning" is carried out in several different ways, in comparing the advantages of which it is necessary that the various circumstances that bear upon the question, such as the character of the stone and the amount of lime that can be disposed of in a given time, should be considered.

Whether the operation be carried out in the simplest manner, or in the kilns constructed on the most scientific principles, much will still depend (both as regards the quality and quantity of the lime produced) upon the kilnsman, for it is only by constant observation from day to day that the eye becomes capable of judging whether the proper temperature has been reached, or that a correct opinion can be formed as to the effects produced by the various disturbing causes which exert an important influence upon the working of a kiln, such as its size, shape, the character of the limestone, the quality of the fuel, and the state of the atmosphere.

The kilns usually employed vary as regards size and shape in different districts, consisting generally of inverted cones or ellipsoids, into which layers of limestone and fuel are alternately thrown. When worked continuously as running kilns, the lime is periodically withdrawn from below, fresh quantities of stone and fuel being filled in at the top. It is obvious that the consumption of fuel must be much less when worked continuously than is the case when, after every charge, the kiln is allowed to cool down before the lime is removed. It is very difficult (even when every care is taken) to obtain from ordinary kilns, when worked continuously, a uniformly satisfactory product; the temperature is not sufficiently under control, and sometimes increases more rapidly in one part of the kiln than it does in another; or not unfrequently a block occurs, and a mass of stone and fuel remains immovable for a considerable time, and when this stoppage is overcome the mass gives way, and a quantity of lime and half-calcined limestone comes down together. Owing to these uncertainties, which no precautions can entirely guard against, when it is essential that the limestone should be equally and thoroughly calcined, the kilns are worked on the intermittent system, the charge being put in at once, and the kiln allowed to cool down before the lime is removed, the extra cost in fuel being more than compensated for by the superior quality of the lime obtained.

In the chalk districts, in which what is termed "flare lime" is produced, to distinguish it from the lime as obtained from the kilns to which I have referred, the process is carried out in a somewhat different manner. Only a small quantity of fuel is mixed with the chalk, its calcination being chiefly effected by the flames of the burning coal placed below. A fireplace is constructed in the outer wall of the kiln of brick arches, these arches being continued within the kiln by piling up large blocks of chalk, over which the remainder of the chalk is filled in; the fire below the arches is lighted, and when the whole mass has attained the requisite temperature (which is determined by the experienced eye of the kilnsman), the fire is allowed to burn out, and the lime, when cold, is withdrawn. These kilns will turn out about thirty tons of lime with a consumption of about nine tons of coal. A variety of kilns have from time to time been proposed with the view of diminishing the consumption of coal, few of which have been constructed on sounder principles, or have been more successful in attaining the desired object, than those of Hoffmann, which are frequently alluded to under the name of circular or ring kilns.

The great economy, as regards fuel, effected by the use of kilns of this description is obtained by causing all the air entering the kiln to pass over the lime that has already been calcined before it reaches the burning fuel, and the products of combustion, together with the carbonic acid and vapour of water from the limestone, to pass over the fresh limestone before reaching the chimney. By the arrangement adopted, the air is raised to a high temperature before it reaches the fuel, by taking up the waste heat from the hot lime, which in ordinary kilns is entirely lost. Combustion takes place under the most favourable conditions, the fuel being consumed in the most perfect manner, with scarcely any escape of smoke. The heat recovered from the gases evolved is sufficient to raise a portion of the limestone almost to dull redness before it meets with the burning fuel, and the amount of heat that escapes is little more than what is required to create a sufficient draught in the chimney. The kiln consists of a flat-roofed circular or elliptical tunnel, divided into twelve or more chambers, placed round a central chimney shaft; the flues which connect each chamber with the central chimney are so arranged as to be capable of being closed at pleasure. Two adjoining chambers of this series are opened (generally every day), in one of which the operation of charging with fresh limestone is going on, whilst the lime is being taken from the other. The air entering at these open chambers passes through four chambers filled with hot lime, which it cools down, becoming more and more heated before it reaches the two or three chambers in which the fuel is being consumed, and afterwards passes through the remaining chambers of the series filled with fresh limestone, finally reaching the chimney through the flue of the last chamber that had been filled on the previous day. The fuel used is small coal, which is thrown in at the top of the flat roof of the kiln in very small quantities at a time, through openings communicating with shafts that are left to receive it when stacking the limestone. These openings are closed by loose covers that are only lifted at the moment when the coal is put in, or for the purpose of observing how the kiln is working. The kilns are constructed on a very large scale, each of the chambers, in a kiln which has now been worked for 20 years in North Wales, being capable of turning out 20 tons of lime. The building of such kilns involves a large outlay of capital, and it is necessary that they should be kept going constantly and regularly, as the kiln after having been once lighted is never allowed to go out, every chamber taking its turn for the operation of filling, firing, and discharging. It is evident under these circumstances that kilns of this description are most suitable for large works, and where there is a constant demand for the lime produced. Another description of kiln has recently been brought out for burning lime and cement, known as the Dietzsch kiln, which is still more economical as regards the consumption of fuel than Hoffmann's, inasmuch as there is less waste of heat, owing to the portion of the kiln in which calcination takes place never being allowed to cool except for repairs. This kiln consists of a vertical shaft, divided horizontally into two parts, which are connected together by a short horizontal chamber. The upper part of the shaft is kept charged with the raw material, which gradually falls by its own weight into the horizontal chamber, from which it is passed on as required, by means of shovels, to that part of the lower portion of the shaft in which its calcination is completed, and which is maintained at a high temperature, by the continual addition of fuel (in small quantities at a time), through apertures made for this purpose and for stoking. The calcined material is allowed to fall into a cooling chamber, through which air is supplied to the kiln. By this arrangement the cement or lime does not remain in contact with the fuel for a longer time than is necessary for its calcination, and no heat is wasted in having to warm up the walls of the kiln after every discharge. The air supplied to the kiln is warmed by passing over the calcined mass which it cools, whilst the gases produced by the combustion of the fuel give up the greater portion of their heat to the freshly charged material before escaping from the top of the shaft. It is stated that in a kiln of this description a ton of cement does not require more than from two to three cwt. of small coal for its calcination. The Dietzsch kiln has only quite recently been introduced into this country. Its construction is simple, but it requires more constant attention than ordinary kilns.

It has been proposed to use gas as the fuel for lime burning, a plan which has the advantage of not bringing the lime into contact with coal or coke, and consequently produces a lime of better colour. Although attempts have been made to adopt this process on a considerable scale, I am not aware of their having been brought to a successful issue in this country, owing to the difficulty that has been experienced in so regulating the supply of gas and air as to insure the ignition of the mixed gases taking place in such a manner as to produce a uniform temperature throughout the mass of limestone, and in making the kiln gas-tight. It may be anticipated that, with more experience, these difficulties will disappear, but at present the Hoffmann kiln for lime burning is entitled by long experience of its merits to be considered as one of the best, both as regards efficiency and economy.

When lime has not been properly calcined, and will not slake with water, it is termed "dead burnt," which may arise from two causes: from insufficient burning, when the limestone, instead of being entirely caustified, has only been changed into a basic carbonate consisting of two equivalents of lime and one of carbonic acid, one-half only of its carbonic acid having been expelled; this basic carbonate, on the addition of water, instead of forming a hydrate of lime, and being converted into a fine impalpable powder, attended with the production of a large amount of heat, is changed with but comparatively little elevation of temperature into a mixture of hydrate and carbonate.

In the case of hydraulic limes which contain a considerable amount of silica, this "dead burning" may arise from the limestone having been subjected to too high a temperature whereby a partial fusion of the silicate of lime formed has been produced, giving an impervious coating to the inner portions of the stone, which retards the further evolution of carbonic acid. On this account the eminently hydraulic limes require to be carefully calcined at as low a temperature as practicable, and hence we not unfrequently find that lias lime has been imperfectly calcined. Pure limes, if subjected to too high a temperature, exhibit somewhat less tendency to combine with water than is the case with lime that has been properly calcined.

Caustic lime units with water with great energy, so much so, as to evolve a very considerable amount of heat. When water is poured upon a piece of well-burnt pure lime heat is rapidly generated, and the lime breaks up with a hissing, crackling noise, the whole mass being converted in a short time into a soft impalpable powder known as "slaked lime;" chemically speaking, it is a hydrate of lime—that is, lime chemically combined with a definite amount of water. In the process that is termed slaking, one equivalent or combining proportion of lime unites with one equivalent of water, or in actual weight 28lb. of lime combine with 9lb. of water (being nearly in the proportion of 3 to 1) to form 37lb. of solid hydrate of lime; the water loses its liquid condition, and it is to this solidification of water that the heat developed during the process of slaking is partly due. In the conversion of a solid body into a liquid, as is the case in melting ice, a certain amount of sensible heat is rendered latent, and in reassuming the solid condition this amount of heat is again rendered sensible. In slaking lime, however, a much larger amount of heat is developed than is derived from the solidification of water, which further development of heat is to be ascribed to the chemical action which takes place between the water and the lime; for chemical combination, in by far the greater number of cases, is attended with evolution of heat. The heat thus generated may be perceptible to the senses or not, according to circumstances—thus, for instance, when carbonate of lime is decomposed by the addition of an acid the heat developed may not be observed, because a large proportion is absorbed in the conversion of the carbonic acid from the solid form in which it existed as carbonate of lime into a gaseous state.

The heat generated by slaking lime has been made use of as a perfectly safe means of obtaining coal in fiery mines without the

necessity for using gunpowder or any other explosive. A hole is bored in the seam of coal about 3ft. in length, and 2½in. in diameter, into which is inserted a perforated iron tube of about ½in. in diameter, covered with a strip of canvas in order to prevent the perforations being closed by particles of lime. The hole is then nearly filled by putting in a number of short cylinders of highly compressed lime in which a groove is left to receive the iron tube, the charge being completed by 6in. of well-rammed clay tamping; water is now forced down the iron tube, and in a few seconds the lime begins to swell, producing a quantity of steam under considerable pressure, which tends to crack the surrounding mass of coal. The temperature never exceeds 800deg. Fahr., so that in the most fiery mines there is never sufficient heat generated to give rise to an explosion.

The manner in which the process of slaking lime is conducted is a matter of considerable importance, because if this operation is imperfectly carried out, the plaster made from such lime will be liable to blister, owing to the subsequent slaking of small particles of lime still remaining in a caustic state, and these blisters will not unfrequently make their appearance after the lapse of a considerable time. All "rich" or "fat" limes (as those limes are termed which are obtained from pure limestones) may be slaked by mixing with a sufficient quantity of water to reduce the whole to a thick pulp, and are not in any way injured by remaining in this condition for a considerable period. In the preparation of plaster for fresco painting, it is customary to employ lime that has been kept for a long time in the state of thick paste, so as to secure the hydration of every particle; for it is well known that the smallest portion of unslaked lime would be fatal to the plaster as a suitable material for the ground of any decorative work of art.

With the eminently hydraulic limes, on the contrary, it is necessary to adopt a different mode of proceeding, inasmuch as it is requisite that care should be taken, in slaking limes of this description, that too large a quantity of water should not be employed.

The energy with which hydraulic limes combine with water is not nearly so great as is the case with pure limes, and if too much water be added, and the lime is flooded, the slight amount of heat generated is absorbed. If limes of this description be allowed to remain for any length of time in a pasty condition, hydrated silicates of lime and alumina begin to be formed, and if these silicates be disturbed and broken up, the power of the lime to set subsequently is diminished. In slaking hydraulic limes no more water should be used than is necessary to secure hydration. The slaking of such lime is carried out in practice by sprinkling water over a heap of lime, and covering it over with the sand that is intended to be mixed with it when converting it into mortar, the covering of sand serving to retain the heat that is developed, so as to enable the process of slaking to be carried out slowly throughout the mass.

By exposure to air caustic lime is slowly converted, without much elevation of temperature, into a coarse powder, consisting of a hydrate and carbonate of lime.

Mortar consists of a mixture of slaked lime and sand, in the condition of a thick paste, which is spread in thin layers between bricks or stone for the purpose of cementing them together; the effect of the sand is to increase the points of attachment, and to render the mortar open in its texture, hence it is that the more irregular and angular are the particles of sand the better is it adapted for the purposes of mortar-making. In mortar required for plastering it is necessary that the sand used should be free from salt, and that no brackish water should be employed, on account of its containing deliquescent salts, which have a great tendency to absorb moisture, and consequently to render the plaster always liable to become damp.

The hardening of mortar is due to several causes which act collectively. In mortar made from pure or rich limes the first setting is due simply to the evaporation of the water, and to the production of minute crystals of hydrate of lime; this hydrate then slowly absorbs carbonic acid from the air, the rapidity of this absorption necessarily decreasing in proportion to the difficulties presented to the free access of air. This being the case, it is manifest that pure limes are not suitable for mortar to be used for thick massive walls, or in places where it is likely to be exposed to the action of water. It is a well-established fact that, in very heavy masonry, mortar made from pure lime may remain for an almost indefinite period in its original soft condition. In the case of mortar made from hydraulic limes, it is necessary that the mixing of the mortar should be completed as rapidly as is compatible with the thorough incorporation of the materials, and that it should be used as soon as practicable after having been mixed, for if mortar of this description be put aside for any length of time, its setting properties are deteriorated.

The pure limes are undoubtedly the most effective when lime is required for disinfecting or sanitary purposes, as, weight for weight, they contain more lime than the hydraulic limes, but for the use of the builder there can be no question but that those which partake more or less of the character of hydraulic lime are most suitable; the mortar of such lime sets quicker and much harder than is the case with mortar made from the purer descriptions of lime. It is on this account that the grey Dorking lime made from the lower chalk is preferred for building purposes to that made from the upper chalk. Mortar for hydraulic purposes may also be made by mixing with the pure limes calcareous clays or shales, which have been so altered by the agency of heat that the silica they contain has to some extent assumed the condition of soluble silica. The mortar which was held in such high estimation by the Romans consisted of lime mixed with puzzuolana, so named from a small town at the foot of Mount Vesuvius, in the neighbourhood of which it was first obtained. It is also found in other localities which have been subjected to volcanic eruptions. This puzzuolana is an altered felspathic tufa, the silica of which has been so changed in its character as to be in a more or less soluble condition.

Trass is a material similar in its character to puzzuolana, obtained from the pits of extinct volcanoes in the valleys of the Rhine, between Mayence and Cologne, as well as in various parts of Holland. It is held in high reputation by Dutch engineers, the name trass being derived from a Dutch word signifying a binding or adhesive substance.

There is a great want of uniformity in the chemical composition of these volcanic products, which necessarily gives rise to uncertainty in the composition and character of the supplies obtained, and their use is now to a great extent superseded by the substitution of hydraulic lime or cement.

IMPROVED HOUSE-BUILDING IN BUENOS AYRES.*

THERE are few parts of the world where the science of architecture is more necessary, and certainly none where it so little exists as in this rapidly-increasing city of ours, euphoniously and appropriately called Buenos Ayres. By reason of the very inferior materials at hand, proper artistic, effective, useful, and sound work is all but impossible to the ordinary workman. By art in architecture I mean professional skill in the disposition of rooms and staircases, heights of floors, ventilation and sanitation, not ornamental stucco-work, with pilasters and columns, standing out and carrying nothing, and balconies, pediments, and parapets of apparently crushing weight, but of no use or beauty whatever. The iniquities that have been and are perpetrated by uncultured constructors, unqualified draughtsmen, and *soi disant* architects go a very long way towards hindering the advancement and civilisation of a nation which, of all the junior countries of the earth, is at the present time the most promising and prosperous. A stranger, on first catching sight of the prison-barred houses, finds it hard to understand how such obsolete vestiges of a barbarous age can find favour in the capital of so progressive a nation as the Argentine Republic—the London of South America, the New York of the Southern hemisphere. I am told, whilst hundreds of young men are yearly taking to the profession of law and physic, none ever turn their attention to architecture. It is made too much of a trade, a commercial business. *Constructor arquitecto*, and *ingeniero* appear to be regarded as synonymous terms, whereas they bear but little real affinity or relation one to the other. Hitherto, all the labour and honours of the architectural profession have fallen to the lot of a few foreigners, amongst whom I am proud to recognise more than one fellow-countryman standing out in the first rank, shoulder to shoulder with Germans, French, and Italians. I fear that they have but very few native-born apprentices in their offices, and it is to this circumstance that the study of architecture proper, both from an artistic and scientific point of view, is suffering and will continue to suffer. In England, on the contrary, every architect's office is overcrowded with articled pupils, and the profession is so overstocked that competition has, for many years past, been both keen and disastrous. In this country youths are crowded into Government offices where there is little or nothing to do, and where the temptations to go wrong are so great that the most promising boys succumb, and the industrious youths become lazy and indolent. Considerable improvement has taken place in the architecture of Buenos Ayres since the beginning of the century, when General Whitelock's army attacked the city, every house of which, by reason of its low and flat roof, became a veritable fortress. At that period, possibly, there could not be found a single *alto* house in the whole city, and Sarmiento tells us that so recently as 1850 there were not a dozen houses boasting of two stories, the principal one being in the centre of the *manzana* where the old Bolsa now stands. The first alto houses of any importance were *La Vireyna Vieja* in Calle Peru, and the *Altos de Escalada* at the corner of Victoria and Defensa—a very grand edifice, doubtless, in its own day, but a frightful eyesore as it at present stands. Then came the *Recoba vieja*, which disappeared in one night under the magic stroke of Senor Alvear's wand. I would that he had swept away that ill-named *Casa de Justicia* as well, or, at least, the Clock Tower. From this period until the Mitre administration, 1862—1868, little or no advancement was made in architecture, whatever may have been the progress of the nation in other respects. But for the Paraguayan war, much more advancement would have been made both in public and private enterprise. The birth of the Argentine Republic, properly so called, dates from the battle of Pavon, where the old *caudillo* system received a death-blow. The large buildings erected for the Provincial and Hypothecary banks mark the Sarmiento period, as stand out the palatial State schools like monuments to General Roca. In like manner, I hope, the new Capitol, Law Courts, Immigrants' Hotel, &c., are destined to speak to future generations in favour of the present administration. Rivadavia first decreed the rounding off of the corners at the *boca-calles*, but it is only of late years that this salutary statute has been enforced, it having remained a dead letter during close on to half a century. Whilst on the subject of street corners, I should like to say a few words regarding the width of the most central and fashionable streets, which are during certain hours of the day most inconveniently crowded. Why not oblige house-owners to set back their buildings three yards or more from the boundary lines of their property on the *veredas?* And furthermore, why should not the Municipality expropriate narrow strips of land through each square, so as to form narrow lanes or approaches to the rear of the houses or buildings? By this arrangement all nuisances such as coals, *basura*, boxes, &c., can be avoided at all the principal entrances, and servants and tradesmen will be provided with entrances of their own. This plan has been successfully adopted in the principal European capitals, and there is no reason why it should not be done here. As we all know, land has lately risen tremendously in value, but I think we shall presently see a reaction set in. Whether it does or not, the population of this city is increasing so enormously, the central part must of necessity be very expensive, and economy must be exercised in covering the land to be built upon. How is this to be done? Simply by sinking basements and building *altos*. The setting back of the buildings will give more light and air, and, architecturally, the aspect of the streets will be much more pleasing.

* Portions of a paper read before the English Literary Society of Buenos Ayres by FRANK E. THICKE, architect, June 23, 1887.

Dr. Crespo, the new Intendente, has increased the limit of the height of buildings by two mètres—thus, instead of 14 mètres we may erect a facade 16 mètres high to the top of the cornice. Mr. Duggan's fine house in Calle Piedad, Dr. Rocha's fine mansion (the architecture of which I am not prepared to criticise) in Calle Lavalle, are notable instances of the advantages of setting back from the side-walk. Mr. Peter Gartland in Calle Florida was the first to employ solid blocks of granite, a plan worthy of consideration, by reason of the abundance of this splendid material to be found in the South of this province, and which, while a thousand times more durable than bricks, is more easily cut and moulded than marble. The "house-famine" has been, and still is, a matter that has not escaped the notice of capitalists and speculators, but the subject has bothered and puzzled them in more ways than one. The exceedingly high price of land has been the chief obstacle to a definite and satisfactory solution of a very difficult question. Even in the remote and out-lying quarters of the city it is hard to find a house for a small family under 80 dollars per month, or three times the rent of a house 18 months ago. If we take the depreciation of currency into account, the rents are still exorbitant and very much higher than in Europe. Taking this into account, and also the very high price of eatables and drinkables, it would appear on the face of it that all of us above the position of peones or servants are living much beyond our means. Time alone can prove whether this is so or not. As the *Buenos Ayres Herald* a fortnight since said that while "in 1886 there were not far from 4,000 building permits taken out, which would indicate housing accommodation for, say, 40,000 persons, but some of these were reconstructions, it may safely be said that the new buildings just about provided for the new comers. We are paying not less than double the price of house rents in the most progressive of cities in the United States, and from three to four times as much as one would pay for equal accommodation in a European city of the size of Buenos Ayres." In 1842 there were only 42 houses built in Buenos Ayres. In 1853 there were 500, and ever since then the number has increased, and two-storied houses began to present themselves pretty frequently. In Mr. Mulhall's statistics of 1884, he tells us that the annual value of houses built in Buenos Ayres is £720,000, as against London £15,300,000, New York £5,600,000, and Montevideo £230,000. But I will now endeavour to deal with the professional part of my theme. Professor Ruskin, who, as everybody knows, is an art-critic, a genius, and an eccentric one, very beautifully says of architecture: "It is the manly language of a people inspired by resolute and common purpose, and rendering resolute and common fidelity to the legible laws of an undoubted God." Good architecture is the work of good and thinking men. A nation's prosperity and progress are judged by its architecture. It is, therefore, manifestly to the interest of us all to pause once in a while and consider the position of affairs in connection with an art and a science which are so truly identified with our physical and moral well-being. The rise and progress of domestic house-building is a subject which should be discussed in this city above all others at the present time with great and impartial deliberation. Undoubtedly a new era is setting in, and a social revolution is impending, which will distract the attention of the native from the extravagantly large and lofty rooms, and over-górgeously decorated entrance halls and salas, and divert his thoughts to the more practical considerations of economy in space and improved sanitary arrangements. The increasing facilities for visiting Europe have had a very beneficial effect upon the minds of those who have, during the past few years, journeyed to London, Paris, Berlin, and Vienna, and many have returned imbued with improved ideas of domestic physical existence which have permeated through the strata of their own spheres with considerable advantage to themselves directly and indirectly to the community at large. The first thought of the designer of a house after taking the general instructions of the proprietor should be: How can I combine stability, utility, and beauty in the building which may become an ever-present monument to my skill, or an ever-standing stigma to my discredit as a professional man? An architect who has a conscience and is properly trained knows perfectly well that no defect is more glaring or more unpleasant than want of proportion. He is taught that by harmony is meant the general balancing of the several parts of a design, and he has learnt that due attention to harmony and proportion gives the appearance of stability and repose which are indispensable in a fine building. After this comes the very important matter of ornament, a subject that to-night must be very lightly touched upon. I may remark *en passant* that colour in architectural embellishment should be regarded as a subsidiary element, and I may moreover hint to you, even in this city of stucco, that it is very doubtful how far external colouring of an artificial character is desirable. Shams are ever to be deprecated, and I loathe and detest those who suffer the exteriors of their dwelling-houses to be daubed over with various outlandish tints which represent in no degree any *natural* materials such as architects or builders of this or any other age have ever witnessed. The time has not arrived as yet when the architect can indulge his fancies in variegated brickwork; but the English-cut bricks which are now being made at San Isidro point to a not very remote future when proper brick houses will be possible without the aid of stucco. When this time arrives and a little more attention is paid to tiles and slate-roofing we shall see springing up all around the suburbs, and, indeed, in the city itself, specimens of Gothic and Queen Anne architecture which will relieve the monotony of the square, flat-roofed, box-like edifices with plastered fronts which abound everywhere and are such terrible eyesores to artistic minds. Far be it from me to criticise too harshly the *plan* of the ordinary native house; but, in justice to my subject, I must allude to the very glaring defects which they possess—defects, in most instances, admitted by the natives themselves. We will take for instance a private residence or dwelling-house, whatever you may call it—in Calle Santa Fé, where so much building is now being carried on (I am sorry to say mostly in the same old style), costing from 15,000 to 18,000 nacionales. You have an entrance in the centre leading to a patio; on either side of this a large room with windows to the street, and what we call at home a French casement-window at the rear opening into the patio. To get from one of these rooms to the other, access can only be had through the exposed patio. These two rooms have behind them three, four, or five other rooms, used as bedrooms, as the case may be, all leading out of one another, and with simply either one or two French casements for the purposes of light and so-called ventilation. Then comes the *comedor* and the kitchen, right away at the rear of the square plot of land upon which the building is erected. Now, it is obvious to the meanest capacity, that in the event of one of these intermediate rooms being occupied by a sick person, or being rendered impassable in any other way, the only way to get to the comedor or kitchen is through the open patio, be the weather what it may. Hereby have been sown the seeds of consumption and other diseases, owing to this fatal arrangement. Another defect patent to a stranger is the absence of proper "wholly inclosed" entrance halls, where callers can wait and hats and overcoats can be left. Cupboards, store-closets, linen rooms, larders, and other appurtenances so dear to the English housewife, are generally conspicuous by their absence. At all times and at all seasons the servants have to trudge through possibly three patios to get to the front door, even if they hear the door-knocker, which is so far off, and bells are so very scarce. In many houses the "door-windows" have no fanlights, so that on a hot summer's night, if ventilation is to be obtained, one of the casements must be opened down to the ground, thereby admitting any rats, dogs, or cats that may be prowling about in the patio, and decidedly destroying the privacy of the bed-chamber. Light, "God's eldest daughter," is a principal beauty in a building; but it does not shine alike from all parts of the heavens. An east window gives the infant beams of the sun before they have strength to do harm. In a west window the sun grows low, and the day seems longer in the room in which it is placed. Through lights are best for rooms of entertainment, and windows on one side only for dormitories. The private buildings in a town are often beset with difficulties which do not occur to those in the country, where the extent of site is freer and ampler. These, consequently, can be isolated and receive light from every side. Their offices may be separated from the main building and the parts may be disposed in the simplest possible manner; but in cities the site is generally more or less restricted, often very irregular in form, and usually bounded by party walls. Yet, with all these obstacles, it is necessary to provide almost as many conveniences as are required in a country house. All that can be done is to make it as much so as the nature of the spot will permit, and to produce the maximum of comfort which the site can be made to afford. Nothing should be beneath the attention of the accomplished architect, nor anything above his powers. He ought as cheerfully to undertake the meanest cottage as the most magnificent palace. A poor man's dwelling in town should consist at least of a sitting-room and a bedroom; a w.c., sink, and lavatory distinct and not far removed from his rooms; a washhouse and scullery with the means of drying clothes in any weather without artificial heat, and, when practicable, a playground for his children. These requirements can only be arranged for on the barrack system which in London has now become so popular, not only for the poorer classes but also for the middle and upper classes. The necessary economy of space in the over-crowded parts of this city, renders it urgent that something should be done in the way of sinking *sotanos* and erecting *altos*. You all know that in England the general mode of building the average middle-class town house is to construct a kitchen in a floor below the ground and a room behind serving for a variety of purposes—an area in front with vaults under the pavement, and the same in the rear. The space opposite the descending staircase forms a cupboard—wine-cellars, larder, &c., are provided for the vaults. On the ground-floor there is rarely more than a passage on one side which conducts to a staircase, and this requiring more width than the passage itself; the best room on this floor is placed in the front, and the back is a smaller room, often opening on a small light closet still further in the rear. A yard is supposed to be behind by which light is obtained for the back-room. On the first or other floors the passage becomes unnecessary; the drawing-room or front upstairs room therefore runs over it, and becomes larger, while the back rooms follow the form of those on the ground floor. Though little variety may be the result to which this sort of house is usually confined, the addition of 4ft. or 5ft. either way will enable an architect to throw in closets and other conveniences. If this style of house is successful in other cities, why should it not be adopted here? It is only a question of time for this plan to be carried out, *necessitas non habet leges*, and it must come to it if any return at all is to be made for the investment of capital. The English word home, it is a curious fact, is an untranslatable one. It has no actual equivalent in any other country, and look in what foreign dictionary you may you will not find it. We English pride ourselves upon our homes, which we call our castles, where we are safe from intruders, where we shake off all business matters or thoughts, and where we indulge in that congenial, loving domesticity, which has made England's sons and daughters what they are and what they are determined they will continue to be. A North American lady has recently paid a charming tribute to English homes. She says: "There is a room in every English house which immediately declares itself as home. Everything declares itself to be a part of the home and the family. Going into such a room the first feeling is the sense of harmony, then the atmosphere of many minds and much culture. There is the chair for papa from which he reads the evening paper and hears his daughter's music; old family portraits are on the walls, and everywhere there are visible the touches of hands familiar with the legends and meanings of the room," &c., &c. The English community in the city of Buenos Ayres do not appear to have built private residences to the extent that might have been expected of them in order that they might make their homes more on the

true old English lines. This may be accounted for by the fact that the majority of them are mere birds of passage, paying periodical visits to the mother country, and never intending to end their days in so far-off a land. Nevertheless, it is a surprising fact, although in various parts of the camp there are many estancia houses which can compete with many a well-designed English country house. Of these the house of Messrs. Kincaid Bros., on the North bank of the Rio Negro, deserves honourable mention. It is a piece of Scotland transplanted and flourishing in the midst of the Patagonian desert. The introduction of hard wood into the construction of houses in this country has apparently, as far as my knowledge goes, not yet been tried, otherwise than in doors and window frames. I think it might prove to be very successful, and have induced the directorate of a new hotel which I am erecting at Mar del Plata to try the experiment. In a flat even country, like the greater portion of this province at least, it behoves us to assist nature by erecting buildings which are picturesque and attractive, and in a seaside place especially we want something more than the mighty ocean to make a *coup d'œil*. Promenades, terraces, public gardens, and other public places may, and probably do, go some way towards making a district pleasing and attractive; but so long as the square, stucco, box-like one-story houses are permitted to be erected, so long will any district remain an eyesore to the artistic mind, be it in city, suburb, country town, or seaside watering-place. When Senor Alvear, our great Lord Mayor, proposed the grand central Boulevard, so simple and so useful, *La Prensa* only backed him in a lukewarm, half-hearted manner, whilst other city journals, edited by Argentines, openly attacked this most excellent measure. The boulevard is a public necessity, and must be made sooner or later—the sooner the better—but it should be made by the people and for the people. All properties improved by the work should be expropriated at their actual value to be resold by public auction in the act of opening the grand thoroughfare. In this way this great health-giving and beautifying work would be realised without costing a cent of public money. Honeycombed as this city is with *pozos*, it is satisfactory to know that in the city itself the water supply from the *aguas corrientes* is abundant, and as satisfactory as can be reasonably expected under a municipality which, as has been recently demonstrated, is not the most perfect in this hemisphere. It is many years since sheepskin men went their matutinal rounds on foot or horseback, their stock-in-trade (water) being contained in bags of raw hide for lack of barrels or tin cans. Many of you here to-night may remember the ante-umbrella epoch, as it is called, when long, snake-headed pipes, projecting from the roof tops across the narrow *veredas*, or sidewalks, carried the storm-water away from the roofs, thus allowing pedestrians to pass along unmolested and perfectly dry. Next came the barrel system, and then the *algibes*. Surface draining has certainly been studied in various parts of this city, and the deluges and petty Niagara Falls are not so common as they were. Not longer ago than 1869 I read of men and horses being swept away, pianos, sofas, and other articles of furniture floating down the most fashionable thoroughfares. Thirty thousand pounds would scarcely cover the loss by the floods on one memorable day. As recently as 1871 peones carried people across the best paved streets on their backs after a heavy fall of rain, and English ladies went to a ball, at the quinta of a leading physician, in a bullock cart! Tramways have done more for this city than for perhaps any other city in the world, and that is saying a good deal. One thing is certain, that trams first began to run here in 1870, and in an incredibly short space of time changed the whole system of life, architecture among the rest benefiting by the reaction. What would the suburbs of Flores and Belgrano be now without the tramways! Many of you must remember when it was a day's journey to visit either Belgrano or Flores. And when the underground railway comes, and it will come sooner or later, what scope will there be for the local speculative builder, and what fortunes will be made on the lands which the line will open up. Time has not permitted me to say all I have in my mind regarding house-building in Buenos Ayres, but I hope that within the next few months you will be enabled to see some of my original drawings and designs carried out in their integrity, and they will, I hope, convey to your minds what my ideas are upon the subject. I have endeavoured to show you that there is imperative need for improvement in house-building in this city, and I have tried to make you believe that it is not so difficult to attain all those domestic home comforts in this far-off land that we have been accustomed to in the old country. Economy of space, and a more detailed investigation into matters generally, both materially, artistically, and sanitarily, on the part of proprietors, are the only cures for evils which, if neglected, will only increase and multiply. The members of this society, many of whom have come more or less recently from the priceless comforts of happy English homes, should not be above studying house-building, both artistically and practically, for though it may not at first bring them actual profit in the shape of dollars, physically and morally, they will not only be helping themselves, but also benefiting their fellow citizens.

THE INSTITUTION OF CIVIL ENGINEERS.

THE council invite original communications on a variety of subjects of professional interest. For approved papers premiums, arising out of special funds bequeathed for the purpose, are awarded—viz., from the Telford fund, which produces £260 annually; the Manby donation, of the value of about £10 a year; the Miller fund, for students' papers, realising £150 per annum; besides a Miller scholarship of £40 each year and tenable for three years; and the Howard bequest of nearly £16 a year, awarded every five years, commencing from 1877. Among the suggested subjects of papers are the following:—Tacheometry, or Rapid Surveying; the distinguishing qualities of Clay to make good Puddle; Colonial Woods suitable for Engineering Purposes; the influence of Sea-Water upon Portland-Cement Mortar and Concrete; Wind-Pressure upon Structures; the Working-Strength of Iron and Steel as affected by (1) the amplitude, (2) the frequency, and (3) the time-rate of the stress-variations; the Effect of Different Qualities of Water on the Condition and Duration of Cast-iron Pipes; Recent Improvements in Cable Tramways; the Present Position of the Manufacture of Steel—its Defects, and Suggestions for its Improvement; the Distribution of Electricity for the Lighting of Towns; and Electricity for Working Street Tramways. In writing these essays the use of the first person should be avoided. They should be legibly transcribed on foolscap paper, on one side only. Every paper must be prefaced by an abstract of its contents not exceeding 1,500 words in length. Illustrations, when necessary, should be drawn on tracing-paper, to as small a scale as is consistent with distinctness, but in no case should any figure exceeed 6½in. in height. The communications must be forwarded to the secretary of the institution, from whom any further information may be obtained. There is no specified date for the delivery of MSS. Among the premiums awarded for the Session 1886-87, were the following:—The Howard Quinquennial prize to John Percy, M.D., F.R.S., in recognition of his researches on the uses and properties of iron. For papers read and discussed at the ordinary meetings:—a Telford medal and a Telford premium to Alexander Blackie William Kennedy, F.R.S., M.Inst.C.E., for his paper on "The Use and and Equipment of Engineering Laboratories"; A Telford premium to William Joseph Dibdin, F.C.S., F.I.C., for his paper on "Sewage-Sludge and its Disposal"; a Telford premium to William Santo Crimp, Assoc.M.Inst.C.E., for his paper on "Filter-Presses for the Treatment of Sewage-Sludge"; a Telford premium to John James Webster, M.Inst.C.E., for his paper on "Dredging Operations and Appliances"; and the Manby premium to Lewis Henry Ransome, Stud.Inst.C.E., for his paper on "The Conversion of Timber by Circular-saws and by Band-saws in the United States." For papers printed in the proceedings without being discussed: A Telford Medal and a Telford premium to John George Gamble, M.A., M.Inst.C.E., for his paper on "Water Supply in the Cape Colony," and Telford premiums to Joseph Hetherington, for his paper "On Utilising Waste Air in Filter-Pressing; with some Results of Pressing Sewage Sludge at Chiswick," and to Killingworth William Hedges, M.Inst.C.E., for his paper on "Central-Station Electric Lighting."

GRANITE QUARRIES OF CHESTER COUNTY, PENN.

THE *Proceedings* of the Engineers' Club of Philadelphia recently contained an account of the "Granite Quarries of Chester County, Penn.," by Mr. J. H. Harden. Chester County has become noted for its syenite, and three companies are engaged in working the quarries. This granite is a beautiful grey syenite, of fine grain, uniform in colour, free from iron or mica, and capable of splitting in any direction. The Pennsylvania Granite Company, who are developing the quarries in one part, are engaged in cutting the boulders into paving blocks dimension stone. Some of the boulders are of immense size, and from any of the quarries the largest sized stone required for architectural purposes can be obtained. Dr. Charles M. Cresson, in a report on the granite, remarks that the stone is a syenite of fine and even texture, the component quartz being less in amount and in much smaller masses than in the Quincy granite, which is also a syenite. The French Creek stone, worked by the French Creek Granite Company, is said to weigh about 191lb. to the cubic foot, the Quincy granite weighing 167lb. The French Creek stone is also said to be inferior in weight to the Slaten Island Granite, used so largely for paving at New York. The report observes that, owing to the finer grain of the French Creek stone, in addition to greater density, it possesses greater toughness and resistance to wear than the Quincy stone. Trials upon imperfectly-prepared cubes of the former stone show that a force of over 23,700lb. on each square inch, or over 1,500 tons on each square foot, was necessary to crush them; whereas, according to Trautwine, the alternate crushing load for granites is stated at 300 to 1,200 tons per square foot. It is said also that the French Creek stone resists atmospheric influences fully as well as the Quincy granite. The waste stone makes excellent macadamising material. Chester County, according to Mr. Harden, is likely to become a great quarry for paving blocks and cut granite, and there is room for other quarries.

EFFECTS OF TEMPERATURE ON IRON BRIDGES.

THE influence of temperature on iron is of vital importance in the construction of iron bridges. It has been observed by Mr. Edwin Clark that "half an hour's sunshine has a much greater effect on the tubes of the Britannia Tubular Bridge than the heaviest trains or the greatest storm; they are, in fact, in a state of perpetual motion." Mr. Graham Smith, in a paper read at Liverpool in 1877, made some useful remarks, which may be usefully quoted here. He referred to the strains caused by the variation of temperatures. "If the difference between the extremes of temperature be assumed at 82° Fahr., or, say, between 20° above zero and 102° Fahr., and a change of 15° be capable of inducing a strain of one ton per square inch on wrought iron, it follows that this variation of temperature, unless provided for, will induce a strain of 5·5 tons per square inch; but this is a somewhat extreme supposition for this reason: such extremes are never coexistent in any 24 hours, because the cold ten degrees of frost is of necessity only present in winter, and then the temperature in the sun might be taken at 40° Fahr., or a difference in any winter's day of but 18°, or a strain of little more than a ton." Mr. Smith thinks an allowance of 7-16in. in every 100ft. is sufficient in this country. The strain caused by expansion has been calculated, unless provision is made, to be about 3½ tons to the square inch. The Meteorological Department furnishes the most exact data obtainable as regards the maximum range of temperature in England, from which it appears that the maximum difference possible

at the same instant between any two parts of a structure is 51° F. Mr. Edwin Clark, speaking of the Britannia Bridge, says: "An increase of temperature of 26° F., from 32° to 58°, gives an increase in length of 3¼in. on the wholebridge. The expansion is thus one-eighth of an inch for each degree, or 1-1450th part of the whole length. It sometimes bends 2½in. laterally and 2½in. vertically when the sun shines on one side or on top of the tube. A heavy train deflects the tube only 3-10in." In a straight girder the resistance to friction on the supports does much, to prevent the free expansion and contraction of the beam; this is usually lessened by the introduction of rollers. The resistance of rolling friction varies directly as the weight resting on the roller or half the whole weight of girder, and inversely as the radius of roller. In order to enable the girder to move freely it ought to be built with a certain camber, so that the horizontal thrust would be in equilibrium with the resistance of friction, and any change of temperature would cause the guide to move freely in the direction of its length. When the resistance of friction is not so balanced by the thrust due to camber there is a danger of the girder twisting or bending. It would be easy to show graphically these forces; but it may suffice to say that for rollers 1ft. in diameter and 100ft. span the versed sine of the camber is calculated at 1·85ft.; the smaller the diameter of the rollers the greater the camber.

TESTS OF PORTLAND CEMENT.

IN obtaining reliable results certain tests are necessary in the use of Portland cement. Weight per bushel is not always to be relied on, unless the cement is fed through a standard hopper into a measure of standard size. One authority, Mr. D. L. Collins, gives rules for this weighing, and a drawing of a hopper. Fine grinding is of more importance, and it makes great difference to the weight, as may be observed by passing the best cement freshly ground through an 80-mesh sieve, and leaving certain percentages of residue. All cement increases in bulk and weighs less with age. Fineness of grinding is one of the safest tests. For engineering works the per cent. residue left should be under 10 through a sieve with 2,500 meshes, and for special work the same residue through a sieve of 6,400 meshes. Speaking of the water test, Mr. Collins says it is one of the safest guards as to the soundness of cement; and recommends that thin cakes should be made up and placed upon pieces of glass or other non-absorbent material, and then, when thoroughly set, one cake should be immersed in water, the other being kept in the air. Before immersion, the cakes may sometimes require 24 hours to become set. If after this the cakes show cracks in the outer edge, the cement should not be passed unless it can be proved that the defect is due only to freshness of grinding, and can, therefore, be thoroughly remedied by air slacking. A glass test-tube filled with gauged cement is a good test; if the tube cracks in two or three days, the cement is good; if the expansion bursts the glass to pieces, it is inferior. Many clerks of works use the test-tube, and on all works where good cement is required it ought to be tested in this manner.

Christ Church, Carlisle, was reopened on Sunday week, after partial renovation. The old three-decker pulpit, reading desk, and clerk's desk have been removed from the chancel, and the higher level of the chancel floor has been extended. The new pulpit is of polished pitch pine with mahogany panels. The seating has been renewed and rearranged, and a system of hot-water pipes has been laid down. The reredos has been redecorated, and the walls painted throughout. Mr. Court carried out all the joiner work, and also prepared the plans for the work just completed; Messrs. J. and J. Wharton supplied and laid the heating apparatus; Mr. Miles Newton did the mason work; and the painting and decorating were done by Mr. Hannah.

General Hutchinson, on behalf of the Board of Trade, officially inspected on Aug. 25th the new tramway from Haslingden to Accrington, and expressed his approval. It was opened for public traffic on Saturday. There is now tramway communication from Haslingden to Blackburn, a distance of nine miles.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Cambrian Archæological Association.—The concluding meetings of this association took place on Friday and Saturday. On the former day excursions were made from Denbigh, the rendezvous of the association, to St. Asaph, where the visitors were received by the Dean and conducted over the cathedral. Visits were paid to Bodelwydden Church, built at a cost of £60,000 by Lady Willoughby de Broke, in memory of her husband; St. Mary's Well, Vaynor Manor House, and Trefynant Church. An excursion was made to Cefn Caves, where human and animal remains of great antiquity have been found. The annual association gatherings terminated in the evening with a public meeting at Denbigh, under the presidency of Lieutenant-Colonel Mainwaring, at which notes on Rhuddlan Priory were given by the Venerable Archdeacon Montgomery, and a paper on Welsh parish records was read by the Rev. Elias Owen, M.A. On Saturday, the members inspected the museum got together by the local secretary, Major R. Lloyd Williams; the 400 exhibits included the charters, plate, and regalia belonging to the town council of Denbigh, ancient manuscripts, and historical portraits.

Glasgow Institute of Architects.—On Thursday the annual excursion of this institute took place, the destination being Dunblane and Doune. The party numbered about 20, and on arriving at Dunblane at 10.40, were received at the Cathedral by the Rev. Mr. Ritchie, minister of the parish, and Dr. R. Rowand Anderson, of Edinburgh, architect to the proposed restoration. Among others present there were—Mr. David Thomson, president of the institute; Mr. John Honeyman, past-president; Mr. T. L. Watson, treasurer; and Mr. Thomas Turnbull, of Wellington, New Zealand, at present on a visit to Europe. Mr. David Robertson, the president of the Institute of Measurers; and Mr. A. Lindsay Miller, secretary of the Architectural Section of the Philosophical Society, and other guests were also present. Dr. Anderson conducted the party to the choir, where he recounted what was known or surmised of the history of the Cathedral. In the adjoining aisle he exhibited some old illustrations and his own drawings of the building, and described some of the proposed restorations, dwelling particularly on points of great obscurity and difficulty with which he had been encountered. On these he invited suggestions of members. The party then spent some hours in examination of the structure and in consideration of some of the points of difficulty. Dr. Anderson does not intend to renovate or restore the wasted or defaced architectural members. His restoration is to be confined to the rebuilding of the parts actually ruinous, with a new roof and floor and the glazing of the windows. The walls and pillars of the building were originally covered with a thin coating of plaster, which was afterwards decorated. No attempt will be made to restore this. The broken and wasted mouldings and carvings are not to be touched. Satisfaction was expressed by the visitors that the renovation was not to include the effacement of the present character of the building, as has occurred in so many other cathedrals and churches. We illustrated the present appearance of the Cathedral by an elevation and details of the west front in the Building News for May 20, 1870, and the nave arcade on Oct. 14 of the same year, both being drawings in the "Sketch-Book Series" afterwards published separately; the west front was shown in a sketch by Mr. W. Ferguson, of Glasgow, on Dec. 13, 1878; and perspectives of the exterior and interior, from drawings by Mr. J. B. Tyerman in our issue of July 24, 1885. The party then visited the ruins of the Episcopal Palace, and a call was afterwards made at Archbishop Leighton's Library, where some of the more curious of the old volumes were examined. In the afternoon train was taken for Doune, where the castle was visited. Mr. Dunbar, the custodian, conducted the party over the building, which is one of the largest and best preserved of the castles of Scotland. Noon was spent in examining the numerous fine apartments of the building, and in tracing the remains of outworks. In the evening dinner was served in an hotel, when Mr. David Thomson, the president, occupied the chair, and Mr. T. L. Watson, the vice-chair. The President afterwards wrote to the clerk to the heritors of Dunblane, saying:—"I am asked to express the great satisfaction of the members that the Cathedral restoration is to be carried out in such a conservative manner as Dr. Anderson's explanation showed. They are of opinion that the effect will be to preserve the structure, and that as the existing work is not to be touched, except where necessary for its preservation, the historical and architectural interest attaching to the building will not be impaired."

Society of Architects.—A special general meeting of the Society of Architects will be held at the society's new rooms, St. James's Hall, Piccadilly, on Tuesday week, the 13th inst., at 7 p.m., when votes will be taken on the advisability of changing the title to "The Society of Architects," and upon other matters of general business, including the balloting for thirty-one gentlemen who have been nominated for membership. It is in contemplation for the members of the society to visit York and neighbourhood during the first week in October. Gentlemen intending to join the party can apply for tickets to Mr. G. A. T. Middleton before September 13th. Tickets for friends may be obtained, admitting to the visits and *conversazione*, price 7s. 6d. each. The following is a sketch programme drafted by the York Architectural Association:—

Monday.—Gentlemen from the South travel down by the 10 a.m. train from King's Cross. 3.30 p.m.—Reception and Conducted Walk round York. 7.30 p.m.—Discussion: 'The Architects and Engineers Bill."

Tuesday.—Visit: Kirkstall Abbey and Adel Church. Train leaves York for Leeds at 9.10 a.m. 7.30 p.m.—Discussion: "Yorkshire Building Stones."

Wednesday.—Visit: Ripon and Fountains Abbey. Train leaves York at 10.15 a.m. 7.30 p.m.—Discussion: "Yorkshire Architectural Art."

Thursday.—Visit: Beverley, Hedon and Hull. Train leaves York at 6.45 a.m. 7.30 p.m.—Discussion: "Professional Charges."

Friday.—9.0 a.m. Visit: St. Mary's Abbey, York.—11.0 a.m. Visit: York Minster and Minster Library.—3.30 p.m. Visit: Heslington Hall.—7.30 p.m.—Conversazione of the York Architectural Association, to which all members of the society visiting York are invited.

CHIPS.

The second meeting of the Cumberland and Westmoreland Antiquarian and Archæological Society for this season will be held on Tuesday and Wednesday, the 13th and 14th inst., when the members and their friends will meet at Ulverston. During the first day Swarthmoor Hall, Birkrigg, Aldingham, Gleaston, and Urswick will be visited; and on the second day, Marsh Grange, Kirkby, Ireleth, Coniston Hall, Lowick Hall, and Hawkswell.

Mr. Charles Waring, of the firm of Waring Brothers, railway contractors, died on Friday at Wycombe Abbey, Bucks, of which he was tenant during the absence of Lord Carington in Australia. Mr. Waring was, from 1865 to 1868, M.P. for Poole.

Mr. Samuel Fielding, of Todmorden, has purchased a building in Dock-street, Fleetwood, hitherto known as the Whitworth Institute, and has offered it to the town for the purposes of a free library. The ratepayers have adopted the Free Libraries Acts, and the building will be formally presented to the town by Mrs. Fielden on Saturday, the 10th inst. The name of the Institute will be altered to the Fielden Free Library and Newsroom, and the new promenade, which is also to be opened on the 10th, will be designated the Fielden Promenade.

By an extensive fire which occurred on Friday in Messrs. Cumming and Smith's furniture factory, North Wallace-street, St. Rollox, Glasgow, damage was caused to the extent of about £6,800, being £5,000 to stock and £1,803 to buildings. Besides the stock, a large quantity of workmen's tools and machinery used in the business has been completely destroyed. Messrs. Cumming and Smith were both occupiers and proprietors of the premises.

St. Joseph's Roman Catholic Church, in Grosvenor-street, Liverpool, was reopened on Sunday after having been internally decorated by Messrs. Jelley and Co., of Slater-street, in that city.

Mrs. Lough has just made a valuable supplementary gift of statuary and models by her late husband to the corporation of Newcastle-on-Tyne. The most important of those works are "Milton Invoking the Muses," "Hercules," a marble statue of Algernon, fifth Duke of Northumberland, a marble bust of the mother of the sculptor, and one of the first Baroness Rothschild, and models of the four Apostles and four of the Prophets.

CONTENTS.

Internal Wall Surfaces... 349
Preparing Plans 349
Stone Structures: their Decay and Protection ... .350
Building Materials.—III. 351
Improved House-Building in Buenos Ayres... 353
The Institution of Civil Engineers... 355
Granite Quarries of Chester County, Penn. 355
Effects of Temperature on Iron Bridges 355
Tests of Portland Cement 356
Architectural and Archæological Societies 356
Our Lithographic Illustrations 357
BUILDING NEWS Designing Club 359
Wayside Notes 378
The Admiralty and War Office Committee's Report ... 378
Competitions 379
Engineering Notes... 379
Building Intelligence 380
Correspondence 380
Intercommunication 382
Legal Intelligence... 383
Water Supply and Sanitary Matters 383
Parliamentary Notes 383
Our Office Table 383
Meetings for the Ensuing Week 386
Tenders 386

ILLUSTRATIONS.

SEVILLE CATHEDRAL. — ANTIQUES FROM THE LOUVRE.—RESIDENCE AT WESTCOMBE PARK, BLACKHEATH. — LONG'S HOTEL, BOND-STREET.—INITIALS FROM THE LETTERS OF CLAUDIUS TOLOMEUS.—ST. CHARLES'S HOME, BULLINGHAM, NEAR HEREFORD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SEVILLE CATHEDRAL.

Of the numerous interesting architectural monuments of Spain, perhaps the Cathedral at Seville may claim the first place, as it is certainly one of the largest and finest; the solemn, or "grandeza," is its distinctive quality, as elegance is of Leon, strength of Santiago, and wealth of Toledo. The original mosque, on the form of which it is built, was erected by Abu Yusuf Jacob-al-Mausur in 1172, and continued to be used as a cathedral until 1401, when it was pulled down. The new cathedral was begun in 1403 and finished in 1506; but the cupola fell down the following year, and the work of reconstructing it was not completed until 1519. The name of the architect is not known; whoever he was, he worked with no thought of self, but for the sole love and glory of God. The cathedral at the present time is in course of restoration under the superintendence of Senor Cassanova. The plan of the building is an oblong, being 414ft. long by 271ft. wide; it consists of five aisles, the two lateral being railed off to form chapels. The nave is magnificent, its height being 150ft., while the dome of the cupola rises to 170ft. The cathedral is lighted by ninety-three windows, some of them being filled with the finest stained glass in the country. The view given is looking up the nave towards the coro to the high altar. The coro is open to the high altar, and is railed off by a fine wrought-gilt reja, the upper part of which is seen; it is the work of Sancho Munoz, 1519; the marble screen, from pier to pier, shutting off the coro from the rest of the nave, is a most beautiful piece of Spanish Renaissance by Bartolomé Morel. The cathedral and its numerous chapels are museums of fine art and curiosities, possessing some of the finest pictures in Spain. GILBERT S. DOUGHTY.

ANTIQUES FROM THE LOUVRE.

This sheet of sculpture represents three of the best groups of Roman statuary to be seen in the great collection of the Louvre. Nero, whose name is the synonym for cruelty and vice, will for ever be associated with works of depravity and brutality. He was the son of Caius Domitius Ænobarbus and Agrippina, the daughter of Germanicus, and was named Nero Claudius Momitius Cæsar. His nightly pleasures were taken frequently in the meanest taverns, and the different scenes of his excesses were found among the vilest characters. Resolved on imitating the burning of Troy, he caused Rome to be set on fire in different places, and during the conflagration, which lasted for nine days, he enjoyed the terrible scene; placing himself on the top of a tower, he sang of the destruction of Troy, accompanying himself with his lyre. He put his mother to death and murdered his wife, Octavia (whom he married when he was only 16 years of age), in order that he might wed his mistress, Poppæa Sabina, the wife of Otho. The odium of Rome's destruction was thrown upon the Christians, and in consequence many were put to cruel deaths. After several unsuccessful conspiracies against him, Nero terminated his own life in the year 68 A.D., in the thirty-second year of his age, after a reign of 13 years and eight months. Wretch though he was, it is said that he had some few to mourn for him, and Suetonius records that some unseen hand had placed flowers on his tomb. Byron thus alludes to this incident at the end of the third Canto of "Don Juan":—

> "When Nero perish'd by the justest doom,
> Which ever the destroyer yet destroy'd,
> Amidst the roar of liberated Rome,
> Of nations freed, and the world overjoy'd,"
>
> "Some hands unseen strew'd flowers upon his tomb—
> Perhaps the weakness of a heart not void
> Of feeling for some kindness done when power
> Had left the wretch an uncorrupted hour."

In brilliant contrast to the dire deeds of Nero stand the records of Trajan's clemency. This Roman Emperor was born at Ithaca. His services to the empire recommended him to the notice of the Emperor Nerva, who adopted him as his son and invested him with the purple. The actions of M. Ulpius Crinitus Trajanus were those of a truly benevolent prince. He died in Cilicia in August, A.D. 117, in his sixty-fourth year, and his ashes were taken to Rome and deposited under a stately column which he had erected in his forum to commemmorate his victory over the Dacians. It is 125ft. in height, and is ascended by 185 steps. Upon the summit was originally a statue of Trajan, but Pope Sixtus V. substituted that of St. Peter when he repaired the column in 1589, and placed a figure of St. Paul over the Antonine Column, which was executed in imitation of the column of Trajan. The celebrated hero Hercules, also illustrated here to-day, ranked as a god after his death. According to the ancients, there were many persons of the same name, but the son of Jupiter and Alcmena, generally called the Theban, is the most distinguished, and his birth was attended with many miraculous events. Before he was eight years old, Juno sent two snakes to devour him, which he seized and crushed to pieces. "The Twelve Labours" which he achieved comprised the slaughter of the Nemæan lion; the destruction of the Lemæan hydra; the catching of the stag with golden horns and remarkable for his swiftness; the seizing alive a wild boar which committed great ravages; the cleansing of the stables of Augias; the killing of the carnivorous birds near Lake Stymphalis; the taking captive a prodigious wild bull; the obtaining the mares of Diomedes, which fed on human flesh; the getting possession of the girdle of the Queen of the Amazons; the destruction of the monster Geryon; the obtaining the apples from the Garden of the Hesperides, and the bringing to the earth the three-headed dog Cerberus. He delivered Dejanira from the Centaur Nessus, whom he killed. The Centaur as he expired gave Dejanira a mystic tunic, which in a jealous paroxysm she gave to Hercules to put on; this he had no sooner done than he was seized with a desperate distemper which was incurable. He erected a burning pile on Mount Æta, on which he cast himself. Jupiter surrounded the burning pile with smoke, amidst which Hercules, after his mortal parts were consumed, was carried to heaven in a chariot drawn by four horses. In the group which we illustrate to-day we see Hercules with the infant Telephus in the palm of his hand. The legend of Telephus, son of Ange, an Arcadian princess, who, while acting as priestess of Athené, was subjected to the violent wooing of Hercules. This unhappy woman exposed her infant on the mountains of Arcadia, where it was suckled by a hind. Mother and child were soon found by Hercules and saved from destruction. The story of Telephus is portrayed on the frieze of the great altar at Pergamon.

RESIDENCE AT WESTCOMBE PARK, BLACKHEATH.

This residence has lately been erected from the designs of Messrs. Higgs and Rudkin, architects, the builder being Mr. H. L. Holloway, of New Cross and Deptford. The building is of red brick, with red terracotta window dressings, hanging tiles, half-timber work, and Broseley tile roof. The entrance hall is 31ft. by 25ft., with a panelled dado and handsome oak staircase and arcading. The house is lighted throughout by electric light.

LONG'S HOTEL, BOND STREET.

This old and important hotel will be very shortly rebuilt on its present site, and with the additional site of No. 13, Clifford-street. The important and commanding character of the intended new building will be seen from the drawing. The hotel will be constructed on the best and most modern principles of drainage and sanitation, in respect of which especial attention will be given. The kitchen departments will be in white glazed bricks. Coffee, reading, smoking, and billiard rooms, with their adjuncts, will be on the ground floor. The upper floors will be specially arranged as sitting, bed, dressing, and bath rooms. The hotel will be provided with a visitors' lift to the several floors, and the hotel generally will be lighted by electricity, with a supplementary system of gas lighting. The work of rebuilding has already been commenced, so as to insure completion by the ensuing season. Mr. William G. Bartleet, F.R.I.B.A., of 2, New Broad-street, E.C., is the architect.

INITIALS FROM THE "LETTERS OF C. TOLOMEUS."

The admirers of Tolomeus, in or about the year 1547, collected many of his letters and caused them to be published, to the number of over 400, in a substantial quarto, by G. Giolito, the famous printer of Venice. Each epistle begins with a fine initial letter, and it greatly taxed the ingenuity of the printer to provide the necessary supply of woodcut capitals. The volume in question contains some three or four distinct series of such letters; prominent among them are a set representing games or sports—thus: A, cards; B, dice; E, jumping; G, ninepins; and V, tipcat. We have selected some of the best of this set of letters in the sheet of woodcuts we have reproduced in facsimile. A few letters of the same character belonging to other series have been included, the subjects in some cases being rather obscure, but the designs are mainly Biblical or mythological. Strange to say, the works of Tolomeus are less sought after by 19th-century collectors for their intrinsic literary merit than they are for these numerous initial letters, and the book has been so ruthlessly cut to pieces on this latter account that it is actually "scarce." What a sad fate for an author after over 300 years! There are sixty different letters in the entire volume.

ST. CHARLES'S HOME, BULLINGHAM.

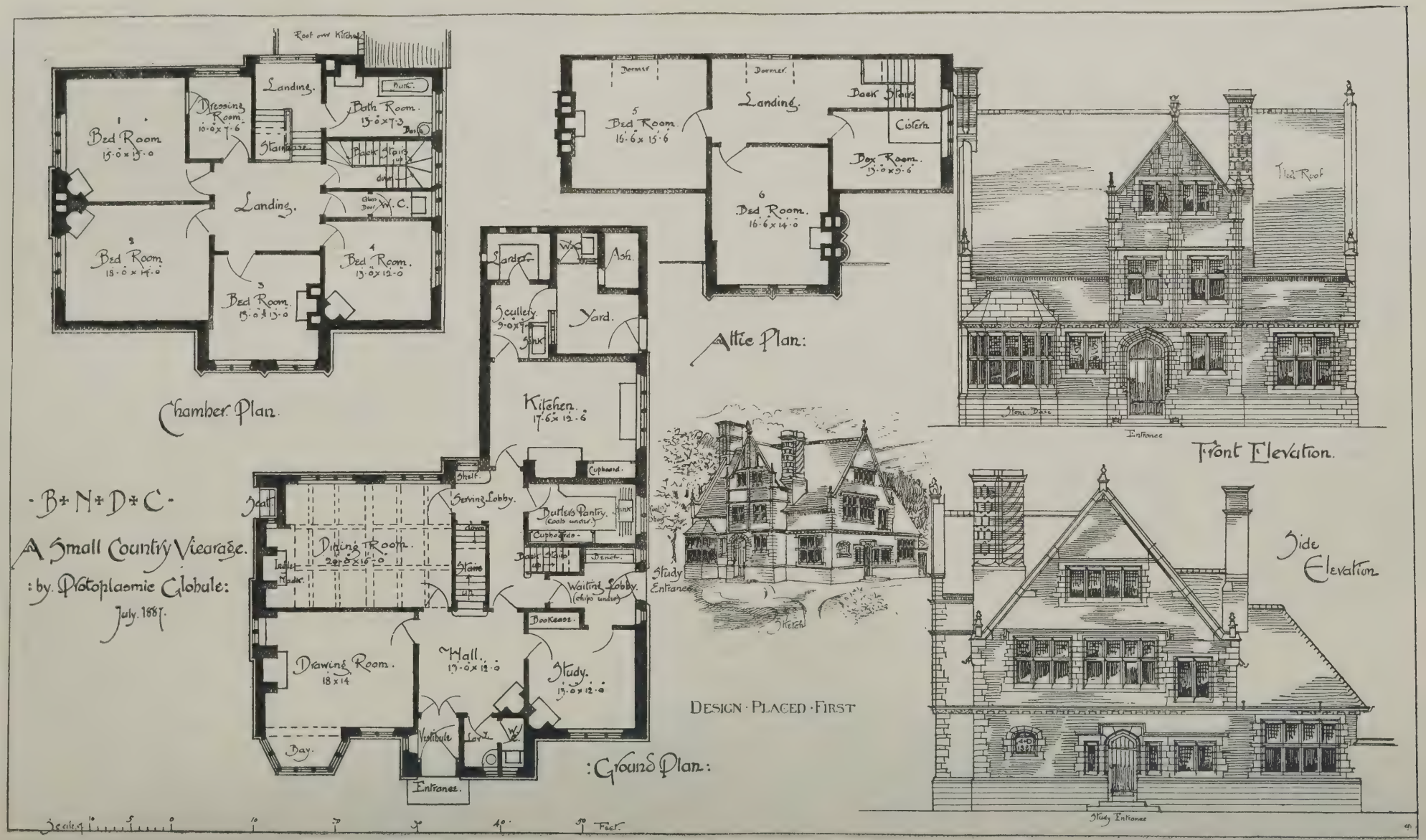
St. Charles's Home, just erected at Bullingham, near Hereford, was built by Mrs. Delabarre Bodenham, of Rotherwas, and is intended for a home for old people on Rotherwas Estate. The materials used in the construction are the local red brick, with dressings of Bromsgrove stone, which harmonise well with the brick. All the external woodwork is of oak. The roofs are covered with local tiles. The cost has been a little over £1,000. Mr. T. Taylor, of Hereford, was the contractor; and the architects were Messrs. Pugin and Pugin, of London.

The foundation stone of a new Wesleyan lecture hall and class rooms was laid in Dilston-road, Newcastle-on-Tyne, on the 24th ult. Mr. J. W. Taylor, of Westgate-road, Newcastle, is the architect, and the building, which is Late Gothic in style, and built of local stone, will accommodate 400 persons, at a cost for erection of £1,300. Mr. Joseph Elliott, of North Shields and Newcastle, is the builder.

The death is announced, at the age of 70 years, of Mr. John Palliser, C.M.G., F.R.G.S., by whom the international boundary line between British North America and the United States was topographically determined across the main chain of the Rocky Mountains, and thence to the Pacific Coast, in 1857-60.

A Local Government Board inquiry was held at Andover on Wednesday week before Major Hector Tulloch, with respect to an application from the town council for sanction to borrow £1,000 for paving purposes. The inspector said he should report favourably on the application.

The new bridge over the Medway, between Rochester and Strood, which is being reconstructed for the South-Eastern Railway Company, in connection with their extension to Chatham, is rapidly approaching completion. Messrs. Cochrane and Co., of London, are the contractors.


Roof over Kitchen
Landing.
Bath Room
15·0×7·3
Dress.
Dressing Room
10·0×7·6
Bed Room
15·0×13·0
Stairs
Plaster Stairs
up
down
Glass Door
W.C.
Landing.
Bed Room
18·0×14·0
Bed Room
13·0×12·0
Bed Room
13·0×13·0
Chamber Plan.
Dormer
Dormer
Landing.
Back Stairs
Cistern
5
Bed Room
16·6×15·6
Box Room
13·0×9·6
6
Bed Room
16·6×14·0
Attic Plan:
Flat Roof
Stone Dress
Entrance
Front Elevation.
Larder
W.C.
Ash.
Scullery
9·0×7·0
Sink
Yard.
Kitchen
17·6×12·6
Cupboard
Shelf.
Serving Lobby.
Butler's Pantry
(Coals under)
Sink
Cupboard
Bench.
Hall
Dining Room
20·0×16·0
Ladder
Hatch
Stairs
Waiting Lobby
(Coke-hole under)
Bookcase.
Drawing Room.
18×14
Hall.
17·0×12·0
Study.
13·0×12·0
Bay.
Vestibule
Lav.
W.C.
Entrance.
Ground Plan:
Study Entrance
Side Elevation
Study Entrance
B N D C
A Small Country Vicarage.
by Protoplasmic Globule:
July. 1887.
DESIGN PLACED FIRST
Scale of Feet

"BUILDING NEWS" DESIGNING CLUB.

SUBJECT R.—A COUNTRY VICARAGE.

WE have no doubt whatever as to the superior merit of the design for a country vicarage contributed by "Loidis," considered only in respect to its architectural treatment; but with equal certainty the plan by "Protoplasmic Globule" is in most points preferable to it, and in house building, particularly in vicarages, where the occupiers cannot select their own houses as the laity can, a good plan necessarily is of primary importance. The elevations of "Protoplasmic's" design are tasteful and quiet in style, with little really to find fault with, though he cannot in this case claim either much originality or any particular home-like character for his building. The point which governs the plan of such a house is the position of the study, with its waiting lobby and separate external entrance. This has been fairly well provided for in this design, and the parish people calling on their clergyman are isolated from the body of the house; and, moreover, which is of great importance, they do not pass any of the reception rooms or the front door, thus leaving the privacy of the dwelling unimpaired, both outside as well as in. The hall is square and light, while the two parlours are well planned, save that the door of the dining-room would have been better placed facing that of the study. At present it crowds upon the dining-room entrance. The staircase ought not to face the front door, and the stairs seem more pinched on the ground plan than they would be in reality. The kitchen is of a proper size; but the other offices are needlessly crowded. The ingle nook window in the dining-room should command an outlook, but as here shown it peeps only into a garden-seat recess. The ornamental chimney stalk adjoining the entrance gable is rather too big in drawing in the perspective. "Loidis" fails, as we have already said, with his plan, but he takes the second place, most assuredly, and we commend his elevations for their pleasing grouping and good proportions. As both these designs are illustrated herewith, our readers can at once follow the rightness of our award. The hall is somewhat similar to the last; but the study is so contrived that every person coming to see the vicar officially must go in front of the drawing-room windows, command a view of the verandah leading from the dining-room, and look right into the study itself; while the projecting bay window, pretty feature that it is, quite shuts off all view of the study door from anyone approaching the house. This the perspective sketch will show. The corridor between the kitchen and the dining-room is awkward, and so are the stairs for convenient service from the kitchen, which indeed is itself much too small for adequate service. The back stairs are badly placed, and effectually spoil the bedroom over the kitchen by rendering the connecting corridor necessary. In other respects the first-floor plan will pass muster, but the bath-room is too publicly situated, and the w.c. ought to have a lobby to it, and should not open off the staircase. "Norseman" sends a rambling plan, very disconnected in its exterior treatment; nearing, in fact, positive ugliness as seen in the perspective. The pastor's study is well isolated from the house, and the ground-floor lavatory and w.c. arrangement is good; but the waiting-room, thus thrust to the front of the house, suggests too much the idea of a public relief office or tax collector's office rather than the entrance to the sanctum of a spiritual adviser or confidential friend. The big windows of the houses beyond seem to indicate worldly grandeur and opulence, and thus they serve to mark unnecessarily the mean commonplaceness of the "study door" already noted. The dining-room and drawing-room are convenient, and the servery connecting the kitchen with the former is well placed, though it would be rather dark. The first floor is, generally speaking, well planned, subject to the remark that the w.c. and bath arrangements would bear considerable improvement. After "Norseman's" design comes that sent in by "Truth," who seems to have studied somewhat lightly the designs of the late E. W. Godwin. There is a crudeness also in his plan, but it realises the needs of a parsonage better than many others, while the study and its separate entrance are practically considered. The staircase has all the look of being dark, in spite of the words "window over" written by the wall of the linen closet; and, besides, the servery under the staircase would be in complete darkness. The exterior of the house, though high-shouldered in effect, would look rather well, and it has an air of quaintness worthy of note amidst so many uninteresting designs. "Iota" has merits in this contribution of his to the club, and his plan shows thought and study of detail, which is duly noted. The w.c. at the end of a long corridor leading off the main landing is, however, an instance of sheer carelessness — nothing could be worse. The exterior of this design is over-windowed, and no elevation is given of the entrance front. In the view, the garden entrance, with its over-depressed archway, looks too important. "Iota," with a little more experience, should rank higher in the contests yet to be inaugurated by our club. "Aspirant" knows how to work well, but not too wisely. There are numerous excrescences in his plan and windows, of all shapes and sizes, which need trimming. Here, too, is instanced another example of how not to plan a priest's study. The waiting-room to it is made too much of without really being convenient. The elevations are creditably drawn. "Omega" comes last among the designs of the first order of merit. Had his drawings been a little more refined he would have commanded a higher place, seeing that his plan is in some respects a very good one. The study entrance is too prominently treated, however, and the huge landing on the first floor is wasteful in the extreme. An isolated dressing room is little better than a dress closet, although in the elevations it may be marked, as here, by an important gable.

"Try Again" takes rank among the best designs of the second class in the competition. His plan evinces a sense of size and compactness which we have not overlooked. His waiting-room for callers on the pastor is situated in juxtaposition with the scullery, and forms, in fact, the only way between the kitchen and that necessary apartment. The back staircase leads also out of it. Such a series of conveniences for the parish caitiff or easily-tempted thief cannot be considered desirable, and spoils the other advantages of this plan as well as the elevation, which it illustrates; thus, we may with advantage repeat the author's motto and tell him to "Try again." "Elean" sends an unfinished drawing of a design not up to his usual standard either in plan or architecture. "Alley N." makes his study doorway compete with the principal entrance, and so visitors would find great difficulty in judging which archway might lead to the front door. In the perspective view both seem to lead to each other with a cloister between them. The plan itself is better, and without being distinguished by any originality of a special kind may be described as decidedly convenient. The sketch illustrating "Ierne's" design rather spoils its effects, but after allowing any merits which the elevations possess we find the plan both poor and disjointed, lacking a central point of interest and all air of comfort. The party wall, dividing as it were the house in two, may account for this failure. "A Student" sends a plan which suggests that its author with a more lengthened study will do better, for there are decided merits in his arrangements of plan. The study and its own door have clearly proved too much for him, and whichever way you approach the house the relative positions of the front door and this subsidiary one seem wrong. The principal entrance is out of sight round the corner in the sketch given. "En Avant" has a quaint elevation for his vicarage; but the view here also spoils it. The dining-room, with its two bays, is rather too pretentious, and the hall would be dark and ugly. The main idea of a clergyman's home is rather lost sight of.

Of plans in the third series of merit we have to enumerate "Vitruvius," with a top-lighted stair (?); "Lost," with a wonderful portico finished with a barge board, though his arrangement for the study by the side of the house realises far better than many other plans what a clergyman needs in the way of a waiting-room and separate doorway for his parishioners; "Rab" attempts a bird's-eye perspective, but evidently it is only a trial task. Another time the results may be better; at present the effect is very bad. His study and waiting-room are very good, and the author is anyhow a practical man, who, with a well-directed inquiry into the requirements of good planning, will avoid the crude features which now spoil his composition. Architecturally, he has clearly much to learn. Last in our list ranks "Stag," who, in case his building should be mistaken for, perhaps, the booking-office of a country railway-station, carves on a circular panel over the front door an inscription which he who rides may read "The Vicarage." We make this remark in all kindness, for the author fails entirely to suggest a gentleman's home by the design submitted, with its round tower and conical roof over it. On plan, this feature forms a circular study—a most inconvenient arrangement—while the flag on top of the roof is quite out of character. Nothing could be more awkward, too, than the angle porch forming a waiting-room for the visitors to the circular study.

SUBJECT S.—A CRICKET PAVILION.

"Protoplasmic Globule" wins the first place again for this subject, "Northumberland" coming second, and there being only one other competitor, "Lawton" comes third. The selected design we shall illustrate in due course, when the details of its ingenuity of planning will be understood better than by a verbal description here. The second best plan has a capital ladies' gallery and some good dressing-rooms. The committee are well isolated, and the players' terrace adjoins their room. Externally the design, too, though cramped in effect, is suitable. "Lawton's" design is more of the regulation type of building, and fails from its want of interest.

CHIPS.

A new hotel, erected on the site of the Duke's Head Inn at Skinburness, on the Cumberland coast of the Solway Firth, has just been opened. Mr. Ferguson, of Carlisle, was the architect, and Mr. E. H. Banks the builder.

The late Henry Cox Wilkinson, late of Enfield, has bequeathed bronze heads of Pope Clement VII. and Pope Sixtus V. to his wife for life, and then to the Science and Art Department, South Kensington.

The tower of Bradninch Church, Devon, which was struck by lightning in December last, has just been repaired by Mr. John Glover, of that village, under the superintendence of Messrs. Hayward and Son, of Exeter, from whose designs the general fabric is about to be restored.

The Wolverhampton board of guardians have decided to build new workhouse schools for 200 children at Wednesfield at an estimated cost of £12,000.

The People's Opera House at Stockport was burnt down on Friday. It was built for use as a temperance hall, and had recently been enlarged and rendered otherwise more suitable for music-hall purposes.

A commencement was made last week in the demolition of buildings in West Tower-street, Carlisle, preparatory to the erection of new markets from plans by Mr. Cawston, of London. Messrs. Hodgson, of Workington, are the chief contractors.

The parish church of Seamer, near Scarborough, is about to be restored at an estimated outlay of £2,400. The pews are to be repewed by open seats, and new roof to nave, new pulpit and other fittings provided.

A memorial chapel is to be added to St. Jude's Church, Southsea, in memory of Sir Owen and Lady Lanyon. It is to be adorned with mosaics, and two monuments—one to Sir Owen and the other to Lady Lanyon—will be placed in it.

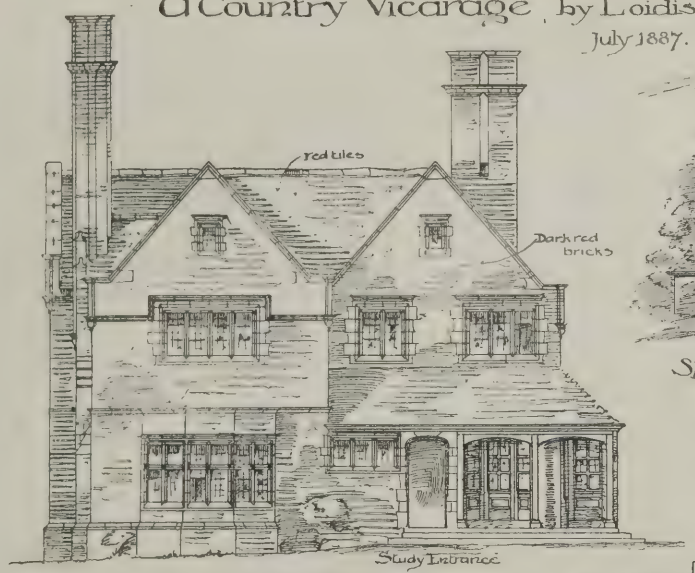
The new technical institute, Keighley, will be opened on Friday, October 14, by the Worshipful the Master of the Clothworkers' Company. Lord Rosebery and Professor Huxley will also take part in the opening proceedings.

The restoration of the parish church of Hayton, near Brampton, Cumberland, was commenced on Monday. Mr. T. Taylor Scott, of Carlisle, is the architect.

The statue of General Gordon for Aberdeen, by Mr. T. S. Burnett, A.R.S.A., was cast in bronze on Friday, by Mr. Walker, at the Grove-street Foundry, Edinburgh, in the presence of the artist and a number of friends. The statue, which is 9ft. in height., will be taken out of the moulds about a week hence, and it should be ready shortly thereafter to be placed on its pedestal in front of the new Art School Buildings in the Granite City.

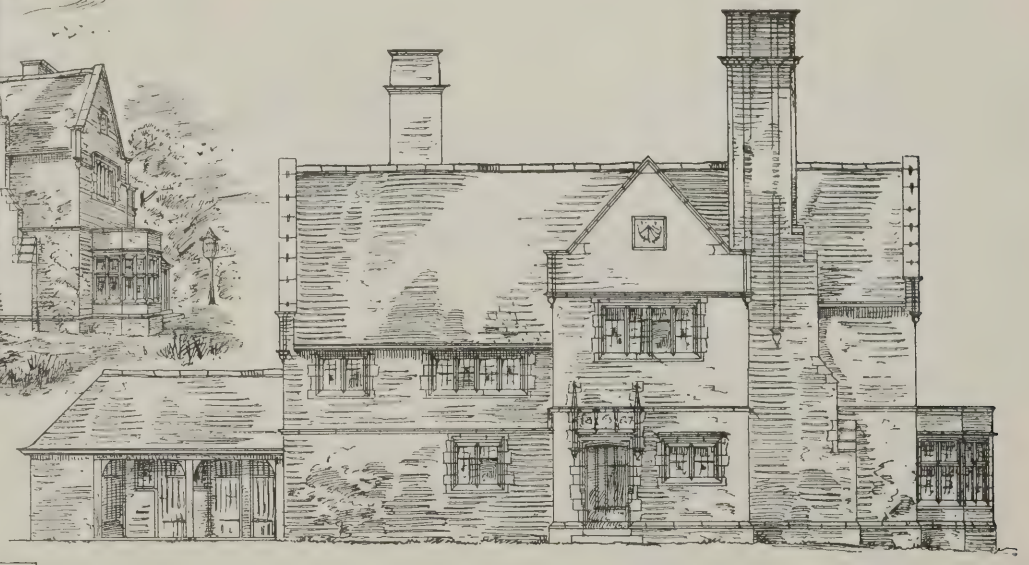
A Country Vicarage, by "Loidis"

July 1887.

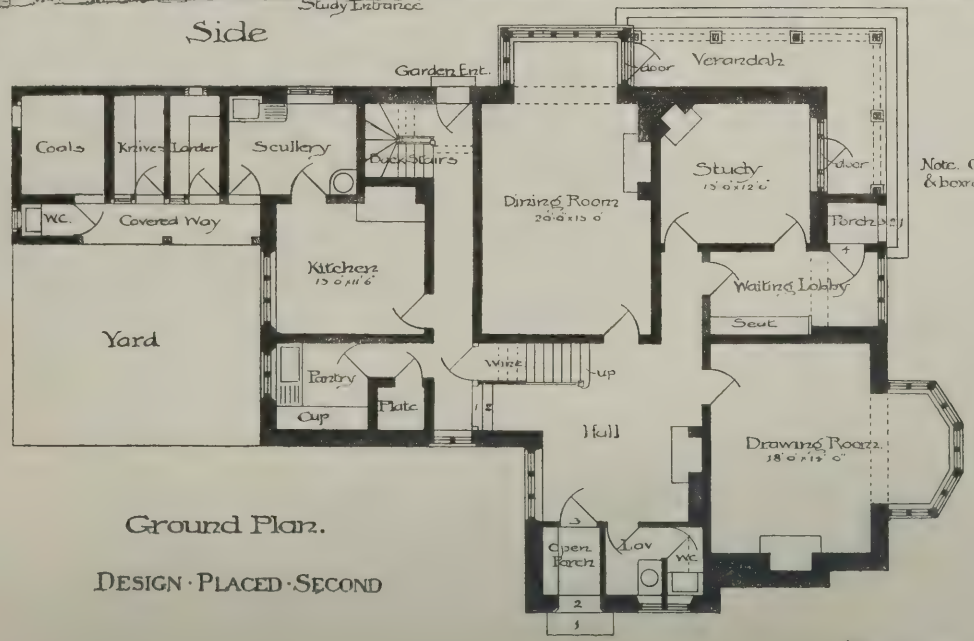


Side



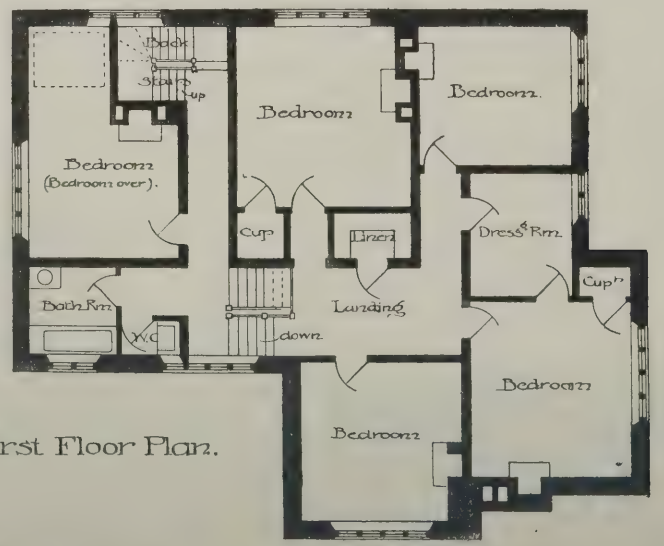


Front.



Ground Plan.

Note. One bedroom & box room in roof



First Floor Plan.

DESIGN · PLACED · SECOND

Scale.

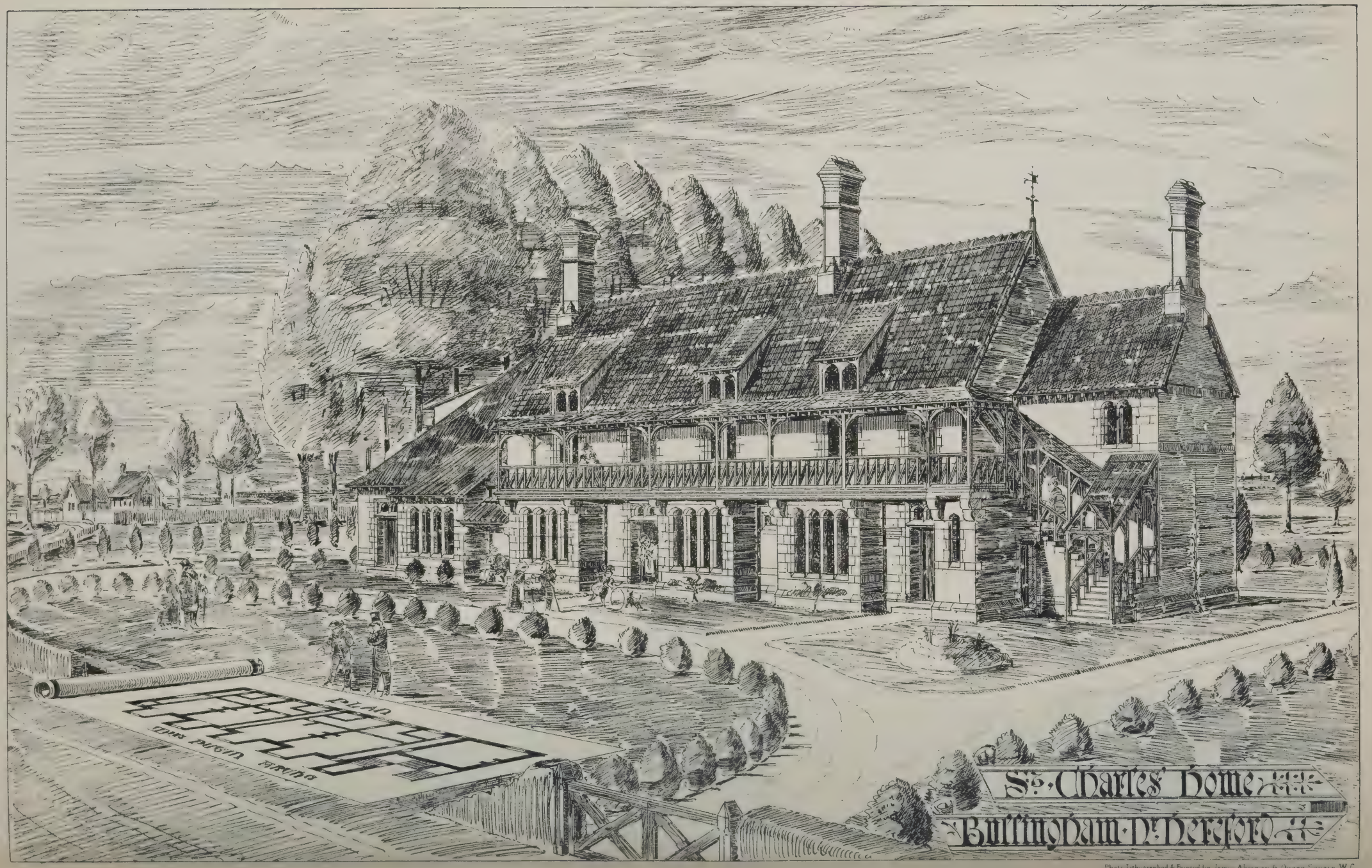


Photo-Lithographed & Printed by James Akerman 6 Queen Square W.C.



Photo-Lithographed & Printed by [illegible] Ammann, 6, Queen Square, W.C.

HIGGS AND RUDKIN.
ARCHITECTS.

ANTIQUES



NERO

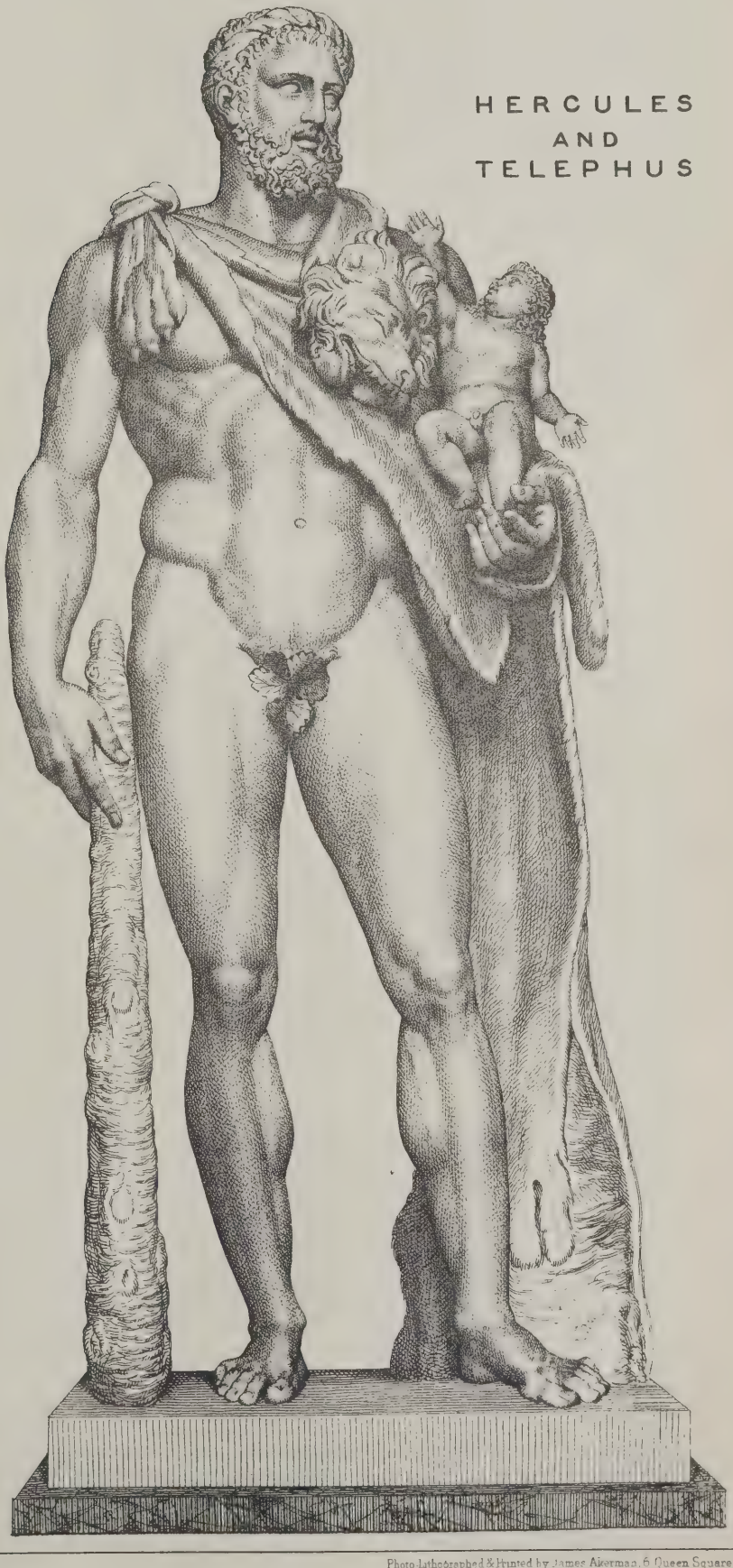


TRAJAN

FR

M THE LOUVRE.





HERCULES AND TELEPHUS

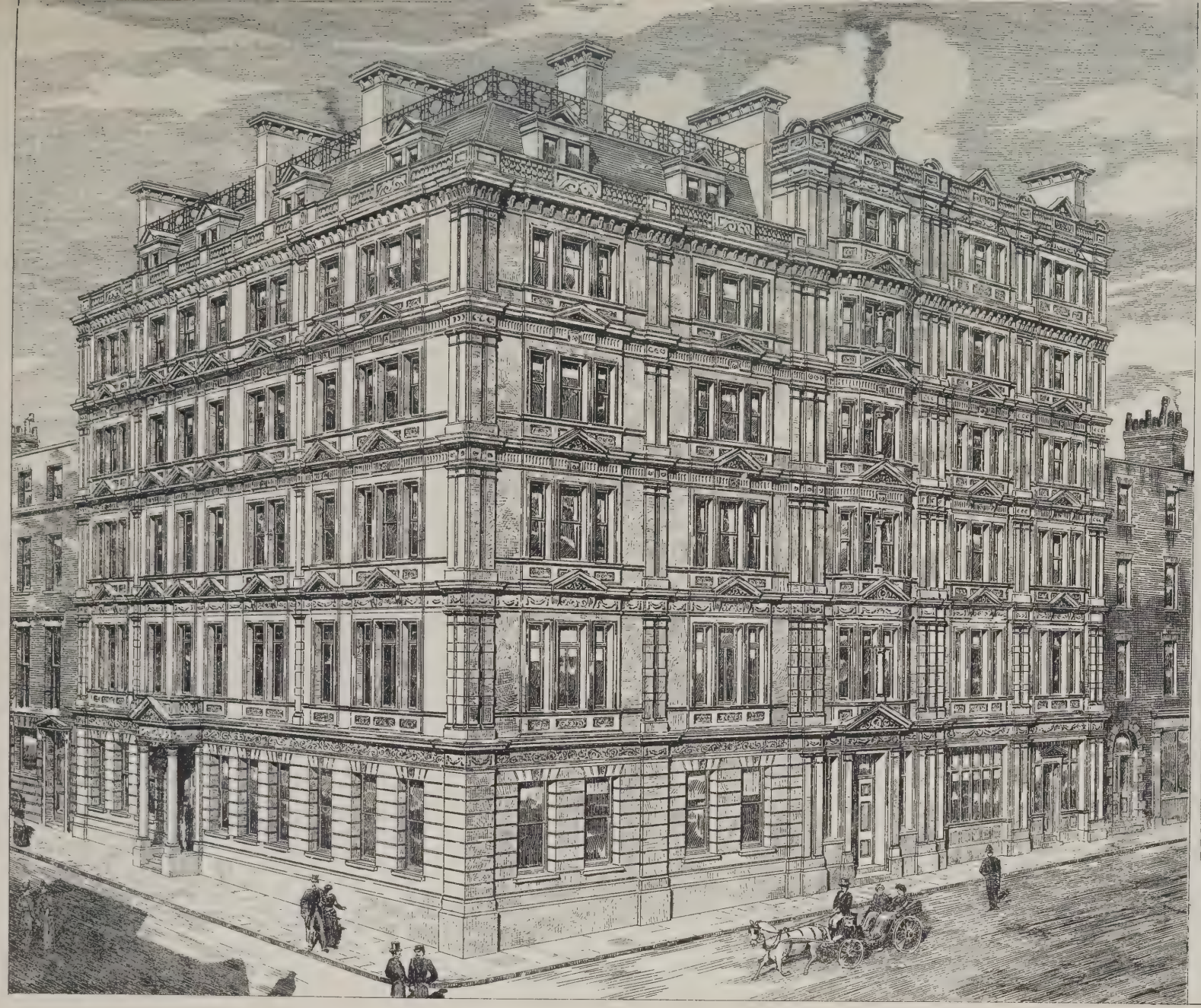
Photo-Lithographed & Printed by James Akermaa, 6 Queen Square, W C



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

INITIALS FROM THE "LETTERS" OF CLAUDIO TOLOMEUS,
PRINTED BY GABRIEL GIOLITO OF VENICE, 1547.

Long's Hotel, Bond Street







William J. Beattie R.I.B.A.
2 New Broad Street, E.C.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

B.N.D.C.

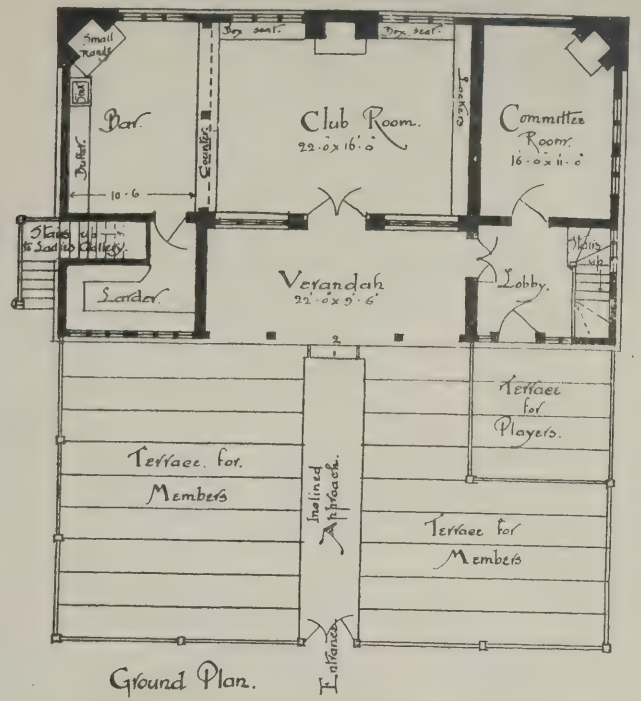
A Cricket Pavilion by Protoplasmic Globule.

July 1887

DESIGN · PLACED · FIRST

Note. Form accommodation on Terrace for 218 Adults.

Inclined Approach to be Earth banked up with Cinder surface



Ground Plan.



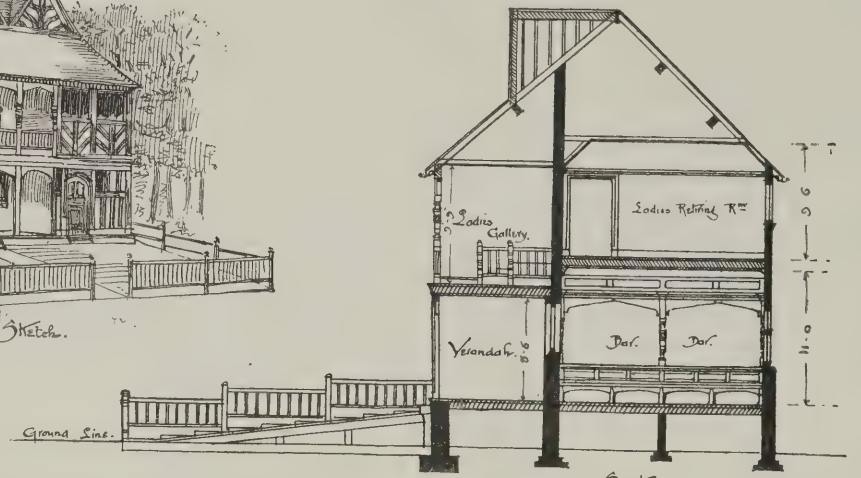
First Floor Plan



Sketch.



Front Elevation.



Section.

Scale of 0 5 10 20 Feet

WAYSIDE NOTES.

LITTLE that is of vital importance seems to have occupied the attention of the architectural topical world during the last two weeks or so. Holiday-making appears to be the chief theme of those who have been, or are going, away. The "big gooseberry season" of the architectural year may be said to have commenced with the closing of the R.I.B.A. on the 31st ult. Since my return from Brittany I have learnt that the A.A., or a portion of that body, have had a very enjoyable excursion in the West of England; that many societies and associations interested in archæological matters have also organised holiday excursions combining instruction with pleasure; and that individual members of the profession, from the most august personages down to the gentleman who grinds up the Indian ink, have been, and now are, travelling far and wide in the cause of architecture. With new ideas and the mind stored with fresh forms and scenes, we almost forget that the parish of St. Martin's-in-the-Fields possesses a church with a very self-asserting portico, or that there was ever a competition for an Imperial Institute.

From the church of St. Martin's-in-the-Fields, the tide of discussion seems to have turned turned towards St. Mary-le-Strand. This "dangerous structure" (!) has now the honour of being the subject of a spirited correspondence in the *Times*. Alarm as to the condition of the edifice would appear to be of periodical occurrence. Fifteen or sixteen years ago, when the interior of the church was refitted under the direction of Mr. R. J. Withers, there must have been fears as to the safety of portions of the stonework, as at the time several vases were taken down from the parapet of the west front, and never replaced. Considerable friction existed between the rector and churchwardens when these improvements were effected, so much so that the latter individuals would have nothing to do with the rector's architect, but actually employed a "common stonemason" to "tinker-up" the exterior and remove the aforesaid vases. This was about 1871 Anno Domini. In 1878, as we may all learn from letters to the daily papers, the church was again overhauled, and the remaining vases received some attention. But now, in 1887, there is considerable danger of their disappearing altogether.

I have seen a curious old print of the church, which must have been published soon after it was built, as the figures represented are all in the quaint costume of the period, and there is a regular Sedan chair being carried in the roadway. The perspective of this picture is quite wonderful; but otherwise it is not a bad representation of the building when it was complete to a vase. One rather strange feature of this print is that over the semicircular western porch is shown a statue. This must either have been removed, or else, as is more probable, it only existed in the imagination of the artist.

There are no new competitions announced that are of any note, if we except the scheme for the proposed new Parliament House at Buenos Ayres. Invitations are, I believe, to be issued to architects of all countries to compete for this building. If, as is stated, the premiums are to be two in number of £8,000 and £2,000 respectively, they are uncommonly liberal towards architects in the Argentine Republic; so much so that one is inclined to think there must be a mistake somewhere of a cypher at the end of both amounts. There is a rumour of another large building being required in foreign parts—viz., an Imperial Institute for New South Wales; but it is probable that even if there be any competition for the work, it will not affect British architects.

The result of the Scarborough Club, and of the Stockport Technical School, competitions must be considered satisfactory, if we judge by the fact that no local men have obtained premiums. True, this circumstance does not *always* warrant fair-play; but in nine cases out of ten it indicates an honest decision. Disappointed competitors, however, can generally show us things in a different light. According to these gentlemen, there never was, nor will ever be, a fair award.

The eleventh hour has now come for those who contemplate entering the Gloucester Baths Competition. It is worth the attention of men who have the time to spare and a sound knowledge of bath construction and the details of their fittings.

And, according to all accounts, there are many with spare time on their hands just at present. The amounts in the lists of tenders, too, have been latterly rather modest. It is really astonishing that an architect will advertise his own weakness by publishing lists of tenders not even out of their teens. What possible good can it do a man to let the world know he has been commissioned to erect a pigeon-house in his neighbour's back garden? Yet we have tenders often published which are about as important. We may expect something like the following some day:—

BEDFORD PARK.—For the erection of a Queen Anne dust-bin for Mr. ———. Mr. T. Square, F.R.I.B.A., architect. No quantities supplied:—

Mr. Bungler*	£55 15 7
Messrs. Arrant Swindler and Co. ...	15 10 0
Messrs. Fairplay...	7 0 0
Mr. Romantique†	4 10 0
Mr. Careless**	1 10 0

* Withdrawn—error in cast. ** Withdrawn. † Accepted—subject to modifications.

It may possibly be of some little interest to the reader to know whither I wandered after leaving Caen. There was much to see at this latter place, but chiefly of an ecclesiastical nature. So numerous, in fact, are the churches of Caen, that there are, at least, two now abandoned—one near the Abbaye aux Dames, which is shut up altogether, and the other at the opposite end of the town is now used as a cart-shed, and is full of carpenters' and joiners' rubbish. From Caen to Bayeux, Bayeux to St. Lo, and St. Lo to Coutances, I journeyed to Avranches, on the borders of Brittany. All the above towns are full of magnificent architectural remains. At Bayeux, too, anyone fond of a joke in earnest should visit the world-renowned tapestry, as the figures are most quaint, and infinitely more ludicrous than anyone could have made them if they had tried to do so purposely. At St. Lo there is a very fine cathedral, with a unique external pulpit of beautiful design. On the west front of the building the reader will recollect there is some exquisite Flamboyant work, that is represented in "The Seven Lamps of Architecture." The whole west front of St. Lo is very beautiful and delightfully unrestored. The mosses and lichens on the old stones are of quite a golden tint, and grasses and other plants flourish in the nooks and crannies of the carvings. At Coutances there is a fine cathedral and two interesting churches. I inquired somewhat more deeply than usual into the internal economy of this cathedral, wandering about the roofs and vaults of nave, aisles, transept, and lantern. When I left Coutances and arrived at Avranches, and had climbed to the citadel-like town and stood upon the terrace in the beautiful public gardens, I was reminded of Sir Charles Eastlake's picture of "Pilgrims in sight of Rome." For there before me I beheld what was in many senses the object of my pilgrimage.

I have made several attempts to "draft" a description of this distant view of Mont St. Michael from the terrace at Avranches, but have failed to produce anything satisfactory, so will not attempt it now. It is really a most magnificent sight, and I had the pleasure of beholding it both in the glow of sunset and the grey light of early morning. Subsequently, I visited the wonderful Mont, and after seeing the strangely interesting town of Dol, and the height near known as Mont Dol, left for home viâ St. Malo. Of the marvellous beauties of Mont St. Michael I have not now time to write. It is, in fact, almost impossible to adequately describe its glories, either of form or colour, its architecture or its natural beauty, it wondrous mass or wealth of detail. The architecture of Mont St. Michael has almost the appearance of a spontaneous growth, as from the wave-washed masses of granite at the base of the rock there is a regular scale of gradation in point of elaborateness till we reach the bristling pinnacles that crown its summit.

GOTH.

THE ADMIRALTY AND WAR OFFICE COMMITTEE'S REPORT.

THE report of the Select Committee on the Admiralty and War Office sites, containing the proceedings and minutes of evidence which has been published in the form of Blue Book, narrates in official language the history of this important public competition with which our readers are now pretty familiar; and we may refer to it again in the light of the evidence which has now been published. On the 4th of March of the present year a select committee was appointed to reconsider the plans and proposals for an Admiralty and War Office, who were further instructed to inquire whether some or all of the existing buildings of the Admiralty might not be retained with advantage; this committee, in fact, was appointed in place of the one nominated in 1885 for the same purpose, but which never met, owing to the resignation of the Government. We may say that Messrs. Leeming and Leeming, the successful competitors for the new buildings, had received instructions to proceed with the plans of the basement portion of their design, and had made considerable progress with them when the Select Committee of the House of Commons was appointed to re-consider the plans. The report from which we take these facts observes that "it is on all sides admitted that Messrs. Leeming and Leeming ably carried out the task assigned to them, and their plans have received high commendation from distinguished architects; while, on the other hand, objections have been taken, and strong feelings have been expressed against the whole scheme." No committee could say more in vindication of Messrs. Leemings' designs, while the evidence published furnishes to our minds conclusive reasons why a grand whole, and not a piecemeal structure should be adopted. Since the idea of reducing the expenditure and making an extension to the existing Admiralty buildings has been entertained, we have hesitated to believe that any successful extension of the old buildings, commonplace and cramped as they are, can be made, though we must confess that the plan and elevation of the proposed additions to that building as prepared by Messrs. Leeming, at the suggestion of the committee, and illustrated in plates 4 and 5 of the Report, show a dignified extension of the old structure towards the Park at the rear. They are designed in a plain style, harmonising with the solid though bare 18th-century building which now does service in Whitehall. In plan this proposal consists in adding a right-angle block of buildings to the rear of the old Park front of the Admiralty, in such a manner that the Park front of the old structure will form one of three sides, inclosing a quadrangle 198 feet square in Admiralty-gardens. On the south side of the inclosure, opposite the Parade, will be a screen of Doric columns, something like that before the Admiralty. The new façade parallel to the screen, and forming the main block, is proposed to have a slightly projecting centre, pedimented, surmounted by a low dome and adorned by attached columns of the Ionic order. This will form the entrance. The end of the return new block is similarly treated with engaged columns and pediment and flat domical roof, and the corresponding side, forming the present end of the Admiralty block facing the Parade, will be also marked by a similar arrangement; but the present Park façade of this block is very plain, and will be left much as it is. The internal façades will thus present an entrance block facing the Parade, relieved by columns and central dome and two plain return fronts, one of which is the present Park front of the Admiralty. The rusticated basements at the end and the palladomical treatment proposed harmonise with the old buildings and Parade elevation of the Horse Guards.

But let us briefly refer to the proceedings of the Committee. It consisted of the following members:—Sir William Harcourt, Lord George Hamilton, Mr. Henry H. Fowler, Mr. Jackson, Mr. Sclater Booth, Mr. Shaw-Lefevre, Colonel Malcolm, Mr. Howell, Mr. Dillwyn, Mr. Ed. Hardcastle, Mr. William Bright, Mr. Seagar Hunt, Sir William Crossman, Mr. Patrick Joseph Power, Mr. Byrne, and Mr. David Plunket. Many interesting fac

re referred to in the minutes of evidence with gard to the site, the old Admiralty buildings, ie designs by Messrs. Leeming, and the em-loyment of those gentlemen. The evidence of ie Right Hon. G. Shaw-Lefevre forms a very nportant contribution. The old Admiralty, he uly observes, has always been considered poor taste; while the front portico is in bad propor-on. He observes, "With regard to its frontage the Park, it is an interesting old building no great artistic merit, but one which, apart om other considerations, one would be rather ad to retain." Yet nobody had thought of taining the existing buildings or had said uch in its favour. The Surveyor of the ffice of Works, Mr. Taylor, had found that ie foundations were "bad and insecure; so nch so that it would be impossible to add to ie building by adding another story; the cond-floor rooms are low, the attic story ot suitable for official purposes, and the nitary arrangements are imperfect." Mr. aw-Lefevre affirms that if the building to ntain the whole of the Admiralty officials ould cost £320,000, and if the present building ere retained, which will only house one-fifth them, the saving would be only £65,000. ill, a War Office site would have to be found. n the other hand, a portion of the Spring ardens site would be left, which is worth 266,000, after allowing for a roadway to ckingham Palace. Referring to the com-tition, in which Messrs. Leeming's design as placed first, Mr. Shaw-Lefevre, when ked whether he thought that the competi-on was a fair representation of the architec-ral talent of the country, plainly answers: was. He was the only person who knew the mes of the 128 who competed, as it ll to his duty to open the envelopes with the mes, in order that the plans might be re-rned. We cannot here quote the replies in ll; but the tenor of them is that Messrs. emings' design was certainly the best, and as also unanimously selected by the judges. essrs. Leeming have, despite certain remarks d criticisms, proved themselves equal to the casion: the evidence adduced by Mr. W. Bright convincing on this point, and both Mr. ristian and Mr. Hardwick, the professional lges, have reported that the Government re fully justified in employing those gen-men as architects. Upon this, instructions re given to them to commence working wings, and they naturally looked upon their pointment as confirmed. They disposed of ir Halifax business, and came up to ndon. It is further recorded in this nute of evidence, that the only competition t they have since entered upon, the new nicipal buildings in Edinburgh, was decided their favour also. Mr. Lefevre's experience buildings, and his good taste and architec-al knowledge, make his evidence of par-ular value. He says: "I undertake to say t the plan of Messrs. Leeming and Leeming, regards its interior arrangements, cannot well improved upon. It is infinitely superior ny existing public building that I know of. n perfectly prepared to defend the scheme n all points upon which it has been criticised ersely as regards its interior arrangements." Christian's evidence is equally strong. He s distinctly that he considers Messrs. Leem-s' design "the work of a master of the t." Referring to the internal arrange-nts, Mr. Christian speaks highly of the ting and ventilation of the building, and of corridors specially, several other plans ing been condemned on those grounds. J. McVicar Anderson agrees substan-ly with Mr. Christian, and observes Messrs. Leeming have won their posi-honourably in competition, and that he resented the feeling of the profession gene-y. Mr. Philip Charles Hardwick also ex-ses similar opinions upon the merits of the gn. Alluding to the alternative plan by srs. Leeming, showing the extension of the ting Admiralty, Mr. Hardwick observes he uld be sorry to see it adopted instead of the selected. He thinks it a mistake to take old structure as the datum of a large new ding as regards the elevation. He even ks it would be preferable to cut down towers and reduce the external orna-ation than to extend the old Admiralty. rs. Leemings' elevation, he says, has one quality—fine proportion. "If you cut off all the ornament from Messrs. Leemings' building there will still be a stately structure." We may add that Messrs. Leeming, in their evidence, approve of Mr. Taylor's plan in the main, taking the present Admiralty buildings as an integral part of the arrangement. The plan illustrated is based upon this idea, the Park front determining the treatment of the elevations, which are simple.

The report concludes that by making additions to the present Admiralty all the requirements of that department may be suitably provided for; that this work, including repairs to the existing buildings, can be done at a moderate cost, and may be completed within two or three years; that a very large reduction of expense for building would thus be secured. Space and time forbid us noticing further the evidence elicited by Mr. Shaw-Lefevre, Mr. Isaacs, Sir W. Harcourt, Mr. Hardcastle, the Hon. David Plunket, and others. The evidence of Mr. Taylor is of particular value, to which we should have liked to refer in detail. The Right Hon. W. H. Smith's evidence is instructive. He finds no complaint with the internal arrangement of the design, and admits the architects showed great ability and skill, but says, "I am not satisfied, and never have been satisfied, with the conditions, nor have the late First Commissioners themselves." From the whole, it is pretty evident that some one has blundered in the first instance, and, as usual, the architects who complied with conditions have had the brunt of the mistake to bear. As Mr. McVicar Anderson points out, the great public improvements, the widening of Whitehall, and the opening of the Mall, ought to have had the first consideration. But we break off here. The plans in the appendix are seven in number, and include the plan of the site with Messrs. Leemings' first design—the view of the building towards the Horse Guards Parade; then alternative elevation, suggesting the reduction of height of the south-eastern wing next the Horse Guards; the plan of proposed additions to the present Admiralty, to which we have referred, elevation of the same, and sections of proposed alteration to that building; also a plan of proposed new War Office on Whitehall-place site.

COMPETITIONS.

Chelmsford Workhouse.—The Chelmsford Board of Guardians considered, on Tuesday week, the plans sent in under motto by three local architects—Mr. Fred. Chancellor, Charles Pertwee, and Frank Whitmore—for the rebuilding of the workhouse. A committee reported that they had considered the three schemes under the mottoes—"Union is Strength," "Adaptation," and "Kelpie," when, the last named plan having been eliminated, there appeared six votes for "Union is Strength," and four for "Adaptation." The Board adopted the recommendation of the committee that the plan "Union is Strength" be selected, and on opening the sealed envelope this proved to be that by Mr. Chancellor, while "Adaptability" was sent in by Mr. Pertwee. The Building Committee were instructed to meet Mr. Chancellor, and complete the plans and specification for the Local Government Board.

CHIPS.

The building committee of Heath Town local board have accepted the plans of Mr. C. Manton, architect, Wolverhampton, for the erection of new offices on the Wolverhampton-road at a cost of about £1,000.

An arrangement has been entered into between the Lanchester and Chester-le-Street sanitary authorities to have a joint sewerage scheme, to be carried out under the supervision of Mr. Balfour, C.E., of Houghton-le-Spring, at a cost of about £1,000; the proportionate shares to be borne by the two authorities being—Lanchester £350, and Chester-le-Street £650. The scheme has received the sanction of the Local Government Board.

A memorial drinking fountain and public lamp have been erected in the centre of Swan Bank-green, Congleton. Messrs. McFarlane, of Glasgow, were the founders.

A new Soldiers' Institute in Cliffold-street, York, was opened by the Archbishop of York on Friday. It is Italian in style, and has been built from designs by Mr. E. Taylor, of Stonegate, York.

Engineering Notes.

The Manchester Ship Canal.—At the half-yearly meeting of this company, held on Monday, the Chairman, Lord Egerton of Tatton, announced that the land survey and plans of works had been prepared, and they only wanted to make final arrangements with the landowners before proceeding vigorously with the work. A contractor for the whole of the work sanctioned by the Act of 1883 had been secured—namely, Mr. T. A. Walker, who had been contractor for the docks at Preston. The contract provided that the works were to be completed in four years from the date of their commencement for the sum of five and three-quarter millions, £500,000 to be paid in shares if desired by the company. He believed there would be no difficulty in executing the works in the stipulated time. Hopes were entertained that they would be able to induce the Queen or the Prince of Wales to cut the first sod, or lay the first stone, in connection with the canal.

University College, Bristol.—A new departure in engineering education is being made by this college by the generosity of local firms. As the outcome of a meeting held early in the present year, most of the firms of the neighbourhood have agreed to institute bursaries or scholarships at their works. The holders of these are to be nominated by the college authorities. Some will be awarded on the results of the annual examinations, while others will be reserved for deserving students unable to pay the usual premiums required on entrance into works. The educational scheme adopted at Bristol does not include any attempt to impart practical workshop instruction within the college walls; but the students spend six months (April to October) in each year, acquiring practical experience in the works and drawing offices of the engineers of the West of England. This system is found to answer so well that Messrs. Stothert and Pitt, of Bath, and the Bristol Waggon Works Company propose to make it obligatory on all their pupils to attend the college courses in the winter months for the first three years of their pupilage. Several firms are willing to take college students for short periods, so that civil engineering and electrical engineering pupils may spend one or two terms of six months in works; while at the same time mechanical engineers may have experience in two or three different establishments during their college career. In return for these concessions the council of the college has decided to permit deserving apprentices or artisans, nominated by the local engineer, to attend the college courses at reduced rates. Nine first-class scholarships and a larger number of second-class ones will be available during the coming session.

Advantage has been taken of the rebuilding of the outer walls of the chambers in King's Bench Walk, abutting on the Whitefriars entrance to the Inner Temple, to replace the old wooden gateway at this entrance by an archway of Portland stone and a porter's lodge, consisting of a two-storied octagon tower of stone. On top of the archway a shield with the date has been carved, while over the footway a carved panel, with the emblem of the Inner Temple—the flying horse—and a shield on each side, with the arms of the late and present treasurer of the society, has been placed. Mr. Arthur Cates is the architect, and the works generally have been carried out under the direction of Mr. W. Oldrieve.

A new laundry and females' dining-room have just been added to the Armagh District Lunatic Asylum from plans by Mr. John Boyd, of Belfast, who was also the architect for several previous enlargements, including the infirmary, new dormitories, and day-room and chapel. The builders were Messrs. Collen, Portadown and Dublin, and the engineering work was carried out by Messrs. Gardner and Co., of Armagh, the total cost of the present works having been £6,000.

The West-end Chapel—the oldest Nonconformist place of worship in Wellingborough, having been built in 1791—which has been closed for alterations and repairs, was reopened on Sunday. The work has been carried out by Mr. Slim and Mr. G. Hacksley. The building has been re-roofed, has new windows and new seats, and is match-boarded to the height of 4ft., while a piece of the south side is partitioned off for a Sunday-school.

Building Intelligence.

BIRMINGHAM.—In order to expedite the work of laying down the cable tramways between Colmore-row and Hockley, the contractor, Mr. Jacob Biggs, of Farm-street, Hockley, has this week completed an installation of the electric light, by the aid of which gangs of men will be able to work by night as well as by day. It is probable that the line will be laid, the depot built, and the whole system of Birmingham cable tramways ready for inspection early in October. With reference to the proposed line from Hockley Brook to the New Inn, Handsworth, a difference has developed itself between the Central Tramways Company and the Handsworth Local Board. The engineers had drawn the plans of this portion of the line, had got in tenders, and were finally considering them when the board required the laying of wood paving between the lines, with which the engineer could not comply. The electric light installation has been undertaken by Messrs. Fowler, Lancaster, and Co., of Graham-street, and consists of five arc lamps, of the Pilsen type, having an illuminating power of 2,000c.p. each, and being placed thirty-five yards apart. The rails and pulleys have been fitted together and numbered at the works of Messrs. Tangye, so that they will be readily placed in position. The contract is for 4,553 yards of single line. During the construction of the line improvements have been made in the methods hitherto used upon cable systems. Pulleys of a new type are being used. The tender of Messrs. J. and E. Wright, of Birmingham and London, has been accepted for the supply of the rope, in preference to ten other tenders; it is to be 3⅜in. in circumference, and will be composed of six strands of nineteen wires each, and is to have a tensile strain equal to ninety-five tons per square inch. Its "elongation," or stretch, must not exceed 1¾ per cent., and it must bear a torsion test of fifty-five turns in a length of 8in. The cars, which have been made by the Falcon Company, Loughborough, are nearly completed. They are of special design in several points, including a novelty in the gripper, which will diminish friction. The depot at Hockley Brook occupies two acres of ground between Whitmore-street and Hockley Brook. The buildings consist of a car-shed, boiler and engine houses, a tension shed, a repairing shop and smithy, a foreman's house, with rooms for workmen, and a waiting room.

CARLISLE.—The new public abattoirs, built in Devonshire Walk, from designs and under the superintendence of Mr. McKie, city surveyor, have just been completed. The site, a triangular area, is surrounded by a brick wall 10ft. in height, and approached by a new 30ft. road, which, like all the thoroughfares and passages, is of concrete. The cattle boxes and sheep pens are under one roof to the right of main entrance, and adjoin the killing and cooling rooms. The ventilation of the slaughter-houses is carried out on the fixed louvre principle. The provision of water is ample; and Adams's automatic flushing tanks are connected with the drains. The walls in the interior of the abattoirs are of glazed bricks up to a height of 6ft. To the left of the main roadway are the offices and the piggery and tripery. The louvre roofs in the pig slaughter-house and cooling room and tripery, and also the overhanging roof of the cooling rooms are glazed on Helliwell's patent system. The contracts amounted to upwards of £5,000, and the contractors were as follows:—Building and concrete work, Messrs. Beaty Bros., Carlisle; joiner and carpenter work, Messrs. Baty and Forster; slater, Mr. Smith; plumber, Mr. Anderson; painter and glazier, Mr. Palmer.

HANLEY.—The foundation stones of a new Victoria Assembly Room for Hanley were laid on Monday. The site is at the rear of the Town Hall, and completes the scheme of municipal buildings. On the site, Mr. J. Lobley, the borough surveyor, who has prepared the plans for the edifice, at the request of the Mayor, gave a description of the new buildings. He said that the point to which the Town Hall Committee had given attention was the construction of a room capable of holding a very large audience which should be second to none in the district, and which should also possess good acoustic properties. The question of ornamentation was reserved for future consideration. The main façade, towards Bagnall-street, would be of a character which would bear favourable comparison with the other portions of the Town Hall. Internally, the structure would be about 133ft. long by 64ft. wide and 55ft. high. It would contain two galleries and a large orchestra, and would seat 2,700 persons; but on great occasions the seats could be removed from the arena, and then there would be room for 5,000 or 6,000 persons to stand. Corridors would be constructed outside the internal walls, so that the sound of persons walking about would not be heard inside; and the galleries would be held to the walls by cantilevers, so that there would be very few columns to obstruct the views of the audience.

LLANDAFF.—The monument to be erected to the memory of the late Bishop Ollivant in the north aisle of Llandaff Cathedral has been removed from Burlington House to that city, and the work of erecting the tomb on which the marble slab will be placed has commenced, everything having been prepared, the blocks of marble forming the pedestal to the slab being carved and fitted, requiring only to be placed in position. The tomb is from a design by Mr. Clarke, of Llandaff, and has been carved by him. It is of white and Sienna marble. The figure of the late Bishop, which is reclining in Episcopal robes on a bed, with hands clasped as in prayer, is the work of Mr. H. H. Armstead, R.A. The work was exhibited this summer at the Royal Academy, and was illustrated in our photo-lithographic pages on the 12th ult.

CHIPS.

The church of Hackness, Scarborough, has received an addition to its stained glass of a window from the studio of Mr. Taylor, of Berners-street. It is a Jubilee gift.

A "Grand Hotel" is about to be built on the Promenade at Sutton, Lincolnshire, at a cost of £16,000. The first section, which is to be proceeded with immediately, will include in the basement vaults, smoke-room, and dining-room; on the ground floor, dining, smoke, and billiard-rooms, six sitting-rooms, and 15 bed-rooms; on the first floor, nine sitting and 19 bed-rooms; on the second floor, kitchen, scullery, laundry, seven bed-rooms, giving a total of 8 public rooms, 15 sitting-rooms, and 41 bed-rooms. Mr. Herbert Walker, C.E., of Nottingham, is the architect.

The award of the umpire in the arbitration between the Cockermouth Local Board and the Cockermouth Gas Company for the purchase of the company's works, has been made known. The local board considered that the company should have about £8,000, with £1,500 for certain contingencies; while the company alleged that £18,700 was the value. The arbitrator gives £14,644, which, with the contingencies, will bring the amount up to over £16,000.

The extension of the Fish Quay at North Shields has just been completed after two years' work. Mr. Charles Jackson, of Newcastle-on-Tyne, was the architect.

A portion of the reredos for Lillington Church, near Leamington, consisting of a handsomely-carved Caen stone panel, representing the "Lord's Supper," is now on view at the show-rooms of Jones and Willis, 79, Edmund-street, Birmingham, who will be very pleased to show it to visitors.

In the City of London Corporation for the present year the Tower Bridge construction account figures in the accounts for the first time, and from it it appears that the cost of the ceremony of laying the foundation-stone was £2,882, and the late Sir Horace Jones was paid £5,250 in addition to his salary as City architect for services in connection with the bridge.

On Saturday the corner-stone of a new branch public library was held at Bolton. The site for the library, containing 600 square yards, is in High-street, Great Bolton, and the architect for the new building is Mr. R. K. Freeman, of Bolton. The style is Gothic, plainly treated, and the building will be of brick with stone dressings, the total cost being £2,000.

St. Nicholas Parish Church, Rochester, has just been renovated at a cost of £600, and the edifice was reopened for Divine worship on Sunday. The renovation is from the plans of Mr. John Drake, of Rochester, and the structural work has been done by Messrs. Callard and Son, of Rochester, while the decorations have been carried out by Messrs. Robson and Son, of Rochester.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions our correspondents. All communications should drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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RECEIVED.—C. of G.—J. T. D. and Co.—M. O.—B. of L.—R. C. and Co.—D. and Co.—S. T. C.

Correspondence.

THE ARCHITECTURAL ASSOCIATION AT BATH.

To the Editor of the BUILDING NEWS.

SIR,—Mr. Halsey Ricardo challenges my remark that Prior Park was built as an advertisement for Bath stone, and assures us that instead of being "a dismal piece of building," as I described the house, it is a "really noble" structure. Mr. Ricardo certainly is welcome to his opinion as to the beauties of Wood's design, though in my judgment Prior Park is an excessively poor piece of work. That it was actually erected as an advertisement, the following quotation from Wood's own description of the house will amply verify, while the architect's glorification of his own design furnishes the best answer that I can give Mr. Ricardo:—"Notwithstanding all the methods that were taken to Reduce the Prices of Stone and the Workmanship of it, Mr. Milo Smith, one of the Proprietors of the Navigation, soon became a Competitor with Mr. Allen in the Trade he had embarked himself in, though he did not long continue so; and his Works dropping, the Quarries at last became the Property of the Person he opposed; whose Designs in the Stone Business have from time to time been very much defeated, partly by the Troubles and Disappointments inseparable to all manner of Trades; partly for want of Freight for the Exportation of Block Stone, and partly by the Chief Master Masons of the Country Reducing their Prices still lower than he himself had abated them to obtain Work, and thereby keep as much of the Domestick Trade of Bath in their own hands as possible. Besides all this, the introduction of the Free Stone into London met with great Opposition, some of the opponents comparing it to Cheshire Cheese, liable to breed Maggots that would soon Devour it; and the late Mr. Colen Campbell,

Architect, together with the late Messeurs Hawksmoor and James, as Clerks of the Works of Greenwich Hospital, were so prejudiced against it, that at a Public Meeting of the Governors of that Building at *Salters' Hall* in the spring of the Year 1728, they Represented it as a Material unable to bear any Weight, of a Coarse Texture, bad Colour, and almost as Dear as *Portland* stone for a Publick Work in or near London." Wood says he was present, exhibited some specimens, and brought a Bath mason with him to give practical illustrations. The result of all this inquiry was that the price of Portland stone was reduced "full three-and-thirty per cent. below what had been formerly paid!" "This great Abatement entirely defeated Mr. Allen's Proposals for carrying on the Masons' work of the Hospital with this stone; and *the Reflections cast upon the Free Stone of the Hills of Bath brought him to a Resolution to exhibit it in a seat which he had determined to build for himself near his works*, to much greater Advantage, and in a much greater Variety of Uses than it had ever appeared in any other Structure." "With this view several Designs were formed wherein the Orders of Architecture were to shine forth in all their Glory; but the Warmth of this Resolution at last abating, an humble simplicity took place, and the first part of the Seat that was carried into Execution in Pursuance of it was the Westward Wing."

The author then describes this "Fabrick," and adds: "Of the External walls only that which Fronts towards the South is Faced with wrought Free Stone; and this was to have been performed in such a manner as to Exhibit the Doric order, under its plainest Dress, but so high as to include the Principal and half Story, though separated by a Fascia. A Tetrastyle Frontispiece was therefore introduced in the middle of the whole Line before such an advanced Part of the Building as was sufficient to contain two of the Stair Cases on each side of the end of the Hay House and at the same time, appear as a proper Basement to the Pigeon House, which was to have Crowned the Center of the Edifice with Magnificence and Beauty: For the Basement extends fifty Feet; and a Square of that Size in the Middle of this Fabrick was to have been covered with a Pyramidal Roof, divided into Two parts, to discover the Body of the Crowning Ornament." "This Essential Part of the Building was omitted in the Execution of the Work." . . . . "Within this super-structure" (the Pavilion) "the Pigeons are magnificently Housed; and their particular Cells are all made with wrought Free Stone; So that if a Beautiful Habitation is really an Allurement to this Species of Birds, as some pretend, Mr. Allen's Pigeons will, in all Probability, never desert their Present Place of Abode." . . . "About Eight hundred Tun of Free Stone in large Blocks was buried under Ground to make the Foundation walls or Stereobata of this Structure" (the House) "and the Stylobata (or Ground Story) of the House was erected both Inside and Outside, with wrought Free Stone." . . . . "For the sake of Novelty, the Outside of the Building shows in its Rear an Hexastyle Frontispiece composed of Ionick Columns supporting a Corinthian Entablature divested of its Beauty for the Convenience of such windows as would give a Prospect to the Garrets; but in Front the Architecture is more compleat; and Mr. Colen Campbell having boasted of the Justness of the Hexastyle Porticoe designed by him before Wansted House, in Essex, it was determined that a juster Hexastyle Porticoe should be executed before this House, and with columns of a larger Size; and for this End, I Designed it with Columns of three Feet one Inch and a half diameter, which exceeds those of Wansted by an inch and a half; made the Intercolumnation of that Kind which Vitruvius calls Systylos; and gave two compleat Intercolumnations to the Flank of our Porticoe, instead of the compleat Interval and small Portion of another at Wansted." "*Now, as the Seat was thus far sufficient for displaying the Material proposed to be recommended to the public by it*, the Perambulation of the Curious was thus designed. After viewing the stables in the simplicity of the Dorick Dress, and coming under the Pavilion, great in its kind, they were to enter an Ionic Gallery which would have had the effect of a vast, long stage to a Rich Theatre; and this leading them to the stone passage that Traverses the Basement Story of the House from whence they were to ascend, by a Flight of Stone Steps to a Stone Hall of the Corinthian order, and then pass into the stupendous Porticoe of the same order. Returning from this Pavilion into the Hall, and passing through the Dining Room, Dressed with the Corinthian Order, a Stair Case, inriched with the same Order, was to amuse them while they were ascending to the gallery in the Chamber story proposed to have been finished with all the Elegance and Beauty that could possibly be given to works of the Corinthian Dress; and from this gallery they were to pass into the Tribunal seat of the Chapel, where the Corinthian order was to increase in Magnificence; and by representing Cherubims and Palm Trees placed Alternately, give them an Idea of the manner in which King Solomon finished the Inside of his Temple in Jerusalem." "The fame of Mr. Allen's stone works was thus soon carried to the Principal parts of the Kingdom," and Wood, the author of this masterpiece, was engaged for five years to correspond with such inquiries as were likely to result in business; but, he adds, "I have the justest Reasons to Lament that my Time had not been better employed." Mr. Ricardo confuses the two Woods, or does not know more than one. The younger Wood designed Pulteney-street, which is pure stuff in comparison with the elder Wood's work in Queen-square. The Assembly Rooms are attributed to the younger Wood; but it was John Wood the Elder who built Prior Park. His "Essay," from which I have quoted, was published (2nd edition) in 1749 by C. Hitch, in Paternoster-row, and by J. Leake, at Bath (Vol. II. page 426, &c.).—I am, &c.,

THE WRITER OF THE ARTICLE.

SIR,—I cannot quite make up my mind whether Mr. Halsey Ricardo, who writes in your last issue, is in earnest or not. Scores of people have written about Bath; but Mr. Ricardo is the first who has spoken so disparagingly of its natural situation, which has been compared favourably, in turn, with Edinburgh, Rome, and Jerusalem. His eulogy on Wood, on the other hand, is considerably exaggerated. Not only are there gross errors in his planning of streets, but his architectural detail is very insipid in quality, whilst his masses and outlines are singularly ineffective, except in Prior Park, and it is ludicrous to hear him compared with Michael Angelo and Wren. In these points, however, Mr. Ricardo is merely stating his own hastily-formed opinion; but he is also wrong in matters of fact. Wood did not lay out or design either Pulteney-street or Camden-crescent. The first was the work of Baldwin (for some time city architect), completed by Pinch; and Camden-crescent, like the Royal, was designed by *the son* of the man who designed Queen-square, &c.

It is not surprising that Mr. Ricardo should say he "did not know Wood had written a book, 'The Beauties of Bath,'"—that was a misdescription of your own reporter. The book was entitled "An Essay towards a Description of Bath." I make these corrections because it seems to me that if it is worth while to give particulars of places and men at all, it is well to do so accurately, even if it involves a little trouble.—I am, &c., C. P. EDWARDS.

158, Strand, London, W.C., Aug. 31.

ARCHÆOLOGISTS AND FREE LUNCHES.

SIR,—Mr. Sands' letters on the shortcomings of archæologists would not be worth noticing, except that being published in a journal of established reputation and wide circulation they are liable to mislead persons unacquainted with the facts of the case. Two specific charges have been brought against archæological societies—(1) that they have degenerated into associations for obtaining free lunches, under the pretence of visiting localities where objects of antiquarian interest exist; and (2) that their governing bodies throw cold water on aspirants to archæological fame. With regard to the first of these charges, nothing can be said against the Societies of Antiquaries of London or Scotland, as neither hold annual meetings of any kind. The British Archæological Institute has a special by-law which prevents that body from accepting hospitality from anyone and I should be very glad to see a similar rule enforced by the British Archæological Association, so as to prevent the possibility of any misunderstanding as to the motives which guide the Council in arranging the programme of their excursions. Admitting, however, that archæologists are so far human as to thoroughly enjoy a good lunch, with plenty of brown sherry, at someone else's expense, the papers published in the volumes of *Proceedings* conclusively prove that eating and drinking is not the main object of the annual meetings of antiquarian societies; and, after all, local magnates are not obliged to feed hungry archæologists unless they like. It must not be forgotten either that the labourer is worthy of his hire, and that the generous providers of free lunches get a certain *quid pro quo* in the after-dinner speeches, and the learned remarks of the members on the objects inspected.

Lastly, that the councils of the different societies discourage genuine scientific workers, however humble, is not in the least true; but some of the councils, amongst which I am glad to number that of the Society of Antiquaries of Scotland, try to suppress conceited dabblers, who bring discredit upon everything they touch. It is far better that the Pictish towers of Shetland should remain buried for a century to come than that they should be explored by persons wholly unfitted for the task.—I am, &c., J. ROMILLY ALLEN, F.S.A. (Scot.)

5, Albert Terrace, Regent's Park, London, N.W.

STRENGTH OF BRICK PIERS.

SIR,—The short article in your last number, headed "Size of Brick Piers," reminds me of the vagueness of all the information given on this subject. When we have any doubt about the strength, such as requires a reference to any formula, we naturally build in a very hard, square brick, and in cement; but it is just here that we are quite in the dark, and have no information at all. It is most desirable that we should have formulæ for at least three kinds of well-known bricks—say (1) square, well-burned, so-called "London" stocks, such as are made at Ware, Uxbridge, and the Sittingbourne district; (2) some standard-pressed red brick or Gault clay brick; (3) blue Staffordshire brick. The last most important of all, as being the brick which will resist the most crushing. Then each should be given with a described lime-mortar and a described cement-mortar, with the necessary calculations for modification, according to height, for detached pier and corrections following the strutting or tying-in of the piers. How can this desirable information be obtained? It is scarcely to the credit of architects and builders that they know so little of the matter in the shape of general trade information or professional knowledge.—I am, &c., J. RICHARDS.

Maxted-road, Kensington, Aug. 29.

NUISANCE FROM SEWER VENTILATORS.

SIR,—From Mr. Buchan's letters on this subject I am compelled to draw one of two conclusions. Either he wishes, by sarcasm and personalities, to stifle the matter so as to prevent its being discussed in your columns, or he is giving his ideas on a subject with which he has had little or no experience.

The heading of my letter of July 8th was "The Nuisance from Sewer Ventilators," and in *England*, when speaking of sewers or sewer ventilation, we mean that section of the drainage system situate on the sewer side of intercepting traps.

This definition can be found in the Public Health Act, 1875. Had I been writing on the subject of house drainage, my letter would have been headed "The Nuisance from Ventilators on House Drains." Mr. Buchan has throughout treated this question in a peculiar manner. He first doubts my statement as to the pipe being clear, suggesting that 10ft. of pipe and a ventilator would give ventilation. When asked to state what additional power he would obtain by this addition, he refuses to answer, and quotes the results of a test applied on house drains under the most favourable circumstances, which is quite foreign to the question at issue, and is not at all applicable to sewers.

My statements have not been arrived at

hastily, nor from single tests, but from many which have been amply verified. I will, however, quote another case. In a large district on the Metropolitan area shafts were built on the higher points for the purpose of obtaining an up-current to relieve the sewers; instead of getting this, a downward current was experienced. The result of testing the temperature of the air in the sewers was that during 12 months it was never under 50° or over 55°. Now compare the temperature in inlets and outlets from May to September, and it will be seen, as I have before stated, that it is impossible to get a circulation of air unless the means used are of a more powerful nature than the variable atmospheric pressure between these periods. From this statement it must not be inferred that the air was stagnant, as there are other powerful agencies which prevent an up-current, and which I should have dealt with in this letter had Mr. Buchan dealt with my former letter in a practical manner.

Mr. Buchan refuses to answer my question: What power per square inch could be got out of 10ft. of additional pipe, and a ventilator, but says, the latter "would enable wind to get at the top of the pipe, so as to exert an expiratory or sucking-out effect upon it, and so cause an upward current in the pipe." Will he state that with the wind blowing at the rate of ten miles per hour on ventilator, the temperature on the top of the pipe being 80°, the horizontal part or sewer 50°, the bottom or inlet 85°, that, under these circumstances, he can get an upward current? When he has done this, I will give further tests which have been proved and verified to confirm my first statement, and also state more fully what I mean by barometrical pressure.

In this correspondence I have not mentioned the work of either A, B, or C, and I have purposely refrained from mentioning any work of my own, and if any "prefatory blast" have gone forth it is from "my fixed exhaust ventilators."—I am, &c.,

R. H. REEVES.

Cedardale, Putney, Aug. 31.

IRISH TENDERS.

SIR,—For some 10 or 12 days previous to the 22nd advertisements appeared in various papers inviting tenders for building a new hotel at Crosshaven, in this county. The result was that four tenders were sent in, and, to the surprise of other candidates, one of the competitors, who happens to be married to the architect's sister, was declared contractor.

Now, Sir, no one questions the fact of his tender being lowest, and, therefore, entitled to the work; but was it good taste on the architect's part, or fair to other parties about to tender, to bring or allow his relative from Waterford to be a competitor for any work of which he may be architect?

There are many reasons why he should not, and builders will readily understand them.

I would strongly advise that in future no builder should send in a tender for any work under this gentleman, unless he adds some such footnote to his advertisement as the following: "The architect guarantees that no tender will be considered from any relative of his."—I am, &c.,

Cork, Aug. 26. LOCAL BUILDER.

The whole of the gasfittings for Alleyn's boys' school at Dulwich, the architects of which are Messrs. Oliver and Leeson, of Newcastle-on-Tyne, have just been supplied by Jones and Willis, of Birmingham and London.

The new building at present being erected in Bloomsbury-square for the Pharmaceutical Society of Great Britain (Messrs. Lansdowne and Harris, architects) is now rapidly drawing towards completion. Great attention has been paid to the sanitary arrangements and the ventilation, Messrs. Robert Boyle and Son's system being applied throughout. Messrs. Boyle's patent heating tubes are also used for warming the fresh air supply to the large examination hall.

Mr. W. Telford Gunson, architect, 10, Marsden-street, Manchester, has been unanimously appointed assessor by the Swinton and Pendlebury Local Board to report and advise upon the competition plans for the proposed public baths for the district.

The offices of the Civil and Mechanical Engineers' Society have been removed to 6, Queen Anne's Gate, Westminster, S.W., at which address the meetings will be held in future.

Intercommunication.

QUESTIONS.

[9379.]—**Swimming Baths, &c.**—Will any of your readers be good enough to inform me of any book or books on the construction and planning of baths (Turkish, swimming, and private)? Also name any towns where baths have been erected with the latest improvements.—EBORACUM.

[9380.]—**Concrete.**—If a specification is prepared for making concrete mixed with cement 5 to 1 in blocks, and ordinary loose-made concrete 6 to 1, and it is hereafter agreed to make it 12½ per cent. less, what would then be the proportions of mixing in each case?—H. M.

[9381.]—**Extras.**—A builder enters into an agreement to complete a contract on a certain date; in default of completion he is to pay a weekly penalty until the whole of the property is complete in every way. The proprietor asks the builder to do certain extras, but stipulated that the largest of these extras were not to interfere with the contract time for completion. The builder does not complete at the specified time, but sufficient for some of the houses to be tenanted. Does the doing of the extras, in your opinion, invalidate the original agreement and so entitle the builder to more time? Or do you think the penalty can be enforced? Can anyone refer me to any decided case on the point?—YOUNG SURVEYOR.

[9382.]—**Soil Ventilation.**—I shall feel much obliged if you will give an opinion in your valuable journal on the following point? It is now well understood that in all cases in which the surface of the soil is left uncovered beneath the rafters supporting the ground flooring of a house suitable ventilation through the walls preserves the timber and prevents rot. If, however, a layer of asphalte be run on the soil, and the rafters placed down upon this, is it necessary or desirable that provision be made for ventilating as in the case in which the soil is uncovered?—WM. THOMAS.

[9383.]—**Echo.**—Can any reader of the BUILDING NEWS tell me how to prevent an echo in a church lately erected? The size of church is 160ft. long by 60ft. wide, and about 45ft. high, inside dimensions.—COLONIAL.

[9384.]—**Half-Timbered Work.**—Will Mr. James Thorneloe, or other of your readers, recommend a good work on half-timber construction—both the framing and plastering—or give particulars himself?—IONA.

[9385.]—**Strong Room.**—Are strong rooms usually ventilated? If so, what is the best known means to be adopted in order to be safe against fire, &c.? Early replies will be esteemed a favour.—DOUBTFUL.

REPLIES.

[9348.]—**Boundary Line.**—No doubt, as "Z." says, old surveyors followed the usage of allowing 1ft. beyond the centre of hedge; but it is not a universal rule by any means, and where there is only a hedge between two fields, the probability is that each party, by exercising acts of ownership, have become tenants in common of the hedge. I believe it will be found that single hedges (unless the facts are known) are to be taken in this way.—G. H. G.

[9359.]—**Rustless Iron.**—"A Constant Reader" can get all information from the Managers, Bowes, Scott, and Read, of Broadway Chambers, Westminster.—BOWES, SCOTT, AND READ.

[9374.]—**Building Construction — Honours Examination.**—Having obtained a first class in the Honours examination, I am enabled to recommend the following list of books as being worthy of study:—Rivington's "Building Construction" (3 vols.), Seddon's "Builders' Work," Hurst's "Architect's Handbook," Humber's "Handy Book on Strains," Rickman's "Gothic Architecture," and the "Orders and Styles of Architecture," published by Weale. I would advise "Provincial Pupil" to work the questions set at previous examinations, as some of the questions are often repeated. If "Provincial Student" fails to obtain a first-class certificate the first time, let him try again until he succeeds, as the examination is very stiff, there being on an average only four first class certificates awarded in England.—W. EATON, Manchester.

[9378.]—**Salisbury and Exeter.**—Apart from their cathedrals, the latter city, at least, is decidedly poor in Mediæval interest. At Salisbury, a visitor should observe it is our only city founded in Pointed-arch times (1220), and therefore void of anything Norman. New Shoreham, Winchilsea, and Hull were minor products of the same century, but this alone was planned as its model city. Unlike any earlier English place, all its streets are straight, of uniform width, and do not meet without crossing. The bounding ones, N.E. and S., form a rectangle, but most of the interior crossings deviate about 20° therefrom. Except the easternmost blocks, which rise a few feet up a slope, the site is so level that, being more than half-inclosed by the Avon to the W. and S., it was planned to divert streams from the bend of that river above to that below, through every street, meridional or transverse, each stream turning at some crossing from an E. to a S. course, and so by zigzagging or branching, irrigating every street. It was a refinement on what Bishop St. Ethelwold had done in Saxon times to the flat part of Winchester. I remember these channels all open, brick lined, bridged at every few yards, and not without fish; but they are now, for a second time, all covered, even that which bounded the close outside its wall. The only old street that I think had none is now oddly called "New Canal," as it was, like "Canal Walk" at Southampton, to be the terminus of a canal between the two cities, which was dug but remains dry. This was a 19th, not a 13th, century exploit. Another notion of the founders was to have much fewer and larger churches than other cities, and Our Lady's Cathedral being at the S.W. corner, to put but one at each of the other extreme corners (all named after martyr bishops), and St. Thomas-á-Becket by the central market-place. It is very odd that, away from the cathedral, the contemporary Hospital of St. Nicolas and the bridges, nothing earlier than "Perpendicular" (at least no window earlier) is in the present buildings. The city was never walled, but the very large close was so under Edward III., with four gates for the half of its circuit that the Avon does not bound. On the outer face, chiefly between the two east gates, are various pre-Norman decorative stones, brought from Old Sarum, which I have never seen drawn, though they are probably the oldest bits of ornament in England. Near this, in St. Anne-street, "T. C." will enter, through the rather poor city museum, the Blackmore collection of pre-historic wrought flints, by far the chief one in the world. Other modern sights are the Elizabethan Longford Castle, two miles south; Wilton House, three miles west; and the costly church of that place by the late Earl. Beyond it are Mediæval Tisbury Church and Wardour Castle, in by far the finest scenery within 30 miles. North, eight miles, are Ambresbury Church and Stonehenge, and two miles on the way to them, Old Sarum. As for the cathedral, it is utterly invaluable as the only one finished in its century, and main type of all English Gothic development, consequent wholly on the vaulting of the clerestory. It is doubtful, of our vaulted ones, whether this or Canterbury or Lincoln were the earliest designed; but Chartres preceded them, and is for the art in general what this is for England. There both outer and flying buttresses were first frankly developed; but here only the former, which are most admirable, and far superior to the French without half their mass. But "Elias the Engynier" still objected to visible flying ones, and made his steep aisle roofs to conceal them. It soon appeared he had pitched them too low, and no English building repeated the error, unless Wykeham's nave at Winchester, where the huge mass of Norman walls permitted it. All the vaulting here, except the square under the tower, is original, and though on the feeblest supports, is the heaviest in England, near 2ft. thick, and of concrete. Henry III. saw the whole begun, finished, and opened, the masonry ending with the first story of the tower, against which the roofs end, a mere 2ft. wall, with an exquisite internal colonnade. Over this was intended, perhaps erected, a wooden steeple (like that on the detached belfry, demolished a century ago), but as high as the present spire. Those, then standing and afterwards burnt, on the central towers of Rheims, London, Rouen, and I think, York and Lincoln, were higher. The bold proposal of Richard de Farley, who had built Pershore Tower, to substitute this matchless work in stone, was happily accepted; but he began by a story about thrice the weight of what it stood upon, and probably no building in the world has so narrowly escaped disaster as this. The many visible flying buttresses were now added; either Farley or his successor made the next story far lighter, with the pinnacles and spire up to the first band, and the remainder someone else finished about 1330. The bit of vaulting to shut out the tower and the two arches across the great transept are of 1460, but the heavier ones across the lesser are by Inigo Jones, and the lesser transepts had no gables till about 1750. The absence of tracery in this place will be compensated for "T. C." by Exeter's gem of a cathedral, which, except the Norman towers, is nearly as uniform and complete a type of the Middle Gothic as this of the early. Unhappily, our English vice of dwarfing the churches' height had then begun. But a peculiarity of old Exeter, if any of the timbered houses that I knew remain, was that they had some stories of ten or more feet high, as in French towns. Elsewhere our ancestors hardly made any higher than 8ft. even in London, and the ground floor still less. On the way between these cities he should not neglect Sherborne.—E. L. G.

CHIPS.

The new line of railway from Alnwick to Coldstream will be opened for passenger traffic on Monday next. The entire length of route is 36 miles, and there are ten stations between Alnwick and Coldstream—namely, Edlingham, Whittingham, Glanton, Hedgeley, Wooperton, Ilderton, Wooler, Akeld, Kirknewton, and Mindrum.

The excavations proceeding in Piccadilly on the site of the new premises of the Junior Travellers' Club have brought to light numerous articles of interest, including a tomb of red granite dated 1509, some bronze armour, several fowling pieces, a richly embossed lamp, and a large quantity of vellum manuscripts.

The borough of Bootle has laid the foundation of a permanent collection of pictures, Alderman Poulsom having presented to the corporation a water-colour drawing of "Lancaster," by Mr. C. L. Saunders, which was exhibited at the Liverpool Water-Colour Society's Exhibition in the spring. The new gallery, in which there are several rooms well adapted for the purposes of an exhibition, will also contain the portrait of Alderman Poulsom, which was presented by his friends some time ago.

At the meeting on Tuesday of the King's Norton School Board, it was agreed to purchase various properties in Sherborne-road, on an area required as the site of a new school, for £4,316, and Mr. William Hale, architect, Colmore-row, Birmingham, was requested to prepare plans for the said school, to accommodate 1,200 children, on the understanding that if the plans prepared were not approved and adopted by the Board, 25 guineas should be paid him in satisfaction of all claims.

The Admiralty are going to build a large Coast Guard Station at Clacton-on-Sea, comprising officer's residence, and eight residences for the coastguard men. Mr. W. T. Hook, contractor, who lately made some new roads at Clacton, has been entrusted with the work.

The late Mrs. Thompson, of Seabrook Vale, Hythe, has bequeathed the sum of £10,000 for the erection and endowment of a new church at Cheriton, near Folkestone.

LEGAL INTELLIGENCE.

TOBOGGAN SLIDES AND THE BUILDING ACT.—In June last, at the Lambeth Police Court, a summons was taken out by the Metropolitan Board of Works against the proprietors and promoters of the Toboggan Slide at the Crystal Palace Grounds. The summons was heard from day to day, and frequently adjourned, so that full evidence could be given on both sides, and some rather curious points of law were raised upon several occasions. The summons was taken out originally against W. H. Smee, by Mr. Elkington, the district surveyor of Penge. It was shown by evidence that a certain structure termed the "Toboggan Slide" had been erected in the grounds of the Crystal Palace, and that it was used very largely by the public. The district surveyor complained that no notice had been given to the Board for the erection of such a structure, which, it was contended, was really a structure within the meaning of the Metropolitan Building Act of 1885. Arguments were used on both sides upon several days, the defendant's barrister contending that such an erection was not contemplated within the meaning of the Act, and further that, according to the Crystal Palace Company's Act of 1881, the defendant would be exempt from such notice. Mr. Biron, after several hearings, decided against the Board, but added that as several points of law had been raised he should be willing to grant a case for a superior court upon the points mentioned. It was urged further that even if part of the structure might be exempt, there were some parts which would come within the terms of the Building Act, and so make the defendant liable. Mr. Biron ultimately dismissed the summons, holding that part of the structure and erection came within the exemption contained in section 21 of the Crystal Palace Company's Act of 1881; but granted a case upon the points, and he has since signed such a document, leaving the following questions for the decision of the High Court:—First, whether the structures and erections complained of were buildings within the meaning of the Metropolis Building Act, 1855; and, secondly, whether they were exempted from the operation of the Metropolitan Building Act, 1885, by section 21 of the Crystal Palace Company's Act of 1881.

WATER SUPPLY AND SANITARY MATTERS.

STAFFORD.—The report of Prof. De Rance on the water obtained at Enson Moor has resulted in the Waterworks Committee of the Stafford Town Council deciding to recommend that body to abandon the work there. Prof. De Rance, in a long report, described the various strata at Enson, and showed that in the small borehole the quantity of salt varied from 29·99 grains per gallon in August, 1886, to 58 grains in August, 1887. In the large borehole the salt has continually increased from 19·75 grains on April 1, 1887, to 554·5 on August 6. A sample of water taken at a depth of 600ft. on August 4 showed 647 grains of salt. Prof. De Rance remarked that he should hesitate to recommend any water containing more than 15 grains per gallon as a source of water supply, and regrets that Prof. Attfield did not long ago call attention to the saline character of the water from both boreholes, especially as that gentleman has compared the water with some "table waters," which are obviously unsuitable for everyday human consumption or for manufacturing purposes. Prof. De Rance thought it very probable that the brine was entering the large borehole in the final 2ft., and if this was so, the filling-up of the lowest portion of the borehole would cut off the supply. The committee did not relish so arduous and uncertain an undertaking, and decided to abandon the works, and on Tuesday the town council reluctantly adopted the report, and referred the whole question of a water supply to a special committee. The town council have been very unfortunate in their borings for water, having expended £9,000 on the Common site scheme, and 7,000 on the Enson Moor scheme, absolutely without a gallon of drinkable water.

STOCKTON AND MIDDLESBROUGH CORPORATIONS WATERWORKS.—On Monday, the members of the two corporations, and the South Stockton Local Board visited the reservoirs at Fighting Cocks and Sadberge, and the pumping station at Broken Scar. At Fighting Cocks they inspected a fourth reservoir, now in course of construction at that place. On arriving at Sadberge, Mr. Bell, the chairman of the board, explained that the reservoirs there occupy 7½ acres of ground, and they will, when completed, have a capacity of 12 millions of gallons. The site is 200ft. above the towns of Stockton and Middlesbrough. Mr. John Johnson, of Middlesbrough, is the contractor. The board will use the reservoirs at Sadberge for the purpose of supplying Stockton and district, and the reservoirs at Fighting Cocks for supplying Middlesbrough and district. At Broken Scar, the last place visited, there are now 11 filtering beds, and 4 subsiding tanks, containing together 20,300,000 gallons. The company having inspected the filtering beds and engine houses, the Mayors of Stockton and Middlesbrough touched the actuating handles, and put the new pumping engines called the Stockton and the Middlesbrough in motion.

PARLIAMENTARY NOTES.

SUPERVISION OF BUILDINGS IN LONDON.—Sir G. Campbell has asked the President of the Local Government Board whether, in view of the fact that the supervision of all buildings in the Metropolis was intrusted to the Metropolitan Board of Works alone, and that their functions were necessarily delegated to subordinates, who were allowed to take fees, he would consider during the recess the propriety of introducing in English towns and the various local areas in the Metropolis some regular authority to supervise buildings, like the Dean of Guilds' Courts in Scotland. Mr. Ritchie replied that the care of all those matters in London devolved on the Metropolitan Board of Works, and through that Board on the various vestries. London was under a special statute in regard to such matters, and the Local Government Board had no control over them so far as the Metropolis was concerned.

BARS AND GATES IN LONDON.—Mr. T. Egerton, in answer to Mr. Lawson, said, on Monday, that the returns made by the Metropolitan Board of Works showed that there were 150 private bars and gates within the Metropolitan area. The Board were unable to state the conditions by which these bars and gates existed. In 1886 the Board inserted clauses in a Bill before Parliament to enable them to deal, under certain conditions, with some of those bars and gates that were most obstructive, but so much opposition was raised, both inside and outside Parliament, that the Board were obliged to withdraw the clauses, and did not see their way to renew the attempt.

PICCADILLY-CIRCUS.—Mr. De Lisle asked the hon. member for Knutsford Division, as representing the Metropolitan Board of Works, on Tuesday whether it had been decided to build upon the two small triangular open spaces recently added to Piccadilly-circus, and to join the blocks by a superstructure and tunnel for traffic; whether the ratepayers, or any representatives of those upon whom the charge would fall, had been consulted, or were to be consulted in that matter; whether the cost of devoting those spaces, without further ornamentation, to light and air could be stated; and what would be the probable cost of erecting there two fountains, independent of any architectural adornments. Mr. Alan de Tatton Egerton said that several schemes applicable to the two triangular open spaces recently added to Piccadilly-circus had been before a committee of the Metropolitan Board of Works, but no decision had been arrived at. As to the second question, the Board were representatives of those who were to pay. On the third and fourth questions, he might say that the value of the site for building purposes had not been reported to the Board, and he was not able to give any estimate as to the approximate cost.

Mr. Stephen Terry, Inspector for the Local Government Board, held an inquiry on Tuesday respecting an application made by the Town Council of Sutton Coldfield for sanction to borrow £3,000 for the purchase of a steam-roller, a fire-engine, for works of lighting, and for alterations to their offices. The borough surveyor, Mr. J. Fletcher, explained the proposals, to which no objection was raised.

Opposition having been raised by certain ratepayers of Fenton to the proposed payment by the local board of that town of £100 to the surveyor, Mr. S. A. Goodall, for extra services rendered in laying out the cemetery and carrying out the sewerage scheme, the local board got over the difficulty on Tuesday by voting the surveyor an increase of salary from £230 to £330 for the next twelve months.

On Wednesday an inquest was held at Camberwell on the body of Edmund Hawken, 74, a retired builder, lately residing at 67, Upland-road, East Dulwich, whose body was found on the railway at Nunhead on Sunday fearfully mutilated by a passing train. The deceased had never, his sister stated, threatened to commit suicide, and there was no reason why he should have committed such an act. The jury returned an open verdict of Found Dead.

The *Herts Advertiser* states that an ugly crack is visible above the eastern arch of the tower of St. Alban's Cathedral, both on its eastern and western face. It appears to the non-professional eye as though the south-east pier were sinking again. Possibly the alterations to the south transept have weakened it, or it may be that the increased weight in the tower is beginning to tell.

Our Office Table.

IN the September issue of the useful "A. A. Notes," Mr. H. D. Appleton, F.R.I.B.A., vice-president of the Association, announces that the approaching session commences on October 7. There are several new departures to which he calls attention. The connection between the Lectures on the History of Architecture and the Elementary Class of Design, which, during the last session or two, has been gradually dissolved, will this year be quite severed, and a course of lectures will be given, arranged in two divisions; the first, being devoted to Classic and Continental Renaissance Architecture, will consist of four lectures to be delivered by Mr. H. Stannus; the second will consist of three lectures on "English Architecture First and Last," by Mr. J. D. Sedding. It is to be hoped that this interesting course will attract a large audience, and be found of great value. The Class of Construction having during last session showed signs of waning interest on the part of its members, the syllabus has been varied to endeavour to raise the quality of the papers sent in, and to treat of the usual questions and duties which occur in everyday practice. The Colour Decoration Class will, this session, be formed under a slightly different name—as the Class for the Study of Ornament and Colour Decoration, and in an association which boasts of nearly eleven hundred members surely ten can be found to devote a few evenings a month to the study of so fascinating a subject as colour decoration. In response to suggestions received, an elementary division of this class will be formed for the study of decoration and colour. It is to be hoped that this new departure may meet with adequate support from the student members.

MR. WALTER EMDEN'S complaint that the building of the new Court Theatre near Sloane-square cannot be begun because the Metropolitan Board of Works are taking their vacation, and will not examine, still less pass, any plans till they meet in October, reveals a very substantial grievance. The plans were, Mr. Emden says, deposited for approval in July last, and when October comes the Board will probably take a month or two before they approve the drawings. In the mean time, the building season is passing away, while the whole of such work is brought to a standstill for two or three months, to the great loss and annoyance of architects, contractors, and building owners. It is difficult to understand why the authorities at Spring-gardens should not, during the holidays at least, delegate the duties of examining and approving plans to the officials in the architect's department, power being reserved to bring difficult or disputed points before a small vacation committee.

SIR J. C. ROBINSON returns in the *Times* to the charge against the repairs now in progress at St. Mary-le-Strand Church, and especially regrets the removal of the stone vases from the parapets, observing that they are an integral and indispensable feature in the general decorative scheme of the structure; they were certainly decided upon and placed with consummate judgment by the eminent architect who designed the church, and their removal would entail irreparable loss and disfigurement. "Is there," he asks, "no remedy against the tinkers and tailors, third-rate architects, hungry contractors, and speculators who seem to have got entire control of the ancient art monuments of the Metropolis?" The commonsense remedy for the overcrowded traffic in this narrow portion of the Strand would be, he suggests, to widen the narrow passage on the north side of St. Mary's Church by taking down some of the houses there, and opening out, rebuilding, and widening Holywell-street at the back. In this way the stream of traffic in the Strand would be divided into two branches, one passing by the north side through Holywell-street, the other along the south side of St. Mary's Church, as at present, and both re-uniting at St. Clement Danes, where already this precise arrangement holds good. Mr. C. Knight Watson comments on the suspicious silence of the persons responsible for the present works at the church under the charges and protests made, adding:—"This parish of St. Mary-le-Strand has already sold a piece of its churchyard to the

Metropolitan Board of Works for the widening of the street. Are they prepared to sell the rest, and the church with it? We have heard a good deal lately of charges against certain members of this Board. They are now under investigation, and we must wait. Is it possible that there is some quiet understanding between certain persons and the Board that the site of the church may be had cheap, for road purposes, if only the Board will do their part in proclaiming it dangerous? The matter may be a job, and to many of us it looks like one."

In another letter to the daily press, Sir J. C. Robinson reverts to the question of the action of light on water-colours, which, it will be remembered, aroused a heated discussion eighteen months since, and was laid to rest by the appointment by the Science and Art Department of two separate Commissions to make inquiries, one of scientific experts, the other of artists and directors of galleries. Neither Commission has shown any signs of life, and it is rumoured, he says, that the discoveries and conclusions of the scientists have been so adverse to the contention that "water-colours do not fade," and generally speaking so unwelcome to the upholders of that doctrine, that the artists' committee has never even been called together, or, at all events, has not as yet taken any action. He adds: "The matter is, however, of public importance, and in many respects even urgent. The general question of the influence of light on pigments is indeed a far-reaching one, touching many other things besides water-colour drawings; it cannot, therefore, be allowed to be dropped altogether, nor to be obscured by partial or biased expositions. A full and complete account and report of the investigations of the scientific Commission, unaccompanied by the glosses of official or professionally interested persons, is what is wanted. Upon this alone the public would doubtless be quite able to form correct conclusions on points heretofore in dispute, and also be made usefully acquainted with matters of far wider and more important range."

Even in regard to municipal regalia it seems that all that glitters is not gold. Some years since Mr. J. L. Ricardo, a former member of Parliament for Stoke-on-Trent, presented a massive chain and badge to the town council of Hanley for the use of successive mayors. For a time it made a brave show, but by degrees began to get shabby, and one occupant of the chair, Mr. Emery, had it "dipped" at his own cost in order to improve its appearance. This only stayed the inevitable wearing off of the plated surface, and the present and recent mayors have been so twitted about its increasingly tawdry appearance when attending functions in their official capacity, that they have hardly cared to bedeck themselves with it. At Tuesday's meeting of the town council, Alderman Powell made the gratifying announcement that Mr. Herbert Keeling, of Shelton Hall, had offered to present the borough with a new mayoral chain. He added that the donor of the present chain must have been very much deceived in its quality, as he would scarcely intend to give one of less purity than 18-carat gold, whereas the present one was of base metal thickly coated with gold. It goes without saying that the proffered gift was accepted with hearty thanks, and in future mayors of Hanley will have more inward satisfaction than in the past in contemplating themselves arrayed in the emblems of authority preparatory to appearing at state functions, lord mayor's feasts, or photographic studios.

Sir Frederic Leighton's "Last Watch of Hero," one of the leading attractions of the recent Academy Exhibition, has been purchased for the permanent collection at the Manchester City Art Gallery, and the president of the Royal Academy has presented to the Gallery his studies of drapery for the same work, which will be hung in two frames, one on either side of the canvas. The price paid for the "Last Watch" has not transpired. The Manchester Art Gallery Committee have also purchased from the Rickards' collection Mr. G. F. Watts's "Player." Both these works are hung in the autumn exhibition, which opened on Tuesday.

The autumn exhibition of the Royal Birmingham Society of Artists, opened on Tuesday, is this year of special interest. The president, Mr. G. F. Watts, R.A., contributes three pictures—a portrait of Sir Frederic Leighton; a study of a young knight, "Aspiration"; and an imaginative work, "The Spirit of the Ages." Mr. Watts also sends a bronze bust of "Clytie." The past-president, Mr. Burne Jones, A.R.A., sends the portrait of his daughter, recently on view at the Grosvenor Gallery. From this year's Academy Exhibition we again see Mr. H. T. Wells's historical picture of the Queen receiving the news of her accession to the throne; the Hon. John Collier's "Incantation," Mr. F. Calderon's "John Hampden," Mr. Small's "Last Match," and "Sindbad the Sailor," by Mr. Alfred Goodwin. Mr. Holman Hunt has promised his "Master Hilary," exhibited at the Grosvenor, and now being touched up, and other figure subjects are sent by Mr. J. E. Hodgson, Mr. J. C. Horsley, and Mr. Sant. Mr. E. H. Fahey shows in the water-colour room a number of his sketches on the Norfolk Broads, and other contributors are Sir J. D. Linton, P.R.I., Mr. H. S. Marks, Mr. Walter Crane, and Mr. John Fulleylove. The Birmingham Society of Artists, under whose auspices the exhibition is held, have just presented Mr. Henshaw, the veteran landscape painter, with an address expressing regret at his retirement from the office of treasurer, accompanying it with an album of sketches and studies by each of the members and associates of the society, enclosed in an oak case. The presentation was made by Mr. J. A. Chetwin, vice-president, and has been feelingly acknowledged by Mr. Henshaw.

The City and Guilds of London Institute have just issued the programme of the technological examinations to be held by them, or by local committees under their auspices, in the ensuing session 1887-8. The examinations are in two grades, the Ordinary intended principally for apprentices and journeymen; and the Honours for foremen, managers, and teachers of technology. Candidates may enter themselves for either grade in the majority of subjects. No candidate may be examined in the same year for more than one subject. There is no limit of age and no fee for examination; prizes of money, medals, and certificates are awarded to successful candidates. The subjects for next session are thirty-five, and include: Oils, painter's colours, and varnishes—examiner, Prof. E. J. Mills, F.R.S.; iron and steel manufacture, Professor C. Roberts-Austen, F.R.S.; pottery and porcelain manufacture, Mr. Gilbert R. Redgrave; plumbers' work, Mr. S. Stevens Hellyer; carpentry and joinery, Mr. Banister Fletcher, F.R.I.B.A.; and brickwork and masonry, Mr. John Slater, B.A., F.R.I.B.A.

Professor Tyndall, in a letter on lightning-conductors, points out that the abolition of resistance is absolutely necessary in connecting a lightning-conductor with the earth, and this is done by closely imbedding in the earth a plate of good conducting material and of large area. The largeness of area makes atonement for the imperfect conductivity of earth. The plate, in fact, constitutes a wide door through which the electricity passes freely into the earth, its disruptive and damaging effects being thereby avoided. A common way of dealing with lightning-conductors adopted by ignorant practitioners is, Dr. Tyndall remarks, to carry the wire rope which forms part of the conductor down the wall and into the earth below, where it ends without any terminal plate; such a "protection" is a mockery, a delusion, and a snare. Some years ago a rock lighthouse on the Irish coast was struck by lightning, when he found by the engineer's report that the lightning-conductor had been carried down the lighthouse tower, its lower extremity being carefully embedded in a stone, perforated to receive it. If the object had been to invite the lightning to strike the tower, a better arrangement could hardly, he believes, have been adopted. He vetoed the proposal to employ a chain as a prolongation of the conductor, as the contact of link with link is never perfect.

An epitome of the Merchandise Marks Law Consolidation and Amendment Act, which has just received the Royal Assent, has been issued by Mr. Edmund Johnson, F.S.S., manager of the Trade Mark Protection Society. The forging of any registered trade mark, or a mark calculated to deceive by its resemblance to a trade mark, is made an offence punishable by imprisonment and fine, with forfeiture of the article on which the forgery appears. An important feature of the Act is the proviso in Section 4 that in any prosecution for forging or falsely applying a trade mark, if the defence is set up that the forgery or false application was done by assent of the proprietors, then the burden of proof will lie on the defendant to prove the assent. In any prosecution a defendant and his wife, or her husband, may, if defendant thinks fit, be called as witnesses, and in the case of imported goods evidence of the port of shipment is *primâ facie* evidence of the place or country of production. No prosecution can be instituted under the Act after three years from the commission of offence, or one year from first discovery thereof, whichever first happens.

Mr. John Barratt, of Beeston Hill, Leeds, describes three suspension foot-bridges spanning the river Wharfe, erected by amateurs in Upper Wharfedale. Two of these are situate near Burnsall, and one near Grassington. The parent bridge is, he says, situated about half a mile below Burnsall, having a clear span of 110ft., with a footway about 2ft. wide, the whole structure suspended from two wire-rope cables about ¾in. diameter, stretched between rough hewn stone piers (built of boulders from the river-bed), and anchored at the ground levels to large stones buried about 5ft. deep. This bridge was designed and erected by a Dalesman, for the convenience of himself and family, to connect his pastures with his residence (Woodhouse Manor). The various wrought-iron parts were made by the village smith at Appletreewick; the cables were obtained from the abandoned lead mines in the neighbourhood; and the cost of the whole structure, ironwork, masonry, and wood, did did not exceed £30. The second bridge has a stretch of about 130ft., and spans the Wharfe a short distance above Burnsall. It was made and erected by a local blacksmith, who followed the design of the "manor" bridge, the piers, however, being formed of stout cast-iron pipes fixed on stone foundations. In a mechanical sense it is neither so handsome nor constructed on such scientific lines as its original. The other bridge in Grasswood is similar to the last described, but shows a superior knowledge of principles, both in design and in erection, doubtless gathered from experience previously gained. Should any readers care to see these novelties for themselves, a journey of about eight miles from Ilkley or Skipton is all that is needed; but this would amply repay the visitor, as he would pass through the heart of "the Arcadia of Yorkshire."

A pension is to be granted out of the Civil List to the widow of Mr. E. W. Godwin, F.S.A. The list of names in support of the petition is quite extraordinary, and testifies, the *Pall Mall Gazette* says, to the esteem in which the late Mr. Godwin was held by a great variety of persons. It is headed by three Dukes—those, namely, of Argyll, Abercorn, and Westminster. Lord Tennyson comes next, and after the Laureate the Marquises of Ripon and Hartington, followed by Earls Granville, Cowper, Lytton, Dufferin, and Dunraven, and Lords Wolseley, Ardilaun, and Curzon. Artists are represented in plenty, including the P.R.A., Sir Noel Paton, Sir John Millais, Mr. Boehm, Mr. Alma-Tadema, Mr. Long, Mr. Orchardson, Mr. W. B. Richmond, Mr. Poynter, and Mr. Whistler. Mr. Godwin's own profession of architect is well to the fore in the names of Mr. Waterhouse, Mr. Aitchison, Mr. Charles Barry, Mr. Cole Adams, Mr. Seddon, and half a dozen others. The signatures of M.P.'s include those of Mr. John Morley and Mr. Labouchere. All these apart, the list would still be a notable one if it contained none but the following, as representatives of literature:—Mr. Browning, Mr. Swinburne, Mr. William Rossetti, Dr. Todhunter, Mr. Theodore Watts, Mr. Buchanan, and Professors Newton, Sime, Yeats, and Thistlethwaite. Mrs. Godwin is certainly to be congratulated.

Another step towards the erection of the free public library, provided for Edinburgh through the liberality of Mr. Andrew Carnegie, was taken on Monday, when the Library Committee of the City Council finally adopted the revised plans of Mr. G. Washington Browne, their architect, and instructed him to advertise for tenders and appoint a measurer at a remuneration of 1 per cent.

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THE ARCHITECT: HIS RELATIONS TO THE BUILDER.

THE precise relation which the architect holds with regard to a contract, whether he ought to be considered only as an agent of his client or as an arbitrator between owner and contractor, is a question which is still rather perplexing whenever any dispute arises. A clear idea of the relationship is very necessary, as it not unfrequently happens the architect is called upon to decide in his capacity as arbitrator a point between the building owner and contractor. As our readers are aware, arbitration clauses, as they are called, are inserted in most building contracts, providing that in case any question, dispute, or difference shall arise between the employer or his architect and the contractor, such question or dispute is to be referred to the arbitration of some architect. We are of opinion that such a clause is sometimes necessary and fair towards both parties, though legal authorities, as a rule, raise objection to the clause being always inserted, and think it better that the employer and builder should be free to submit their differences during the progress of the work. It is said that arbitrations are costly and unsatisfactory, and so they are; for, as everyone knows, the contractor can question about this or that, and raise a quibble purposely, knowing that it will be referred to the arbitrator, or the employer, and the architect will gladly settle the matter in his favour to avoid the process. If, however, the deed makes it clear as to what questions are to be referred to an arbitrator, there can be very little to object to. Unfortunately this is not always the case, and the parties rush into law.

From what we have said there is strong grounds for affirming that the architect, in his present capacity between client and contractor, holds a threefold relation. He is an artist or designer, so far as he is engaged in the design of the building, an agent to the building owner in certain matters which bind him, and as regards disputes between the owner and the contractor an arbitrator as well. We will now refer only to the two latter capacities. There is some confusion about the matter. Can the architect bind the building owner or his principal by any act? Are his decisions to be taken as conclusive and final? And, first, as to the duty of the architect as an agent. When he simply prepares a design, he is certainly not an agent; but directly he undertakes to carry his design into execution, he has, by custom, an authority to act for his client. He has power to order quantities and to give instructions for certain things that appertain to the contract or work of which he has prepared plans. Still, there are some who say that an architect is not an agent. In Lord Grimthorpe's "Book on Building," a form of contract is given which distinctly provides that neither the architect nor the clerk of works in his absence "shall be considered for any purpose the agent of the committee, nor have any power to act contrary to their directions." The whole of the work shall be done to the satisfaction of the architect. "But the passing or certifying of any work by the clerk of works, or by the architect himself, shall not exempt the contractor from liability to replace the same if it be afterwards discovered to have been done ill, or not according to the plans and specification either in execution or materials." There are certainly two sides to the question. The employer who contracts has a right to have his work carried out well, and any inferior work made good, even though his architect has certified and passed the work; but then who is to judge, if not the architect, as to the proper execution of work? Many employers find fault with matters in which they have not the faintest notion of what is right, and it would be manifestly unjust to the contractor for the employer to be able to compel him to reconstruct or alter these. If an architect passes improper materials and workmanship he is certainly unworthy of the position he occupies. There will always be a hesitation amongst those who engage architects to allow them to exercise too much authority; it is for the profession, therefore, to endeavour to rectify abuses by having proper contracts drawn up, which, while giving them authority to act in matters appertaining to the design and construction, will afford them power to require the making good of work which has been discovered to be badly executed within a reasonable time after completion. If we allow that the architect is for some purposes the principal, it follows that he should have the option of determining questions that arise in the progress of the building. We can hardly see how he can act in one case unless he possessed the functions of a judge in certain questions.

But as we said just now, there are doubts about this question wherever the deed between the parties is not clear. Suppose, during the progress of a building, the builder finds something described in the specification contrary to the instructions given or details furnished by the architect. Is it to be referred to the arbitrator—supposing an arbitration clause introduced? Or, say an inferior quality of bricks has been used, can the architect insist upon the removal and substitution, or is that also to be referred? These are questions which arise in nearly all contracts. The architect is certainly the only authority who can with propriety decide in such cases. Contractors, however, have a right to be consulted, and the custom is now to introduce an arbitration clause, by which the contractor may appeal to the judgment of an independent architect. When such a provision is inserted too much attention cannot be given to its wording. We shall refer to one of these forms by-and-by.

Under many contracts the architect exercises the fullest powers. He is sole judge. He has to give certificates which cannot be examined, and are conclusive; he has to decide in any case of disagreement that may arise owing to any omission or any discrepancy betwen the drawings and specifications, or as to their intent and meaning, and he is virtually made by the deed an arbitrator, so that if there is a reference to him of matters in dispute between the contracting parties his decision is final and conclusive. We here quote a clause of exceptional power, which is sometimes found in contracts, relating to "extras": "In case the architect shall consider it desirable to order additional work, or to increase, alter, or diminish the quantities, or the dimensions, or alter the character of the works described in the contract, drawings, and specifications, such additions, diminutions, or alterations shall not in any way vitiate this contract, but shall be performed by the said contractor under all the conditions, stipulations, and responsibilities therein contained, in like manner as if they had been expressely described and included in the specifications and drawings." This clause is very stringent; but was used by the engineer of the Hastings Pier Company, who were defendants in the well-known case of "Laidlaw v. Hastings Pier Co." In this instance, the judge, Lord Coleridge, said, truly, the provision brought the execution of much extras within the contract, "and subordinated the contractors in their execution to the absolute and uncontrolled authority of the engineer, who could order them to be executed without delay.' It further provided that the value of such additions, diminutions, and alterations should be estimated according to a schedule of prices annexed. In this instance the judge said the certificates given were conclusive, the defendants being bound by them; but the contract went further, and provided that, if dispute or difference arose, the engineer was to decide, and his decision was to be binding on both parties.

The clause inserted in the heads of conditions sanctioned by the Institute of Architects refers all cases of dispute to the arbitration and final decision of an architect as a fellow of the Institute. Certain clauses are exempted from this rule, referring to matters left during the progress of the work to the sole decision of the architect. These exceptions relate first, to the provision of everything necessary and requisite for the due execution of the works according to the true intent and meaning of the drawings and specifications taken together, any discrepancy between them being decided by the architect; second, to the removal of inferior materials, the architect being vested with full power to require other proper materials to be substituted; third, the re-execution of bad work, in which the architect is to have also full power to employ other persons to do the work and to charge the cost to the contractor. Two important matters to which the arbitration clause applies are the certificates of the architect and the time of completion, both of which are questions that the architect is not always the most eligible person to decide. It may be argued that if the architect is to determine certain points reserved, he ought to be able to decide in other cases as well; but the wording of the clause makes it applicable mainly to all disputes, in which he himself is one of the disputants, "Provided always that in case any question, dispute, or difference shall arise between the employer *or the architect* on his behalf and the contractor," &c. Here it is clearly meant that the question must have arisen between the employer or his agent (the architect) and the contractor, and not simply a dispute between the employer and contractor, in which the architect is not a party. In other words, the architect may be no party to the dispute, in which case a reference is scarcely possible without the sanction of an architect. Thus, if an employer contend that the contractor is not entitled to a certificate, and the architect gives one, the employer is bound. A very important decision bearing upon the usual arbitration clause in building contracts ought to be mentioned here. We refer to the case of "Clemence v. Clarke," 1880, when Mr. Justice Grove gave judgment. It was argued in that case, if we remember rightly, that the architect's final certificate may, under certain circumstances, when, at least, there is an arbitration clause, be reopened. Mr. Justice Grove distinctly repudiated this idea. He showed that the clause applied to intermediate work. His words were: "But to what does the clause refer? To my mind not to disputes between the employer and his contractor, but between the employer and the architect on the one hand, and the contractor on the other. And who is the person likely to dispute the questions of the works having been completed? Why, I should think the contractor would be anxious to get his money. The contractor might allege that the works were completed when the architect says they are not; and in case of a dispute like that between the contractor on the one hand and the architect on the other (and this would appear a reason for the arbitration clause), where he enters into a dispute with the contractor, then he is not to be allowed to be a judge in his own case, and then a reference should be made; and in such a dispute as that the arbitrator is to be in the place of the

architect." Our readers will see that this distinction is important, and it places the architect in a better position in case of a dispute between himself and the contractor. On the contrary, if there is no dispute, and the architect makes his certificate, his award is final. After this clear distinction between the cases in which an architect has the right to determine, and those in which he has not, the relation subsisting between the architect and contractor is made tolerably plain. There are decided objections to making the architect the sole arbitrator in case of dispute, though it is often to be seen in documents which have been unwittingly signed by the contractor. The binding nature of the contract depends of course on the rigour of the architect, and the exacting nature of his demands.

A SOMERSET TOUR.

FEW districts in England are richer in the blending of natural scenery with architecture than Somerset. The general tourist will find plenty to interest him in the historical and geological aspects; but for the student of architecture there is an abundance of good examples of ecclesiastical work, and of a kind that differs in many important particulars from the architecture of the northern, southern, and eastern districts of England. The plentiful supply of good building stone in Somerset, especially of the oolitic variety, has been favourable to architectural style. Every period is represented; Norman and Transitional at Glastonbury Abbey, Early English and Decorated of the purest phase at Wells Cathedral, itself as perfect and complete a development of those styles as can be found anywhere, and Perpendicular as seen to perfection in Bath Abbey Church; indeed, these two cathedrals, in their integrity of plan and completeness are unsurpassed.

The main interest of Bath lies of course in its fine Perpendicular Abbey church. It can hardly be called a cathedral, though John de Villula's original Norman edifice is reputed to have been a cathedral of some extent, the nave of which equalled in size the present church. Professor Freeman has sketched very graphically the relation of the Abbey church with the church at Wells: how Bishop John removed his bishopric from St. Andrew's at Wells to the abbey church of St. Peter at Bath, which was an old Roman town, and a much larger place than Wells; how he rebuilt the church at Bath, and how badly he treated the monks there and dispossessed them. The church was founded by Offa for secular canons, though it was afterwards a monastery, and then, as we have seen, it became to be the bishopstool. The bishop was abbot in fact. This took place early in the 12th century. A subsequent bishop, Robert, became the bishop of Bath and Wells, and he it was who rebuilt the former church, though not the existing building, which is of much later date. Wells again became the favourite place, the bishops preferred it, and so Bath Abbey fell into ruin. The rebuilding was undertaken by subsequent prelates, and the present church was not certainly finished till early in the 17th century. As most of our readers know the edifice well, it will be superfluous to say that being almost the latest example of the last period of Gothic architecture, it is not one of the purest or best. A general glance at it is disappointing, though it is fair to say the interior surpasses the expectation formed by the exterior. Looking at the edifice again after many years, we can only express the conviction which others must have formed, that there is a great want of gradation between the details of the nave arcading and the highly elaborate fan groining of the nave and aisles. For instance, one is struck by the somewhat heavy wave mouldings unrelieved by fillets which make up the section of piers. The ogees are very large and the capitals exceedingly small, if not poor. The great interest in this edifice is that it is essentially a fine local example of a parish church, which has been lately, under Sir Gilbert Scott, adapted to congregational worship; also, it represents in a very complete form the great aim of the Perpendicular builders to increase the area of windows. The large size of the clerestory windows, and those lighting the nave, chancel, and transepts, entitle the structure to the appellation of the "lantern of England." The painted glass is very fine in the blending of colour. Worthy of notice are the very elaborate and varied carved bench ends, and we must also draw attention to a contrivance for improving the sound which probably not many visitors have noticed. Across the westernmost piers of the crossing, above the pulpit, prayer desk, and lectern, are stretched a series of fine wires secured to the members of the stonework, which are found to have materially aided the transmission of sound by breaking up the echo. Over the pulpit is stretched on these wires, which are all on the same level, a cloth canopy. For a large, lofty church, the hearing is good compared with many others. Externally, the blackened appearance of the masonry in the lower parts is one of the disfigurements to which stone is exposed even in the comparatively smokeless atmosphere of the city. It is much decayed on the south side, especially the clerestory and tower, where the perishable part is eaten away. The lofty flying buttresses become a necessity under the conditions imposed by so high a clerestory with such large windows. One peculiarity of the design is the oblong proportion of the tower on plan, owing to the very narrow transepts, which are only 20ft. wide. This does not add much to the general effect. Poverty in detail is apparent in a close examination; the aisle windows are by no means elegant in their arch curves and tracery, and the straight head above the great east window is a fault which its charming glass hardly atones for. The interior of the edifice is at least as perfect in its Late style as the interior of Salisbury, Exeter, or Wells.

The student of building stones of the Oolite formation will find Bath the great centre, and whatever may be said of the perishable nature of the Bath varieties of stone, its atmosphere is certainly more favourable to its preservation than that of London and the southern districts. In many of the houses and public buildings built of Bath stone worked at Combe, Box, Carsham, and Furley Down, we find weathering qualities that will stand examination, though in a few cases decay has taken place in the laminal lines when a kind of surface disintegration exhibits itself. Wherever decay appears it will be found the selection has been at fault, or the stone has been set on its wrong bed. Some of the earliest-built houses show very little decay. Pulteney-street, Bath, a fashionable quarter in the days of the latter Georges, is built entirely of the local stone, which, though discoloured and brown, has worn well. One of the secrets of successful treatment is to be observed in the avoidance of projections and decorative features in the quiet Classical style adopted. In the houses one seldom notices even architraves round the windows, and the stringcourses and cornices are small, the former mere flat bands. Several of the modern villas follow this treatment of the stone, and where decoration is found it often consists of incised ornament, as may be seen in some new villas on the Bathampton-road.

Leaving Bath by the Cheddar Valley route, a charming country is traversed by the Great Western Railway, affording the student a good study of the local architectural peculiarities of Somerset. The churches are mainly interesting for the noble Perpendicular towers, and of these we must especially mention the fine examples of Wrington, Axbridge, and Cheddar, belonging to one of Mr. Freeman's three types. The Wrington tower is a noble instance of massive, lofty belfry, which is seen to still grander scale at St. Cuthbert's, Wells, where the main portions or stages of the windows are left unpierced, leaving the vertical lines of the mullions and jambs in their severe simplicity. The Bristol type, with turret and spirelet at one corner, is also very effective, and commonly met with. At Axbridge, and again at Cheddar, is to be noticed a triple series of windows on the longest side, the centre one pierced; the latter tower is particularly large and handsome, and wider on one side than the other, the summit being crowned with the usual turrets. These towers are generally at the west end, and they completely stop the nave. For its grand and dignified tower St. Cuthbert, Wells, is unequalled. The lofty windows on the upper stage, two on each face, occupy more than half of the height, and being unpierced, except at the heads, resemble panels in two stages. Of the beautiful cathedral of Wells it is needless to say much. Mr. Freeman has written the best description of it in his interesting history of the Cathedral Church. The grand west front, with its storied niches of sculpture, will always remain uncertain as to its date. Professor Willis, we think, considered the front the latest part built; but both Mr. Freeman and Mr. Parker inclined to the belief that it was the oldest portion, that it was built on the earlier church, like the west front of Peterborough, the nave and choir being added since. We think there can be little doubt it is the earlier part, and that Jocelin was the builder. Dispute as to date is, however, of little importance. We look rather at the magnificence of the front—its quite French character; though Freeman thinks the other Early work rather more French, though peculiar to Somersetshire. Re-examining the noble front, we may remark that it is not a mere screen like the front of Salisbury; but a massive structure combining two western towers and a centre portal. The sharp, light grey marble shafts in the stories of buttresses against the warm coloured limestone lighten the whole up remarkably, and give a brightness to the façade. Of all the views of the cathedral, that from the south-east from the Shepton Mallett-road is the most picturesque. The peculiar panelled style of the Somersetshire towers is noticeable—strongly marked vertical lines predominating. French feeling is evident too in the simple and austere arcades, especially in the arrangement of shafts with the rectangular members, and also in the abaci of the capitals. The remarkable arrangement of inverted arches between the tower piers scarcely destroys the repose of the structure; the double curves gracefully unite with the pillars, to which they add so much strength, and the *tour de force* idea is rendered unique in its plan. Wells possesses a very complete set of conventual buildings not to be found elsewhere in this country, and we cannot leave it without noticing the excellent preservation of the stone, and the exceedingly cleanly and bright look of the interior—a credit in this respect to the ecclesiastical authorities.

THE BRITISH ASSOCIATION AT MANCHESTER.

THE fifty-seventh annual meeting of the British Association for the Advancement of Science was opened at Manchester on Wednesday in last week, the 31st ult., with a presidential address by Sir Henry E. Roscoe, M.P., in which he traced the progress of discovery and research in chemistry during the past fifty years. Among the multitude of

papers read in the various sections, we give abstracts of a few likely to be of special interest to our readers.

Full reports of the meeting will be found in the *English Mechanic* for Sept. 2 and 9.

THE INFLUENCE OF SILICON ON THE PROPERTIES OF STEEL.

Mr. T. Turner, the secretary of a committee, consisting of Professors Tilden and W. Chandler Roberts-Austen and himself, appointed for the purpose of investigating the influence of silicon on the properties of steel, presented his report to the Chemical Section on Friday. When the committee were appointed at the last meeting of the Association a series of experiments had already been commenced. That series had now been completed. A second set of observations in continuation of the work had also been commenced, and the results were so far advanced that it was hoped to publish details in a few months. The first series of experiments was undertaken to determine the effect of silicon on the properties of specially pure iron. The mechanical tests were conducted by Professor A. B. W. Kennedy, F.R.S., of University College, London, and duplicate experiments gave concordant results. It was seen that the relative hardness was not very greatly influenced by the proportion of silicon added. The general conclusions arrived at from the experiments made were submitted. On adding silicon, in the form of silicon pig, to the purest Bessemer iron, it was seen amongst other interesting results that the hardness increased with the increase of silicon, but appeared to be closely connected with the tenacity. The second series of experiments was not yet quite ready for publication, but they showed that manganese greatly modified the effect of silicon in producing shortness, and hence enabled the metal to be readily rolled and otherwise worked, even in the presence of several tenths per cent. of silicon. For the majority of the applications of mild steel silicon did not appear to be advantageous.

ACHIEVEMENTS IN MECHANICAL ENGINEERING.

In the Mechanical Science Section, the President (Prof. Osborne Reynolds), in the course of an address delivered on Friday, reviewing the achievements in mechanical science during the past quarter of a century, said there never had been a time in which mechanical revolutions had followed one another with such rapidity. In all the main departments of practical mechanics progress had been so rapid that appliances had been superseded long before reaching the term of their natural existence. As new departures since 1861 which had already established themselves, we had the telephone, the incandescent electric light, the dynamo, and the secondary battery, the gas engine and sewing machine, not to mention the bicycle. We had also the tin can and freezing machine and roller mills, as well as the machine gun and Whitehead torpedo. The era would be memorable, particularly in that district, by the commencement of the Manchester Ship Canal, for which there was no precedent in this country; the completion of the Tay Bridge, the Severn Tunnel, and the Forth Bridge, which had now attained its full height of 360ft., although otherwise not by any means fully formed. An important step had been brought about in the internal development of the steam engine, represented by the triple and quadruple expansion engines. The increase and spread of mechanical knowledge had also been remarkable, and the appreciation of applied mechanics had steadily increased. Of late years there had been almost a scramble to found new colleges to teach engineering or to introduce such teaching into existing colleges. Since 1867 Owens College had received gifts and bequests from engineers of upwards of £150,000. It was the same way at Sheffield and at Leeds, where an engineering school had just been founded by Sir John Hawkshaw and the engineers of the town, and again at Liverpool. To be hailed as one of the greatest inducements to keeping alive in engineering schools a real scientific interest in the practical work which was going on around was the introduction of what were now called engineering laboratories, in which students might familiarise themselves with the actual subjects for which the theoretical work was undertaken. In recent periods the encouragement given by the British Association to researches had led to many results of the greatest importance by the effect of example in calling forth aid from other institutions—that of mechanical engineers, for instance, which recently induced Mr. Towers to carry out his already celebrated research on the friction of lubricated journals, the results of which claimed notice as constituting one of the most important of recent steps in mechanical science. Such investigations it was now the function as well as the interest of mechanical laboratories to undertake, and thus what had hitherto been a great obstacle in the path of mechanical progress seemed in a fair way to be removed, and steady advance to be insured.

THE REGIME OF ESTUARIES.

The President of the Section, Professor Osborne Reynolds, read a paper on "The Régime of Estuaries and the Possibility of Small Scale Experiments." The object was to bring forward certain results and conclusions with respect to the action of water in arranging loose granular material over which it may be flowing. These results and conclusions were in the first instance arrived at during a long-continued investigation undertaken with a view to bring the general theory of hydrodynamics into accord with experience rather than with any special reference to this subject in hand; but they have since been to some extent made the subject of special investigation. The general conclusion was that the régime of each part of the bed as to maintenance in steady condition, lowering or raising at any time, depends solely on the character of the motion of the water, which, if straight and uniform, neither acquiring nor losing velocity, causes a uniform drift in the direction of the stream which keeps the condition steady. If the water is losing velocity it causes a depository drift, and raises the bed; if gaining velocity, it causes a drift and lowers the bed; while, if curved, the direction of the drift is diverted towards the centre of the curve, with its attendant effect of lowering the convex side and raising the concave side of the bed. The bearing of this conclusion on the inner estuary of the Mersey was discussed, and a method of experimenting was indicated which affords a ready means of investigating and determining beforehand the effects of any proposed estuary or harbour works—a means which, after what he has seen, Professor Reynolds thinks it would be madness to neglect before entering upon any costly undertaking.

THE MERSEY BAR.

Mr. W. Shelford, of London, read a paper on "Improvements of the Access to the Mersey Ports." The geographical position of Liverpool Bay was sufficient to account for the bar and the accumulation of sandbanks, but the sandbanks at the bar had not advanced seawards for a century, and a development of the Mersey navigation might be said to have commenced with the construction of the Manchester Ship Canal. The tide in Liverpool Bay had the great vertical range of 30ft. at spring, and the capacious natural tidal reservoir of the Mersey caused a strong local current into and out of the bay; but there was no external or along-shore current independent of this capable of removing heavy detritus to a distance, although the character of the bottom showed that the finer suspended matters brought down by the river were carried away and deposited in deep water. The reasons for the absence of such external current were evident, since the bay was not only considerably landlocked by the Welsh and Lancashire coasts, but almost directly opposite to it was that part of the Irish Sea where there was no perceptible current owing to the meeting of the branches of the Atlantic tidal wave which has passed round the north and south of Ireland. The great volume of the local tidal flow would be sufficient, if properly directed, to maintain a navigable channel at the bar. The fact that the same tidal flow, where directed by natural sandbanks, now maintained a channel about 6,000ft. wide at low-water springs, and from 24ft. to 48ft. deep for over nine miles from New Brighton, was adduced as a proof that the quantity of tidal water was sufficient to maintain such a channel. That it failed to do so now where the bar occurred (i.e., from 9½ to 11 miles from New Brighton) was sufficiently explained by the increase of the effective width of the channel at the bar from 6,000ft. to 23,000ft. The author found that the sectional area of the low-water channel from New Brighton to the bar was tolerably constant, as might be expected from its being formed and maintained by a constant flow of water through yielding materials. He considered that a channel formed through the bar by dredging would not be self-maintaining on account of the tendency of the flood tide to break through the sides, and so to keep open subsidiary channels, which would rob the main channel. He would suggest only such works as would comply with the following essential conditions:—(1) The least possible interference with the present tidal currents of the bar; (2) the increase of the Burbo Bank; (3) the concentration as far as possible of the flood and ebb streams in one channel. The author would restrict the width of the low-water channel over the bar by extending the natural sandbanks seaward. To do this he would deposit moulds of rough stone, protected where necessary by larger blocks. The works need not be carried to a greater height than 4ft. above low water and spring tides.—Mr. Abernethy, of London, said it could not but be regarded as an extraordinary fact that at the present day the Liverpool bar should exist, especially having regard to the circumstance that the problem of removing bars had already been solved and practically carried out. At Aberdeen the bar had been removed by dredging, deepening the channel of the river Dee within the tidal estuary, and by embanking and increasing the hydraulic depth throughout the channel proper. In 1851 he sounded the bar at the River Tyne, which was done away with by similar operations. Like results were obtained on the Tees, and in the case of the River Danube draining works and dredging had secured the object in view. Great results had also been gained by the same process in the Mississippi river. If works similar to those constructed at the mouth of the Danube and at the Mississippi were carried out in the case of the Mersey, the same results would follow, and the bar would be permanently removed. A new phase had now been introduced into the matter, inasmuch as the Manchester Ship Canal would be before long an accomplished fact, and it would then be to the interest of the promoters of that great work and the various ports to unite in carrying out works which would enable vessels of the largest class to come into the Mersey at all states of the tide. Mr. Wheeler corroborated Mr. Abernethy. The port of Dublin was an instance in which, by building training walls in order to concentrate the whole force of the tidal scour at the bar, the obstruction had been removed. Mr. Shoolbred said it was satisfactory to know that a great many tidal authorities were in direct support of the proposals of Mr. Shelford. Mr. Price Williams urged that Liverpool and Manchester engineers should combine to carry out the removal of the bar of the Mersey. Sir James Douglas remarked that there was nothing for it at Liverpool but to have training walls and dredging. Mr. Daniel Adamson was of opinion that by fixing a training wall to the corner of the Cheshire shore they would by the greater velocity of the outgoing current sweep the bar into the sea.

THE MANCHESTER SHIP CANAL.

Mr. E. Leader Williams read a paper describing the Manchester Ship Canal. He said the length of the canal would be 35½ miles, and vessels would pass through in about eight hours. The banks would be principally of stone, and railways in all cases would be placed over the canal at a height of 75ft. above the water. There would be docks at Manchester, but they did not intend to let the municipal authorities fill them up with sewage.

THE SEVERN TUNNEL.

Mr. B. Baker read a paper written by Mr. T. A. Walker (contractor for the Manchester Ship Canal) on the subject of the Severn Tunnel. He gave explanations with regard to the engineering difficulties that were met with in the construction of the tunnel, and said that during the six months that had elapsed since its opening for passenger traffic not the slightest hitch has occurred in working it. The speed of the trains has often been as much as a mile a

minute. The ventilation has been perfect, and the relief to the traffic between South Wales and the south-west of England has been very sensibly felt; this traffic will no doubt, with the accommodation afforded by the tunnel, be greatly increased when the trains from London to South Wales run direct through the tunnel, instead of as at present by Gloucester.

THE FORTH BRIDGE.

Mr. A. S. Biggart read a paper on the Forth Bridge works. The progress made in the past two years was described, Mr. Biggart dealing particularly with the erection of cantilevers. The experience gained from the work of erection already completed had assisted greatly in enabling the promoters to prepare the plant for future work; and after full consideration Sir John Fowler and Mr. B. Baker, the engineers, and Mr. Arrol, the contractor, felt warranted in adopting another principle for erection of the next lay of cantilevers. Cranes, some at high altitudes above the work, and light cages and platforms would be the distinguishing feature of the new method. A discussion arose regarding the effect of air on workmen at such a great altitude. Mr. Bartlett explained the precautions taken to prevent accident. Mr. Glaisher, Sir Jas. Douglas, Sir F. Bramwell, and Sir Douglas Galton were among those who joined in the discussion.

MANUFACTURE OF PORTLAND CEMENT.

Mr. F. Ransome, in a paper on the manufacture of Portland cement, described the method generally adopted up to the present time, which he designated the "kiln process," and pointed out the several defects inherent in it. He then proceeded to describe a method that he has devised and patented which is free from the defects alluded to. Its main features consist in burning the materials of which the cement is composed in the form of powder instead of in lumps, and he demonstrated the economy of capital, space, time, fuel, &c., insured thereby. He next gave a statement of facts bearing upon these results, illustrating his method by diagrams of the apparatus as devised, and exhibiting samples of the material employed, with sections of some briquettes produced therefrom, and a table of the tensile strains to which they have been subjected. He concluded by alluding to further developments and the utilisation of other materials capable of producing excellent cement, which cannot be accomplished economically by the "kiln process."

THE ANTIQUITY AND DEVELOPMENT OF MAN.

In his opening address as President of the Anthropological Section, Prof. A. H. Sayce dealt with the evidence of the history and development of mankind afforded by the study of language. He held that the chief distinctions of race were established long before man acquired language—indeed, it was difficult to believe that man had known how to speak for any very great length of time. On the other hand, the Semitic languages afforded a conspicuous example of the fact that languages might remain fixed and almost stationary for a long series of generations. He once calculated that from 30,000 to 40,000 years was the utmost limit that could be allowed to man as a speaking animal. While the Asiatic origin of the Semitic languages was beyond dispute, scholars had of late years been coming more and more to the conclusion that Europe was the cradle of the Aryan tongues. Professor Schrader proved that the speakers of the parent Aryan must not only have lived in a cold climate, but that they must have lived in the stone age, with the skins of wild beasts only to protect them from the rigours of the winter, and nothing better than stone weapons with which to ward off the attacks of savage animals. The primitive Aryan was acquainted with fire; he could even sew his skins together by bone needles, and could possibly spin a little with the help of rude spindle-wheels; but beyond that his knowledge of the arts did not seem to have extended. The community to which he belonged was esentially that of pastoral nomads, who changed from season to season the miserable beehive huts of matted mud in which they lived. They could count at least as far as a hundred, and believed in a multitude of ghosts and goblins, making offerings to the dead, and seeing in the bright sky a potent deity. The fair Scandinavian race was the modern descendant of the race which spoke the parent language of the primitive Aryan community, and left traces of itself in the Scandinavian kitchen-middens. The determination of the several racial elements in these islands was particularly difficult, on account of the intermixture of population; and nowhere was the difficulty greater than in the case of the Celtic portion of the community. Long before the Roman Conquest the intrusive Aryan Celt had been intermarrying with the older inhabitants of the country, who doubtless belonged to more than one race, the result being that the so-called Celtic race was an amalgamation of races differing physiologically, but dominated by a common moral and intellectual character.

Canon Isaac Taylor read a paper, in which he argued that the origin of the Aryan race was to be sought not in Central Asia, but in Northern Europe.

THE ARRANGEMENT OF MUSEUMS.

A joint meeting of the Biological and Geological Sections was held on Friday to discuss the question of the arrangement of museums. Dr. Henry Woodward, F.R.S., President, opened the debate, and remarked that the question how a natural history museum should be arranged might seem to the uninitiated a very simple matter, but it was one which had occupied the attention of many of the most able naturalists during the past 50 years, and still remained with many a subject of widely divergent views. There were certain principal methods which might be seen followed out in the most of our large museums. He submitted that in public museums the specimens should be so arranged as to render them attractive to and easily to be comprehended by the public at large, who help to support these institutions. This could not be done by mixing the whole of the fossil and recent forms together. In a large museum immense advantage would, he thought, be gained by placing the collections of recent and fossil forms in each great group in near proximity to one another. In the subsequent debate Prof. Haddon maintained an opposite point of view to that taken by Dr. Woodward. The fundamental mistake into which most museums run was in having too many specimens for professional purposes. The tendency should be to cut down the number of specimens in public museums, and to afford the student every possible facility. The discussion was continued by representatives of both biology and geology, including Professors Hughes, Seeley, Traquair, Boyd Dawkins, Sollas, and Hartog, Dr. John Evans, Dr. Carruthers, Mr. Hoyle, Dr. Carpenter, and Dr. Haughton. The general conclusion was that some *modus vivendi* should be sought and found between the two extreme views, and that it was as foolish for the student of recent forms to neglect fossil forms as it would be for the palæontologist to ignore the knowledge gained from observation of living phenomena. It was said by Prof. Dawkins that there was no one method by which geological museums could be arranged. They must be arranged with a view to the needs of each place. The conditions of Manchester were wholly unlike those of London. In that city there was no possible opportunity of arranging or accumulating such vast collections as were found in the Metropolis, and they had to do what they could to have the various departments of nature represented in a natural history museum. How could they do that best? By doing it in the most simple fashion. The arrangement which they had resolved to carry out in the Owens College Museum was as follows:—Mineral kingdom shown below (the beginning of all things), mineralogy, petrology. Then above that they would treat of the history of life on the earth, animal and vegetable, and in that way they would be able to build up the history of the earth in a graduated order, from the beginning of the stratified rocks down to modern times. Botany and zoology came under the heading of history of life on the earth. They branched naturally from the study of things which have been to what we have.

IRRIGATION OF LOWER EGYPT.

A scheme for this purpose, which was explained by Mr. Cope Whitehouse, is to make a reservoir of the Raiyan Basin which would fill at high Nile, thus preventing the excessive rise of the river and providing for the season of drought. The Raiyan Basin is a depression to the south and west of the Fayoum, its northern extremity nearly on a line with Beni-suef, 73 miles south of Cairo. Less than £1,000,000 would suffice for the works, and the revenue afterwards to be derived would amount to about £2,000,000. The works would add one-third to the available resources of Egypt. Papers in supplement of the scheme were read by Col. Ardagh, and on behalf of Capt. Conyers Surtees and Capt. R. H. Brown.

EGYPTIAN MARBLES.

The mountainous country between the Nile and the Red Sea was the subject of a paper by Mr. E. A. Floyer, of the Khedivial civil service. One point mentioned was that the fine porphyry on Jebel Zeit, quarried in 147 AD. by Epaphroditos, was last year reopened by Mr. W. Brindley, of London. The next paper was by Mr. Brindley, who described a journey to the quarries in question. The Romans in taking porphyry from these quarries carried the blocks to the Nile, a distance of 96 miles. Now the porphyry will be conveyed by a gentle incline to the Red Sea, 25 miles distant. We shall publish Mr. Brindley's paper in full next week.

PROTECTION OF STONEHENGE.

The Association have passed the following resolution:—"That the Council be requested to consider the advisability of calling the attention of the proprietor of Stonehenge to the danger in which several of the stones are at the present time from the burrowing of rabbits, and also to the desirability of removing the wooden props which support the horizontal stone of one of the trilithons; and in view of the great value of Stonehenge as an ancient national monument, to express the hope of the Association that some steps will be taken to remedy these sources of danger to the stones." With regard to this resolution, the Council reported that "they had carefully considered the question, and having had the advantage of perusing the detailed report recently prepared by a deputation of the Wilts Archæological and Natural History Society on the condition of the whole of the stones constituting Stonehenge, are of opinion that the proprietor should be approached with the expression of a hope that he will direct such steps to be taken as shall effectually prevent further damage."

EGYPTIAN SCULPTURES AND PAINTINGS.

Mr. W. M. Flinders Petrie read in the Anthropological Section some "Notes on the Accuracy of the Sculptures and Paintings of Races on the Egyptian Monuments." He showed numerous plaster casts of bas reliefs and line drawings, mostly in profile, and of a very early period, representing faces of Egyptian character and of types characteristic of neighbouring nations of antiquity. These casts had been prepared from fragmentary architectural remains by means of paper "squeezes," which consist of moist slabs of paper which may be beaten into the grainings and indentations of the stone. When the "squeeze" is dry it may be removed, and impressions taken from it or any suitable material. The copies thus made are well adapted for photographic purposes, as they may be arranged in a more favourable light than might be possible in the hardly accessible positions in which the originals are often found. Photographs taken from the mouldings were exhibited. A companion paper was called "Studies on some Groups of Mr. W. M. Flinders Petrie's Casts and Photographs of Ethnographic Types from Egypt," and was read by the Rev. H. G. Tomkins. He hazarded a number of conjectures identifying place-names familiar to Egyptologists with localities bearing similar names to-day. He spoke of the wonderful Pun people, and described a set of terraces built by them, the walls of which rose by successive gradation to the height of 3,000ft. He also made reference to the pre-Scriptural history of the Hittites.

LONDON AND SOUTHWARK SUBWAY.

Mr. J. H. Greathead read a paper on "The City of London and Southwark Subway," of which he is the engineer, and which, he said would be three miles in length. The total cost of the line from beginning to end, including land, buildings, stations, and equipments, would not exceed £200,000 per mile. Steam locomotives were not to be used on the line, which

is to be worked on the endless cable system of traction.

ELECTRIC LIGHTING.

Mr. Georges Forbes delivered in the Free Trade Hall on Saturday night a lecture to working men on the subject of "Electric Lighting." Mr. Forbes, whose lecture was illustrated by numerous experiments, explained how light was created by electricity, and spoke of the various lamps in use. The arc used, he said, was the best for large spaces, and the incandescent for small buildings and houses. The incandescent lamp was safe, cleanly, and healthy—safe, because it could not set fire to inflammable objects and could not explode like gas; cleanly, because it had no noxious gases to tarnish silver and decorations; healthy, because it did not heat or pollute the atmosphere. The lecturer explained how electricity could be best generated for the purposes of lighting, and dealt with the difficulties attending it distribution through a large district from a central station. The only method that had been a success was the system of using an alternative current of high pressure in the mains and converting it by a specially-designed apparatus into a low pressure at the lamps. This system was founded on Faraday's discovery of induction, and it was being largely used in America and Europe. The lecturer proceeded to lay before his hearers a system for the construction of main conductors through the streets, and, finally, produced a meter by means of which the amount of electricity consumed by each customer could be measured. Mr. Forbes proceeded:—In conclusion, let me say a few words on the progress of central-station electric lighting in this country. It has been extremely slow, owing largely to the Electric Lighting Act of 1882. If electricity be put on the same terms as gas, and if you have your station on a river bank or any place where coal and water are cheap, you can be well supplied with electric light at the same price as gas, at 3s. a thousand feet, with a fair profit to the promoters. On the Continent of Europe there are numerous central stations. In America there are 250 central stations in different towns, and the progress has been enormous. At present there are probably more than 300,000 arc lamps in use in that country. The Americans are also getting the start of us in electric railways and tramways and generally in the application of electricity to motive power. We once beat the whole world in steam railways. Our pre-eminence in steam has gone far to make this country what it is. So let it be with electricity, for we are now passing into the age of electricity.

PREHISTORIC MAN IN GREAT BRITAIN.

The report of the committee, consisting of Sir John Lubbock, Dr. John Evans, Professor Boyd Dawkins, Dr. Robert Munro, Mr. Pengelly, Dr. Henry Hicks, Dr. Muirhead, and James W. Davis, appointed for the purpose of ascertaining and recording the localities in the British Islands in which evidences of the existence of prehistoric inhabitants of the country are found, was read before the Anthropological Section on Tuesday. It stated that the objects sought to be attained by the committee consisted in recording and mapping the prehistoric remains of Great Britain. The committee had arranged to secure the assistance of one or more competent persons representing certain areas—districts or counties, who recorded the occurrence in that area of any prehistoric objects which had been or might be found.

MIGRATIONS OF PRE-GLACIAL MAN.

Dr. Henry Hicks read a paper before the Anthropological Section on Tuesday, which raised an animated discussion. His subject was the "Migrations of Pre-Glacial Man." Referring to the further researches carried on this summer at Cae Gwyn Cave, North Wales, Dr. Hicks stated that the additional evidence obtained proved most conclusively that the flint implement found there last year—a beautiful flint-head—in association with the remains of pleistocene animals, was under entirely undisturbed glacial aspects. It proved another link in the chain of evidence which, so far as it went, pointed to a migration of man to this country from some northern source, as the human relics found in the caverns and also in the older river gravels—which Professor Prestwich was now disposed to assign also to the early part of the glacial epoch, when the ice sheet was advancing—occurred in association with the remains of animals of northern origin. There was not a relic to show that man reached this country with animals of an eastern or southern origin. Evidence pointed to a northern source as that from which man came to this country. He followed the reindeer in their compulsory migration, and kept mainly with them near the edge of the advancing ice. The age of this pre-glacial man must be many thousands of years—as many, according to one great authority, as 240,000 years.—Professor Boyd Dawkins protested in the strongest manner against Dr. Hicks applying the term pre-glacial to palæolithic man alone; and for this reason. The story of the existence of the earliest man was a story not only told in the river beds and caverns of Wales and France; but a story told us in lands far out of the reach of the reindeer or any other northern animal, and in lands in which there was no shred of proof that there was any glacial period at all. In North Africa, Palestine, India, and elsewhere, where there was absolutely no glaciation, where was found palæolithic man, we found the same remains with him as in glaciated Europe. He objected, therefore, to the application of "glacial" in order to fix any special period for the existence of the earliest man. He proceeded to adduce evidence, based upon the distribution of the remains of animals, to show, or at least to suggest, that the birthplace of man was a warm country, and that his migration was from the south to the north. Man, he said, made his appearance in Europe along with the southern animals, and when the cold came on he went south; and from the whole distribution over Europe, Asia, and Africa he must have been in possession of these areas during greater periods of time. He maintained, also, that there was evidence to show that, instead of the Esquimaux being, as Dr. Hicks thought, the ancestors of the people of our islands, they were the descendants of the men who migrated from the south to the north. Mrs. Stopes, of Upper Norwood, London, pointed to a carved shell found a few years ago in the red crag at Walton-on-the-Naze, as affording, in her opinion, absolute proof of the existence of man in this country at a period anterior to the glacial epoch. Several speakers dissented from the views which Dr. Hicks had brought forward. Evidence of the existence of a pre-glacial man was now indisputable.

BUILDING MATERIALS.—III.*

(*Continued.*)

By W. Y. Dent, F.C.S., F.I.C.

HYDRAULIC CEMENTS.

THE first hydraulic cements made in this country were obtained by burning natural cement stones, a patent having been taken out in 1796 for the preparation of what was improperly termed "Roman" cement from the calcareous clay nodules known by the name of septaria, which are obtained in considerable quantities on the Kentish and Essex coasts, the chief supplies being procured from Isle of Sheppey and the neighbourhood of Harwich, where they are dredged up from the sea at low water. The composition of these nodules varies considerably, but they may be regarded generally as consisting of from about 50 to 65 per cent. of carbonate of lime associated with argillaceous matter containing oxide of iron. The Mulgrave cement made at Whitby from stone found on the east coast of Yorkshire, the Medina cement from the Isle of Wight, as well as various quick-setting cements made in different parts of the country, may be regarded as more or less partaking of the same character as the so-called Roman cement. The operation of burning these natural cement stones is a very simple one, but requires care and experience, the object sought to be attained being to drive off the carbonic acid from the carbonate of lime, and to cause the silica of the argillaceous portion of the stones to enter into combination with the lime, forming silicates that are capable of being readily attacked by hydrochloric acid. To effect this a very high temperature is not necessary, and should, indeed, be avoided, for many of these natural stones, if exposed to the same temperature as that which is employed in the manufacture of Portland cement, would undergo partial vitrification, and would no longer, when mixed with water, possess the setting properties of cement. The stone is burnt in a kiln worked on the intermittent system, and afterwards ground to powder, the quality of the cement depending upon a proper selection of the stone and the care taken in firing. The trade in Roman cement was at one time of so much importance that the question was raised whether foreign vessels should be allowed to dredge for the stone off the English coasts; but partly owing to increased supplies of material from which cement answering all the purposes of the original Roman can be prepared, but chiefly to its having been superseded by Portland cement for all purposes where strength and durability are required, the Roman cement manufacture has ceased to possess any especial interest. The cement known as Portland, which was so named from a fancied resemblance of blocks of this material to Portland stone, far exceeds in importance every other description of cement, both as regards the extent of the manufacture and the purposes to which it is applied. A patent was taken out for the manufacture of this material, in the year 1824, by Mr. Jos. Aspdin, a Yorkshire bricklayer, who states in his specification that he mixes powdered limestone and argillaceous earth in a fine state of division with water, then evaporates the water, and calcines the mass in a furnace until the carbonic acid is entirely expelled, and this is essentially a description of what is done at the present time. This was not the first attempt at the artificial preparation of hydraulic cement, inasmuch as so far back as 1810 a patent was granted to Edgar Dobbs for burning a mixture of lime, clay, or any earthy material for the manufacture of cement, and in 1818 another patent was taken out by Maurice St. Leger for the use of a mixture of chalk or lime with clay or any substance consisting of silica and alumina; this mixture was to be made into a paste with water, dried, and burnt in a kiln. For some time prior to Aspdin taking out his patent, the well-known French engineer, M. Vicat, had been engaged in carrying out a series of experiments on the subject of hydraulic limes and cements, and an investigation of the subject was also undertaken by General Sir Chas. Pasley in 1826 at Chatham, who, in the course of his experiments, was the first to make use of the Medway blue clay, which has since been the principal source of the supplies of silica and alumina required for the manufacture of Portland cement in the chalk districts. It is a curious fact that in the early attempts to prepare Portland cement from artificial mixtures of clay and chalk, great care was taken to avoid too high a temperature in the kiln, and the light-coloured underburnt pieces (such as are now returned back to the kiln to be more thoroughly calcined) were regarded as yielding the best cement. The first to establish works on the Thames for the manufacture of Portland cement was Mr. Frost, who, about the same time that General Pasley commenced his experiments, erected kilns at Swanscombe, which were subsequently transferred to Messrs. White Bros., who have since that time continued the manufacture. Some time afterwards a son of Mr. Aspdin established works in the same neighbourhood at Northfleet, a place that is now almost entirely devoted to the cement trade. For some considerable time the quantity produced was very small, whilst the quality produced was variable, and could not be depended upon, and so little was the new cement appreciated, that in 1833, whilst Roman cement was selling at 1s. 6d. per bushel, only 1s. could be obtained for Portland. The trade has now become an important branch of national industry, every year new works are commenced, or old ones enlarged and supplied with new and improved machinery for saving labour, the demand for the article keeping pace with the increased supply. English makers are now so closely pressed, both as regards quality and price, by their German competitors, that it is only by exercising the greatest economy, and the production of the best quality, that they can hope to succeed in maintaining their position. The valuable qualities of this cement were early appreciated by the French engineers, and a large quantity of English-made cement

* Being the Cantor Lecture delivered before the Society of Arts.

was employed in the construction of the French docks and harbours. The greater portion of the cement made in this country is manufactured at the numerous works situated on the Thames and the Medway, the materials from which it is prepared being simply chalk and clay. The upper chalk, or that in which flints most abound, is that which is employed on the Thames, the grey chalk which lies immediately below it being also used on the Medway. The clay used for mixing with the chalk is obtained by dredging at low water on the banks of the Medway. Care must be taken in obtaining it that it is free from sand, and that it contains no fibrous vegetable matter; in the condition in which it reaches the works it contains about 40 per cent. of water. There is nothing very peculiar in the composition of this particular clay that should render its use essential for the manufacture of good Portland cement, the gault clay, as well as other descriptions of clay, being applicable for this purpose; any unctuous clay in which the proportion of alumina is considerable, that is free from sand and other impurities, and is capable of being reduced to a fine state of division, can be used for the manufacture of Portland cement. The clay and chalk in the proportion of three parts of the upper chalk or four parts of the grey chalk to one part of clay are thrown together, with a quantity of water, into a wash mill, which consists of a large circular trough (varying somewhat as regards character and size, but being generally about 18ft. in diameter) in which the mixture is ground by means of a revolving beam to which heavy bars of iron are attached, to the condition of a fine semi-fluid mud, or "slurry," as it is termed. The slurry is then pumped up to be further ground, either between rollers or by horizontal stones, and passed thence to the drying floors. Until within the last few years, a very much larger quantity of water was put into the wash mill than is now generally the case, the slurry being pumped up into reservoirs or "backs" (as they are termed), where it remained until the mixture of clay and chalk held in suspension by the water had deposited, when the supernatant water was drawn off, and the slurry, as soon as it had attained sufficient consistency, had to be wheeled away in barrows to the drying stoves. This system necessarily involved a great deal of manual labour, besides a considerable loss of time, several weeks being required to allow the particles of clay and chalk to subside; this method was, moreover, not conducive to the uniformity of the mixture, owing to the tendency of the heavier particles to deposit before those which are lighter. It is now the custom in most works to put only just enough water into the wash mill to make the slurry of a sufficiently liquid consistency to allow of its being removed by pumps. The drying of the slurry, instead of being conducted as formerly in special ovens heated by coke, is now carried out in chambers erected on a level with the top of the kiln, these chambers being heated by the waste gases from the kiln as they pass on to the chimney. The kilns in which the cement is burnt are closed at the top, the products of combustion being carried through the chambers containing the slurry, so that, as soon as the burning of a batch of cement in the kiln has been completed, a further quantity of slurry is sufficiently dried for another charge, and as this is already on a level with the top of the kiln, the operation of filling the kiln is facilitated. The kilns ordinarily employed for burning cement are somewhat similar in their construction to those used in burning lime, and are generally worked on the intermittent system, the difficulty experienced in working ordinary kilns continuously being quite as great in the case of cement as it is in burning lime. The Hoffmann kiln, which is largely used in Germany for cement, has not been adopted to any extent by English manufacturers; this may, perhaps, be partly accounted for by the fact that, in the chalk districts, the dry slurry is always, to some extent, in the condition of dry powder, whereas the materials for German cements are generally mixed dry, and moistened with water, and then made up into bricks before firing. The object to be attained in burning cement is not merely to drive off the carbonic acid from the chalk, and to effect the transformation of the silica of the clay from an insoluble into a soluble condition, but also to bring about those combinations of silica, alumina and lime, which require a very high temperature for their production, giving rise to a hard, almost semi-vitrified clinker. So far from being injured by being exposed to a very high temperature (as is the case with natural cement stones), Portland cement cannot be manufactured of full strength without being subjected to such a temperature, although it must not be so great as to produce actual fusion, for under such circumstances the material would be useless for cement. The conversion of the silica of the clay into a soluble condition will be found to have taken place in the half-burnt, yellowish pieces of cement that are returned to the kiln to be re-heated, in which even some of the chalk is not calcined. The difference between a lightly-burnt cement and a well-burnt clinker would appear to be due to the action of alumina, and the part it plays in the formation of double silicates of alumina and lime, and aluminates of lime. It was shown by M. Frémy, many years ago, that aluminates of lime obtained by subjecting mixtures of pure alumina and lime (consisting of one equivalent of alumina with one, two or three equivalents of lime) to a very high temperature produce, when mixed with water, hydrated aluminates of lime, which not only possess the property of hardening under water, but are capable of binding together very large quantities of sand into a mass possessing the hardness of stone. In the lias districts in Warwickshire, the limestone (which is of a harder description than chalk), and the shales which take the place of mud, are passed through toothed rollers and ground to a fine powder by horizontal stones. The powder is mixed in a pugmill, with as much water as is necessary to form a soft paste of sufficient plasticity to be capable of being separated into pieces about the size of bricks, which, when dried, are ready for the kiln. When drawn from the kiln, the calcined cement is crushed between rollers and ground to a fine powder by horizontal stones of the same description as those used in flour mills. Since it is necessary, in order to obtain the strong cements now demanded, that the mixture of chalk and clay should be heated to such an extent as to bring it into the condition of a hard clinker, the question of its being sufficiently ground has become one of great importance, on account of the difficulty experienced in reducing such a hard material to a very fine state of division. Unless the cement be ground fine its binding properties cannot be developed, and the quantity of sand it will bear mixing with is diminished. The coarse particles of cement which will not pass through a 50-mesh sieve are totally inert as a binding material; they will not even adhere together, although they may be converted, by simply grinding to powder, into an excellent cement. There can be no doubt but that the finer a cement is ground the better it is; it would, however, be manifestly impracticable to reduce a hard, well-burned clinker to an impalpable powder; the fineness must be limited by the cost of grinding. A few years ago a cement was thought to be sufficiently ground if 80 per cent. would pass through a 50-mesh sieve; now, however, it is required that 90 per cent. should pass a 76-mesh sieve, or 5,800 meshes to the square inch. When ground, the cement is conveyed to a store (the results of several days' grinding being mixed together so as to insure as far as possible uniformity throughout the bulk), where it should remain for three weeks or a month before being issued. However well made a cement may be, yet if it be mixed with water too soon after grinding, heat is generated, and it is liable to swell and crack; hence the necessity of making up small blocks, and observing whether any rise of temperature takes place on the addition of water, and whether, subsequently, any cracks make their appearance. Cement, to set properly, requires an ample supply of water, and will sometimes, if applied to a very dry wall, not adhere to it properly from deficiency of water. It would appear that the benefit derived from immersion in water continues for a considerable period, judging from an experiment made with two briquettes of the same cement, one of which was kept three years in the air, and the other in water. The one which had been kept in water gave the highest breaking strain, had a more crystalline fracture, and contained more water in chemical combination than the briquette that had been kept in air for the same period. The great improvements that have been made in the manufacture of Portland cement within the last twenty-five years owe their origin in a great measure to its having been employed in the construction of sewers for the metropolitan drainage, under the superintendence of Mr. Grant, who, with the view of obtaining the best possible article that could be manufactured, devised certain definite tests by which the quality of supplies could be controlled. The terms of his first specification were "that it should weigh 110lb. per striked bushel, and that briquettes made up with water having a minimum area of 2½ square inches, after immersion in water for seven days, should not break under a tension of 400lb., equal to 177lb. on the square inch." Such a limit appears to be absurdly low, now that we are accustomed to cements which well bear a tension of from 400 to 450lb. on the square inch, and yet some eminent cement manufacturers of that time gave it as their opinion that a strain of 133lb. on the square inch was as much as cement could be expected to stand. Although the seven day test with neat cement is still very generally adopted on account of the inconvenience which a further delay in ascertaining the quality of supplies would entail, it is admitted that with hard-burnt, slow-setting, cements a period of twenty-eight days would allow of much more satisfactory results being obtained. Tests should also be made with a mixture of one part of cement and three parts of clean sharp sand; briquettes made of this mixture should be put in water twenty-four hours after they have been made, and at the expiration of twenty-eight days bear a strain of 250lb. on the square inch. It is important that the same description of sand should be employed in all cases, the particular kind of sand now very generally adopted is that obtained from Wortley Field sand-pits, near Leighton Buzzard. The grains of sand should also be of uniform size, and only those portions should be employed which have passed through a sieve of 900, and been retained by one of 1,600 meshes to the square inch. Inasmuch as the finer grinding of any cement makes its weight per bushel lighter, the actual specific gravity of the cement (which should be 3·1) is now regarded as a better criterion of its quality. A new method of calcining cement has been proposed by Mr. Frederick Ransome, which yields very promising results. It consists in the use of a furnace composed of a revolving cylinder placed in an inclined position, and lined with firebricks or other refractory material in such a manner as to produce a number of parallel longitudinal ridges, or "feathers" through the entire length of the cylinder. The fuel employed is gas obtained from slack coal by means of an ordinary gas producer, the air necessary for its combustion passing through a regenerator heated by the waste heat from the revolving furnace. The slurry is lifted to a hopper placed at the upper end of the cylinder, from which it falls in a steady shower through the flame of the burning gases, which enter at the lower end of the cylinder. The slurry, as the cylinder revolves, is caught by the "feathers," and is lifted until the feather attains such an inclination as to shoot it off to the bottom again, but owing to the inclined position of the cylinder at every revolution, gradually nearer to the lower end; this occurs repeatedly, until the completely calcined cement falls into a receptacle at the lower end of the cylinder, which is rotated at such a speed as to allow about half-an-hour for the cement material to pass from one end of the cylinder to the other. It is obvious that such a method must possess several important advantages:— (1) The cement when it leaves the cylinder is in the condition of a coarse powder, some of the particles being about the size of beans, instead of being in heavy lumps of hard clinker; it is, consequently, capable of being easily ground to a fine powder, which is not the case with the ordinary cement clinker. (2) A very considerable saving of fuel is effected, the consumption being estimated at not more than one-third of that required in ordinary kilns. (3) The temperature is completely under control, and the cement is not exposed to a high temperature for a longer period than is necessary for perfect calcination, whilst every particle is subjected to the same amount of heat; the cement is,

consequently, of a more uniform character. (4) The plant required is of a less expensive character than is necessary with ordinary or circular kilns, a cylinder of about 4ft. in diameter, and 20ft. in length, being regarded as capable of turning out as much cement as a 30-ton ordinary kiln. The most important point to be determined in the analysis of Portland cement is the proportion of lime, which in a well-made cement should be from 58 to 62, or perhaps 63 per cent. Any excess of lime should always be regarded with suspicion, inasmuch as it is well known that by increasing the proportion of lime, the strength of briquettes made of such cement at the end of seven days may be augmented. An excessive amount of lime, however, cannot be employed without incurring the risk of the cement cracking and becoming disintegrated. When the lime is associated with magnesia, the magnesia should be regarded as to some extent taking the place of the lime, and the quantity of the lime should be proportionally diminished. A well-prepared Portland cement, such as is made on the Thames or the Medway, should not contain any appreciable quantity of magnesia, say, about one per cent. Although any large proportion of magnesia in Portland cement cannot be considered desirable, yet it must not be forgotten that magnesia is capable of forming hydrates of great permanence and hardness, and that some very good hydraulic cements contain as much as 8 per cent. of magnesia, such, for example, as the well-known Rosendale cement of the United States of America. There can be little doubt but that the assertions that have been frequently made as regards the tendency of cements containing magnesia to disintegrate may sometimes have arisen from overlooking the fact that the results observed might be due to excess of basic constituents in the cement. In a recent statement put forward as to the injurious action of magnesia, the cement referred to contained 72 per cent. of lime and magnesia, and it could scarcely be regarded as extraordinary that such a cement should prove a complete failure, since it is well known that such a proportion as 72 per cent. of lime would render any Portland cement so unsafe as to cause it to be condemned.* One of the materials of which it has been attempted to make cement similar in its character to Portland is blast-furnace slag. Many endeavours have been made from time to time to utilise a material for which, until a few years ago, no application could be found except for road-making purposes. A great number of patents have been taken out with the view of accomplishing this object. In 1864 the plan of subjecting the melted slag (as it runs from the furnace) to a powerful jet of air or steam was proposed by Mr. Geo. Parry, which causes the slag to assume the appearance of wool. This slag wool can be used for a variety of purposes, and, being a bad conductor of heat, is well adapted for use as a covering for boilers' steam-pipes. When we recollect that this slag consists principally of silica, alumina, and lime, and that the silica is in a condition in which it is more readily capable of entering into new combinations than it is when in the form of clay, it might be expected that we have in blast-furnace slag a material peculiarly calculated to be of service in the manufacture of cement, artificial stone, or mortar. Accordingly, we find that, as far back as 37 years ago, attempts were made to utilise slag for such purposes. In 1850 a patent was secured by Mr. Jos. Gibbs for the manufacture of mortar and artificial stone by mixing ground slag with lime. The subject was subsequently taken up by some of the owners of ironworks, and a method for working slag was devised by Mr. Chas. Wood, of Middlesbrough, by the adoption of which he estimated that slag could be reduced to the condition of slag sand at a cost of a few pence per ton. The molten slag is made to flow into a bath of water, which is kept in a state of violent agitation by a revolving cylinder provided with a series of perforated screens or buckets, by which the slag is separated into small particles and carried up into a spout, which conveys it into trucks placed to receive it, the water falling back into the bath through the perforated screens. Many thousands of tons of slag sand have been manufactured in this manner, from which mortar is prepared by grinding the slag with 5 per cent. of lime, the mortar setting so quickly that it is necessary to use it within twenty-four hours of its having been made. Bricks are also manufactured in vast quantities by mixing the slag sand with 10 per cent. of slaked lime, and pressing the mixture into bricks, which, when dry, are ready for use, without requiring to be subjected to the heat of a kiln. Attempts have long been made to manufacture a cement resembling Portland from slag sand, but until recently without leading to any very successful result. If care be taken in selecting the slag sand, in ascertaining its composition, and in mixing with the proper proportion of chalk, very excellent cement may be produced, for the calcining of which Ransome's revolving cylinder is especially adapted. The slag-sand cement, prepared in a proper manner by what is called the homogenised cement process, as promoted by the Improved Cement Company, certainly gives results which are somewhat surprising, since briquettes made of this cement, whether tested neat at the end of seven days, or mixed with three parts of sand at the end of twenty-eight days, will stand the same tension test as good Portland cement. At the same time it must be borne in mind that great caution is necessary in adopting a cement of this nature, more especially when it is recollected that blast-furnace slags differ materially in their composition, and it is therefore not surprising that the introduction of a cement of this unusual character should have much to contend with as regards want of confidence in its power to retain its good properties for any length of time, more especially as previous experience on the subject of cement would tend to lead to the conclusion that no sufficient combination of the silica and alumina with the lime could be brought about by mechanical mixture alone, however intimately the substances might be incorporated with each other. It would appear, however, that when care is taken to see that the constituents of the cement exist in suitable proportions, a very serviceable article is capable of being produced. The cement is prepared by simply mixing together, in the most intimate manner possible, slag sand and dry well-slaked lime, without subjecting the mixture to any firing process. The secret of the success that has attended this method of making cement would seem to be the result of the very intimate mixture that is obtained by means of a revolving metal cylinder containing a number of iron balls, favoured by the soft and somewhat spongy character of the slag sand. In this, as well as in all new descriptions of cement, time is necessary to discover its defects or establish its merits. If a cement made in so simple a manner will continue to increase in strength for as long a time and to the same extent as Portland, this slag sand cement must become an important branch of manufacture; but at present its lasting qualities are not sufficiently established to allow of its being employed for any important work without the engineer incurring a little responsibility. It has, however, been clearly proved that a very excellent material, capable of being used as cement mortar, can be made out of slag sand by this method. Some excitement has lately been created by numerous letters which have appeared in the newspapers on the results produced by mixing sugar and lime together for the manufacture of mortars and cements. Unfortunately, these communications have seldom given sufficient details of the nature of the experiments made to enable anyone to say how far the results described are due to the sugar or to other causes. A mixture of sugar and pure lime made into a paste will set very hard upon the surface, but the interior of the mass remains in a friable condition, and will not withstand the action of water. Sugar may possibly be used with advantage where only pure lime is to be obtained, but it is not probable that any such mixture will compete in strength and durability with a good hydraulic lime. Amongst the most recent novel applications of cement are those of Mr. Wilson, of Grays, Essex, who, by inclosing in the cement wire-netting and hoop-iron, so strengthens it as to enable him to construct cisterns and drain-pipes that will stand very rough treatment, without being inconveniently heavy. He also constructs telegraph poles, as well as a variety of other articles for which cement has hitherto been considered as unsuitable.

* From a recent report of Professor Brazier on the cause of the failure of some Portland cement used in the construction of a graving dock in Aberdeen Harbour, it would appear that the reaction which takes place between the magnesium chloride contained in sea-water and lime may, under certain conditions, be sufficient to cause the disintegration of some descriptions of Portland cement, the lime in the cement being dissolved.

PLASTER OF PARIS.

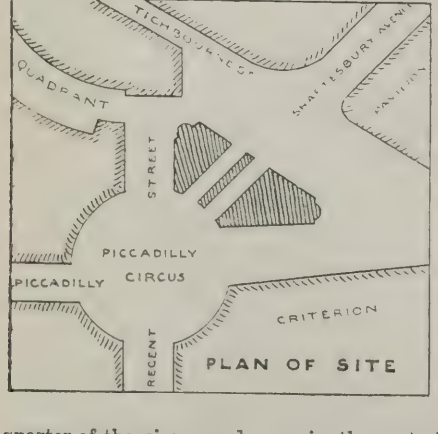
The setting of cements like Portland and Roman is due to combinations of a somewhat complicated character, the precise nature of which is far from being distinctly understood. It is altogether a different question with respect to plaster of Paris, which is due to hydration only. Gypsum is sulphate of lime combined with water, and when exposed to a temperature of about 360deg. Fahr. the water is driven off, and anhydrous sulphate of lime, known as plaster of Paris, remains. Sulphate of lime is found in nature in the form of transparent prisms, as selenite, and in opaque and semi-opaque masses, as alabaster and gypsum; it is also found not in combination with water, in which condition it is termed anhydrite. The principal beds of gypsum belong to the Tertiary system, the finest of these deposits being those of the Paris basin in the district of Montmartre. In this country it is found most abundantly in the counties of Derbyshire and Nottingham, extensive plaster works being carried on in the Vale of Belvoir, a short distance from Newark, where the gypsum occurs in beds varying in thickness from a few inches to 3 or 4ft. The only preparation which the gypsum undergoes previous to calcining consists in chipping off the outer portions, which, being contaminated with earthy matter, would injure the colour of the plaster. With all the varieties of gypsum there is a tendency to assume a crystalline character, and accordingly, as it possesses less or more of this structure, it is described as dense, granular, or fibrous. The white translucent alabaster which is used in statuary is a compact mass of crystalline grains, so soft as to be capable of being easily turned or cut. The altar piece in the chapel at Chatsworth is a fine example of alabaster work. Gypsum, when finely ground, is known in the colour trade as terra alba, and is used to a considerable extent in the manufacture of colours. It is, however, in the form of plaster of Paris that sulphate of lime is of the greatest value in commerce and in the arts. For its production several methods of heating the gypsum are adopted, a flat kiln or oven being generally employed in this country. After raising the kiln to a temperature of a low red heat, the firing is discontinued, and it is charged with the lumps of gypsum, which, after about eighteen hours, has lost its water of hydration, and become converted into plaster of Paris. The kiln is sometimes worked continuously, and is heated by flues which are carried round the chamber in which the gypsum is placed; when this method is adopted, it is necessary that care should be taken that the temperature does not rise too high, and that the plaster is withdrawn as soon as the water has been expelled. Considerable experience is required in carrying out this process (which is simply one of dehydration) successfully, for although when the temperature is kept within proper limits the plaster possesses the power of re-absorbing its water with avidity, yet this power is diminished if the gypsum be overheated. When subjected to a red heat for some time, the gypsum increases in density, and if this temperature be continued it gradually assumes the character of natural anhydrite, which does not possess the properties of plaster of Paris. It is safer not to drive off the whole of the water rather than risk exposing the gypsum to too high a temperature, as the retention of a small portion of its water does not prevent the plaster from re-absorbing the water that has been driven off. Although plaster of Paris does not chemically combine with more than one-fourth of its weight of water, yet it is capable of forming a much larger quantity into a solid mass, the particles of gypsum being converted into a network of crystals inclosing mechanically the remainder of the water. The value of plaster depends upon this property of setting with a very large quantity of water, for if the plaster were not capable of being used in the condition of a thin paste, its value as a material for taking casts would be greatly diminished; the thin plaster, when poured into a mould, fills every cavity, and the slight expansion which takes place in the act of setting forces it into the finest lines of the moulds. Sulphate of lime is soluble in



water to the extent of one part in 400, the solubility being but little influenced by temperature. It is on account of this solubility in water that cements which consist in a great measure of plaster of Paris are incapable of bearing exposure to the weather. By mixing gypsum with a small quantity of certain salts, such as alum, borax, and sulphate of potash, it is rendered capable of bearing a higher temperature than ordinary gypsum, without injury, and the character of the plaster produced is altered, the mixture setting into a harder material or cement, of which we have examples in the cements known as Keen's Parian and Robinson's.

PICCADILLY CIRCUS.

THE week before last we fully described the various schemes which the Metropolitan Board of Works have under consideration for the completion of Piccadilly-circus; there is, therefore, no occasion now to enumerate the different proposals; but we have made a sketch from the large model of the most important design hitherto brought forward. The idea of this plan is to provide a series of shops on the polygonal piece of land which forms one



quarter of the circus, and occupies the central area of the present open site. We have endeavoured to give a correct rendering of this design, and also accompany the view with a sketch plan so that our readers may fairly judge of the merits and disadvantages of the scheme. Any proposal which covers the available ground with buildings, excepting perhaps a fountain with statuary, the whole forming a refuge as well, should be unreservedly rejected; and, in our opinion, it would be very difficult to conceive a more objectionable plan in every way than that which we illustrate herewith. We can hardly think that the majority of the Metropolitan Board of Works will agree to the erection of such a monstrous structure, whatever may be urged by some members as to the high rentals which the proposed shops would secure. We presume that Mr. T. Blashill, the architect to the Board, has, in preparing this design, only carried out his instructions, and endeavoured to realise as best he might the ideas of certain members who are working in the matter. The secretary to the Shaftesbury Memorial Committee sends the following letter, which certainly seems more to the point, always provided, of course, that the fountain he proposes is suitable to the site. A combination of a refuge and underground public convenience, coupled with a fountain and place for pot shrubs and flowers round its base, seems to afford the only satisfactory solution of the problem now attracting such widespread attention.

SIR,—May I be allowed to suggest that the bronze memorial of the late Lord Shaftesbury would be an additional attraction if one of the triangular spaces could be secured for its site? Mr. Alfred Gilbert, A.R.A., has been commissioned to execute this work, and has for some time been busily engaged with the model. It will partake of the character of a fountain, and will be useful as well as ornamental—in fact a work of art which would do credit to the site, for which it is admirably adapted, and be a fitting memorial of the great man whose works of mercy it will symbolise and whose memory it is intended to honour and perpetuate. I venture to submit, Sir, that nothing would be more appropriate at the commencement of Shaftesbury-avenue than an artistically-executed memorial of the late Lord Shaftesbury; it would, moreover, I believe, have the generous approval of the entire public. —I am, Sir, your obedient servant,

H. R. WILLIAMS, Hon. Sec. Shaftesbury Memorial Committee.

6, Lime-street, E.C.

The main thing to be considered is public convenience, combined with the improved appearance of our great thoroughfare, and in crowded London these desiderata for the most part are not realised for lack of uninterrupted open spaces. This area has been secured at a vast outlay. Why spend more money in blocking it up again?

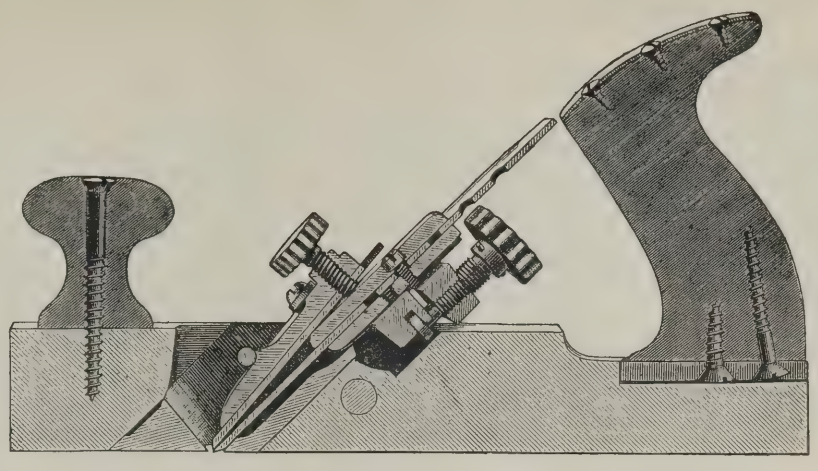
BOSAHAN HOUSE, CORNWALL.

BOSAHAN HOUSE, at St. Anthony's, six miles from Falmouth, which has been in course of reconstruction during the past three years for Mr. A. Pendares Vivian, from plans by Mr. Ewan Christian, of Whitehall, is now approaching completion. The style of the new mansion is Elizabethan, and the house alone, excluding the splendid stables and other outbuildings, covers a ground area of 21,760ft. It is built of stone quarried on the estate, the mullions and dressed parts being Doulting stone from Somersetshire, worked and fixed by Messrs. C. Trask and Sons. The main entrance to the mansion is by two vestibules, 10ft. square. The first one has heavy old oak doors. One of the vestibules is paved with Devonshire marble, and the other with serpentine, diamond pattern. Through the vestibules the great hall, 50ft. long and 22ft. wide, is reached. The floor is laid with old oak from Adair House, St. James's-square, now the Junior Carlton Club. Immediately facing the entrance is a large 26-light window, containing numerous crests, arms, &c., in stained glass, executed by Messrs. Heaton, Butler, and Bayne, of London. On the right of the great hall are a fireplace and walnut mantelpiece. The last is 14ft. in length and 9ft. 9in. in height, and was carved at Verona expressly for the hall. The panelling round the hall is oak from an old house in London; two wrought-iron columns near the entrance came from an old church in London. The walls will be hung with Flemish tapestry, and on the panelling will be an authentic collection of old arms. The hall will also be adorned with heads of the wapiti, buffalo, moose, elk, bear, red deer (Scotch), antelope, &c., all of Mr. Vivian's own killing. The roof of the great hall is supported by a number of corbels carved by Mr. Harry Hems, of Exeter. The corbels are 22ft. from the floor, and from floor to apex the height of the roof is 45ft. In the roof above there are 2,550 cubic feet of oak weighing more than 30 tons. The hall will be lighted by eight 32-candle-power electric lights, hanging from the hammer beams. From the great hall is a staircase 6ft. wide, with oak dado and carved newels. On the left of the hall is a spacious billiard-room, 30ft. by 20ft., and having bay windows 12ft. by 6ft. The mantelpiece, like the one in the large hall, is of Italian walnut, with Verona carving. The ceiling is a copy of a well-known one at Knowle, Kent. The room will be lit by six 16-power electric lights. Both the great hall and the billiard-room will be heated with hot-water pipes fitted by Mr. Tirrell, of Redruth. The next room on the left is the library, 18ft. by 20ft., with bay window. The mantel is in a Louis Seize style, composed of Sienna marble beautifully carved. The library opens into the drawing-room by large folding doors. The drawing-room is 30ft. by 18ft., with a bay 12ft. by 5ft. The mantelpiece is Louis Seize in style, and is of pure white statuary marble, from Brussels. The floor is of oak, covered with an Indian carpet. The door and window fittings are of teak, while the mock shutters are from Lord Stair's old house, as is also the hearth. The ceiling is a copy of one at Crewe Hall, the seat of Lord Crewe, the work being done by Messrs. Jackson, of London. On the right of the great hall is the dining-room, also 30ft. by 18ft, with a bay 10ft. by 6ft. The floor is of oak. The fireplace is from the house of Lord Stair, the beautiful carved wood, painted white, being lined with Poltesco serpentine. The side tables are Italian with marble slabs. The fender is also Italian, and the ornaments are old French bronzes. A fine piece of furniture in this room is an Old English Sheraton sideboard. The dining-table is of Spanish mahogany. The floor is covered with a modern Turkey carpet. The electric bells are fitted in Florentine bronzes, excepting one at the head of the table, which is movable on the floor, and rung by pressing with the foot. There are four electric lights on brackets and one pendant. Passing out of the dining-room and through a lobby, Mr. Vivian's private room is reached. Its dimensions are 18ft. by 16ft., with an octagon bay, copied from Guy's Cliff, Warwickshire. From this room the gun or work-room is reached, this being 20ft. by 18ft., and from it a corridor leads to the garden entrance and the offices. The kitchen is 32ft. by 18ft., while the butler's pantry is 24ft. by 15ft. On the other side of the passage are the servants' hall, 23ft. by 14ft., and the scullery, 15ft. by 14ft. The housekeeper's room adjoining the gun room is 18ft. by 15ft. The store room, butler's room, dairy, &c., are also on the ground floor. On the chamber floor there are four spare bedrooms and dressing-rooms, boudoir, and servants' bedrooms, &c. On the

ttic floor there are eleven bedrooms. There re bathrooms on each floor. The bays of all he principal rooms are laid with parquetry of ak, the work of the carpenters on the spot. 'wenty-one of the doors are from an old manor- ouse in Nottinghamshire. The whole man- ion is lighted with electricity, the fittings eing by Messrs. Crompton, of Mansion-house uildings, London. The power for working hese is supplied by an engine of eight nominal orse-power, erected by Messrs. Marshall, of ainsborough. In addition to working the ynamo, the engine is used for pumping water o the tanks at the top of the mansion. A lift orks from the bottom to the top of the build- ng. In the tower there are cisterns capable f storing 6,000 gallons of water. Here also a large clock with two faces, north and east, ade of Cornish copper, and manufactured at he Vivian Works in Wales. The clock is sup- lied by Messrs. Gillett and Co., of Croydon, nd has chimes. The top flats of the building re of copper, as also are all the down pipes, ain troughs, &c. The roofs, 44 in number, re slated with green Welsh slate from Cardi- anshire. On the top flat is a curious bell, hich was in the old house, which till recently ccupied part of the same house. It is dated 505, bears the words "Anno Domini, Maria ocor.," and is supposed to have originally elonged to a convent. The height of the uilding from ground to copper flats is 60ft. bove the turret is a Tudor dome, covered with opper. The mansion has been erected through- ut with hydraulic lime, mixed with clinkers nstead of sand, thus rendering it exceedingly ard. There is a vertical asphalte damp-course rom top to bottom between the stonework, all he outer walls being of two thicknesses, the amp-course being between them. All the ex- erior walls are 2ft. 3in. thick, and none of the nterior walls are less than 9in. in thickness. he stables are about 100ft. from the house. hey consist of six stalls and two loose-boxes, ompletely fitted with Musgrave's patent fit- ngs; they are paved with Cornish brick, and re lighted by electricity. Above are a large oft and sleeping rooms. The coach-house and addle-room adjoin the stables. In the former here is room for six carriages. At the end of he stable buildings is the laundry. Within a hort distance are the engine shed and boiler ouse. Everything has been carried out in a ubstantial manner, both in regard to the uildings themselves and also in connection ith the interior fittings, the question of cost eing of secondary importance. The two ter- aces in front of the house have been com- leted. They are over 300ft. long. The grounds re being laid out by Mr. W. Crawford. The lerk of works is Mr. F. W. Mansell, of London, nd Mr. W. Rowe is foreman of joiners. The ot-water work to baths and sinks, and copper ork to roofs and flats laid by Mr. Wilton, of edruth. The painting and glazing are by Mr. . Glasson, of Truro; and the blinds and pholsterer's work by Messrs. Criddle and mith, of Truro.

BOOKS RECEIVED.

Illustrations of Old Ipswich, by John Glyde Ipswich: John Glyde, 35, St. Matthew's- treet). The present part—No. V.—deals with The Bridges of Ipswich," which, though ostly of modern construction, are upon the ines of the ancient structures, which were ecessarily narrow. The architecture of old ridges is one of the most scanty records, and, herefore, we think Mr. John Glyde has done ell to illustrate and describe those both past nd present spanning the three streams on hich Ipswich is built. The photogravure of ld Stoke Bridge, which crossed the Orwell, and onnected Ipswich with the hamlet of Stoke, lustrates one of the masonry bridges of he ancient type, built of brick and stone. It of three arches of elliptical shape, the piers aving cutwaters, niches, and panels above, nished by cornice and balustrade, which artake, as usual in all ancient bridges, a considerable rise. This old stone ridge was erected in 1670, and was destroyed y a flood in 1818; the photogravure being aken from a water-colour drawing of the ridge as it stood in 1790. Many particulars aken from the old records relating to repairs f Stoke Bridge are of interest, especially the accounts of the surveyors, John Sawyer and Jonathan Button, referring to the value of labour and materials. The present iron structure of one arch, 60ft. span, was designed and constructed by Mr. William Cubitt. Bourne Bridge is next described; though now rebuilt on the old foundations, it was, from the particulars given of it, a structure of seven pointed arches, which remained till nearly the end of the 18th century; the foundations of the old masonry carrying the present brick and timber structure are still visible in the bed and shores of the little Bourne stream at low tides. The present steep-pitched and narrow Handford Bridge stands upon the site of an ancient timber construction, of which many interesting facts are recorded. A brief notice is given of Friars Bridge, which formerly stood near the present Cattle Market, and apparently provided as a means of communication with the Franciscan Grey Friars priory. Mr. Glyde has the true zeal of the antiquary, and has from a variety of sources written a very readable account of the old Ipswich bridges.



NEW SELF-SETTING BENCH-PLANE.

THE sectional illustration represents a new self-acting bench-plane which has been perfected and is now manufactured and introduced by the Gage Tool Company, of Vineland, N. J. This tool combines the advantages of the iron and the wood plane, and is claimed to possess points of superiority over many excellent planes already on the market. The construction is clearly shown in the sectional view, and, as will be seen, is very simple. In replacing the bit no setting of the same is required, as it falls with great accuracy into the correct position, and in this respect the plane is self-setting. For minute accuracy the bit is adjusted by the screw shown behind the cutter, and after it has been properly adjusted it cannot be set wrong or be moved out of position by striking a knot while in the act of planing, which is a feature to be appreciated by all who have occasion to use a plane. The cap is not attached to the cutter, but remains stationary, and is clamped in position by the screw passing through it. The cutter can be moved up or down by the thumb-screw shown behind the bit, and thus, even while at work, the thickness of a shaving can be changed by a simple movement of the thumb and finger. Provisions have also been made by which the bit or cutter can be set square with the face of the plane, even if the cutter is not ground exactly square with itself. The throat is prevented from wear by being within the adjustable iron bit-holder, which extends through the plane. It is claimed, and this claim is based upon actual trial, that the cap and cutter can be removed and accurately readjusted in five seconds; consequently, the time saved in setting the bit would alone amount to many days' labour in the course of a year usually spent in setting the cutter. The Gage Tool Company pride themselves in their selection of the steel for and the tempering of the cutters, by which they obtain a uniform cutting quality, enabling the company to warrant their planes for planing the hardest hemlock knot to the satisfaction of the users. It is also claimed that the tool can be changed from a double to a single iron, or from a single to a double iron, in two seconds. It can be adjusted to the coarsest or finest work, and will smooth cross-grained, eaty, hard or soft wood, against the grain. The plane stocks are saturated with hot wax or oil. Old-fashioned wood-planes can readily be changed to this new plane.—*American Machinist.*

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

HAMPSHIRE FIELD CLUB.—On Tuesday week the members of this club visited, under the guidance of Mr. C. R. Pink, F.R.I.B.A., of Winchester, several churches in the upper part of the Itchen Valley—viz., Avington, a Georgian structure; Itchen Abbas, rebuilt in 1863, when the fine monuments were heaped together in a vault, where they still remain forgotten and uncared for; Easton, which has a fine vaulted Norman apse and Transition door; Mortimer's Worthy, with its fine Norman doorways, its roof and tombs; and Hydebourne, or Headbourne Worthy, with its picturesque and remarkable work of pre-Norman times, and with many interesting structural peculiarities, such as the Holy Rood, at the west end, in an upper chamber or chapel; its quaint tower, and flat buttresses. The rector, the Rev. J. H. Slessor, has preserved a *unique* Wykehamist monument—viz., a brass from the church floor, now fixed in the wall, commemorating a scholar of Winchester College, whose name is John Kent, a Berkshire lad, who was admitted a scholar in 1431, and died in 1434. As the solemn entry of the Warden and Fellows and scholars to Wykeham's New Buildings here was made in 1393, this monument recalls a "boy" who was admitted 38 years after the "entry," and it is, we imagine, the earliest extant memorial of a scholar. The effigy, from its style, is doubtless a likeness, and wears the robe pretty much as scholars do now, save that it is longer. The effigy has a label issuing from the mouth, with the words—"Misericordias Domini in eternum Cantabo"; whilst at the feet of the figure is "Hic Jacet Johes Kent, quondum Scholaris novi Collegii de Wynchestre, et fileus Simonis Kent de Redynge cusjus anime propitietur Deus." Under the eastern window, in the "God's Acre," rest the remains of the Rev. Joseph Bingham, author of the "Antiquities of the Christian Church," by which he is immortalised. He died rector of this parish in 1723.

The Wesleyan chapel at Guisborough, after having undergone extensive alterations and improvements, was reopened on Sunday. The chapel has practically been rebuilt, only part of the walls of the old chapel, erected in 1811, not having been removed. The total cost of the alterations will reach about £1,500. The rebuilt chapel is Gothic in character, and the chief elevation is of red pressed bricks with stone dressings. 100 extra sittings have been provided. The contractors were Mr. A. White, Guisborough, for the brick and stone work and slating; Mr. Wm. Heckle, Guisborough, the wood work; Mr. Jas. Purdy, Guisborough, the plumbing; and Mr. W. T. Harrison, Guisborough, the painting.

A band of forgers of antiquities purporting to come from prehistoric lake dwellings in Switzerland have been unmasked. Some of them are being prosecuted before the cantonal tribunal at Freiburg, and have made admissions which fully bear out suspicions long lurking in the minds of Swiss archæologists. Stäffis seems to have been the headquarters of the spurious trade.

The War Department intend to construct a new railway connecting the whole line of forts along the Medway valley, now in course of formation for the protection of the garrison and the dockyard against attack on the land side.

CONTENTS.

The Architect: his Relations to the Builder	385
A Somerset Tour	386
The British Association at Manchester	386
Building Materials.—III.	389
Piccadilly Circus	392
Bosahan House, Cornwall	392
Books Received	393
New Self-setting Bench-Plane	393
Architectural and Archæological Societies	393
Our Lithographic Illustrations	394
Modern Lamps	394
Shops at Streatham	394
Wayside Notes	415
Building Intelligence	416
Engineering Notes	417
Competitions	417
Correspondence	417
Intercommunication	419
Legal Intelligence	420
Water Supply and Sanitary Matters	420
Statues, Memorials, &c.	420
Parliamentary Notes	420
Our Office Table	421
Meetings for the Ensuing Week	421
Tenders	422

ILLUSTRATIONS.

"THE REPOSE IN EGYPT."—INTERIOR VIEWS OF NOTRE DAME, CHALONS-SUR-MARNE.—AN ENTRANCE CORTILE.—SOMERVILLE HALL, OXFORD.—BUSINESS PREMISES, 86, STRAND.

OUR LITHOGRAPHIC ILLUSTRATIONS.

"THE REPOSE IN EGYPT."

THE evident favour with which our previous reproductions of Carl Müller's pictures have been received induces us to give another. "The Repose in Egypt" tells its own story too well to need description, and the scene represented may be elaborated at will by any student of Scriptural art.

INTERIOR VIEWS OF NOTRE DAME, CHALONS-SUR-MARNE, FRANCE.

THESE spirited pencil and tint drawings are by Mr. Arnold B. Mitchell, A.R.I.B.A., and form part of the series which he prepared when Soane Medallist of the Institute, and for the same series of studies a medal in the Pugin Traveling Studentship competition was this year awarded him. The church of Notre Dame, Châlons-sur-Marne, is one of the most exquisite examples of Early French Gothic extant, furnishing at once a model in general design and arrangement peculiarly typical of the Transitional period. In some respects the detail is very like the choir at Canterbury and Sens. It was rebuilt by Bishop Boso ("Gallia Christiana," Tom. II. p. 506), and dates from 1157 to 1183, during which latter year the church was consecrated by Bishop Guido. M. Viollet-le-Duc, in his "Dictionnaire de l'Architecture," under the article on Construction, Vol. IV., p. 75, gives the several plans of the apse at various heights, including the chapels which form the chevet, together with a view of the ambulatory showing the entrance to one of these radiating chapels; and he likewise gives a cross section through the apse illustrating the flying buttresses, triforium, and groining. Further drawings follow in the same volume of the richly-treated corbel table round the apse, illustrating the chapter devoted to the "Corniche," p. 331, and under "Corbeau," p. 317, a sketch is printed showing how the diagonal ribs terminate against the wall shaft caps in the aisles. In Vol. V., among the articles illustrating his valuable treatise on "Fenêtres," M. Viollet-le-Duc publishes exterior and interior elevations of the upper range of apse windows, giving a detailed plan showing how the utmost light has been obtained at the clerestory level with a minimum use of masonry. Mr. Eden Nesfield, in his "Specimens of Mediæval Architecture" (plates 19 and 20), published two views—the one a general interior, similar to Mr. Mitchell's sketch herewith given, and a view looking into the easternmost chapels. Mr. George Edmund Street's autograph study of this chevet appeared in our own pages a short time since (see BUILDING NEWS, Feb. 6, 1885), and may be advantageously referred to in this connection. Mr. Mitchell's sketch from the north transept looking west into the nave gives an admirable idea of the interior elevation and leading features in the noble design of this church. The triforium gallery is rather wider than the aisle below it, and is both vast and lofty as well as beautifully proportioned. The height of the nave from the pavement to the top soffit of the vaulting arches is 68ft. 3in., and the width between the wall piers, which are about 18in. in diameter, is 28ft. 4in., the aisles being 12ft. 9in. wide from pier to pier. To the springing of the roof vaults of the nave the height measures 49ft. The triforium floor is 28ft. 5in. from the ground pavement level, and to the clerestory string it is 47ft. The bays of the nave arcade between the responds figure 12ft. 2½in., the caps of these piers being 16ft. 10in. from the floor to the upper line of the abacus, while the capitals, abacus included, are 2ft. 1½in. high. The western façade is, comparatively speaking, more simply treated, but the great towers and lead-capped spires are particularly bold and handsome. The towers measure 104ft. 9in. to the top of the cornice from the ground, and the spires to the base of the finials are 97ft. 6in., giving a total height of 202ft. 3in. As specimens of carpentry the spires are very notable instances. Mr. R. J. Johnson, in his rare book "Specimens of Early French Architecture," gives some views and carefully-measured drawings, with mouldings and profiles to a larger scale (plates 51 to 56). A ground plan of the church itself does not seem to have been published.

CRANSHAW HALL—THE LARGE SALON.

THE problem in the decoration forming the subject of the accompanying illustration was to obtain in an ordinary and not very interesting, large country mansion one large and lofty room, by including several small rooms, running through two stories in height. The existing corridors and staircases have been utilised, and access obtained from them to the musicians' gallery, shown over the entrance doors. The ceiling and spandrels are carried out in thin canvas plaster, and the woodwork is in painted deal, with the exception of doors and window finishings, which are in dark Spanish mahogany, with satinwood and lighter mahogany in the panels. The mantel, of which only a small portion shows in the drawing, is carried out in alabaster and a marble obtained from the locality. The work has been executed from the designs of Mr. Walter Hensman, of Shepherd's-bush, Mr. F. Myford acting as clerk of works.

SOMERVILLE HALL, OXFORD.

THIS is one of the Halls for lady students. The existing premises having proved inadequate to keep pace with the growth of the movement, the council decided to erect an entirely new block of buildings to supplement them. The idea of this scheme is that the students should live as members of a large family under the care of a lady principal, each being provided with a separate apartment, fitted up as a combined sitting-room and bedroom. Hence the arrangement of the plan corresponds somewhat to that of an ordinary residence. Tuition and lecturing are provided for elsewhere. Diagram plans accompany the view, which will explain themselves, a point being that the majority of the students' rooms reap some benefit from sunshine. Economy has had to be carefully considered, and only a portion of the block has at present been built. The work has been carried out by Messrs. Symon and Co., contractors, Oxford. Mr. H. Wilkinson Moore is the architect.

BUSINESS PREMISES, NOS. 86 AND 87, STRAND, W.C.

THESE premises occupy the site of Nos. 86 and 87, Strand, No. 86 being formerly well known as Osmond's Hotel. They have now been incorporated in one building, the property of Mr. W. Campbell, jeweller, who retains for his own use the ground floor and half the basement. The upper portion of building is intended to be used as a private hotel or for offices; the entrance to this portion is on the west side. The building up to level of first floor has been built in cement, with fireproof floors, with strong double fireproof doors shutting off Mr. Campbell's shop and the staircase to the upper portion. The shop is fitted up in specially-designed American walnut fittings, and with panelled ceiling of enamelled iron. The upper portion of building contains large coffee and smoking rooms, lavatory, bath, and w.c. accommodation, and about seventeen other rooms, exclusive of kitchen, &c., on top floor. The front is executed in cut red brick with Portland stone dressings and red Mansfield panels, the pilasters to the shop being of granite, with specially cast bronze capitals and bases. The general works have been carried out very satisfactorily by Mr. S. Jerrard, of Lewisham, S.E., who, as also his foreman on the works, Mr. Vouseley, have paid special attention to their work, and great credit is due to both. The lift is by Messrs. Waygood and Co; the shop fittings were executed by Messrs. Colls and Sons, and the shutters by Messrs. Francis and Co. The carving both to stone and brick, and the modelling of capitals, was the work of Mr. G. Frampton, jun., of Camberwell. The whole of the works have been carried out from the designs and under the superintendence of Mr. Alfred Drewe, architect, of 28 and 29, St. Swithin's-lane, E.C., and Margate.

MODERN LAMPS.

WE illustrate four lamps, all copies of old work. Three are reproduced from the designs of Thomas Chippendale, in brass; and the fourth is in wrought iron. They were made for an exhibition a short time since by Mr. Litchfield.

SHOPS AT STREATHAM.

OUR illustration represents a block of large freehold shops recently erected on the High-road, adjoining Streatham Railway Station, and is evidence of the marvellously rapid growth of suburban London during the last few years.

A short time since Streatham was a picturesque village. It is now a busy town, well supplied with shops and business premises equal to those of the West-end. The above block consists of seven large shops covering the triangular piece of land formed by the junction of the High-road and Gleneagle-road. They are specially adapted for businesses requiring large show room and storage accommodation. The ground and basement floors are each 50ft. deep with entrances from both roads. There are eight living rooms over each shop. The elevation is Flemish in character, of red brick and Bath stone dressings. They were designed and erected under the superintendence of Messrs. Wheeler and Hollands, F.R.I.B.A., of Chancery-lane, W.C., the lower part of the circular corner building being specially designed for the Alliance Bank (Limited) by Mr. Pinches, A.R.I.B.A., of the Adelphi, who also designed the elaborate fittings and strong rooms of the bank. The whole of the premises have been built and fitted up by Messrs. Hill, Bros., builders and contractors, Broadway, Streatham, S.W.

The new recreation-ground at Kilburn, purchased of the Ecclesiastical Commissioners by the City Corporation, is being laid out, and will be formally opened by the Lord Mayor in about a month's time. It consists of about 30 acres of grass land lying between Kensal-green and Queen's Park stations, and is being planted with some 5,000 young trees, brought from the Corporation Nursery at Epping, and with many shrubs, while tar-paths cross the ground in various directions. The work is being carried out at a cost of £3,000 under the supervision of Major Mackenzie.

Considerable improvements have been lately made to the church of St. Edmund, King and Martyr, in Lombard-street. The old stone step which disfigured the chancel have been removed and replaced with steps of white marble, and the floor has been relaid with black and white marble tiles. The work has been carried out by Messrs. Arthur Lee and Bros., of Bristol.

New premises are on the point of completion at the corner of the Haymarket and Coventry-street, being the first block erected in the Piccadilly improvement scheme. The building is French Renaissance in character, and was designed by Mr. H. H. Collins, of Old Broad-street, E.C. The cost of the building has been about £21,000. The contractor was Mr. Wm. Brass, of Old-street; the ironwork and fireproof construction were supplied by Messrs. Dennett and Ingle, the stained glass by Mr. Wm. Gibbs, of Kingsland-road; and the carving was executed by Mr. Sanson.

Mr. Henry Irving is to unveil next month the fountain and clock tower presented to Stratford-on-Avon by Mr. Childs, of Philadelphia, as a Jubilee tribute, and now being constructed from designs by Mr. J. A. Cossins, of Birmingham.



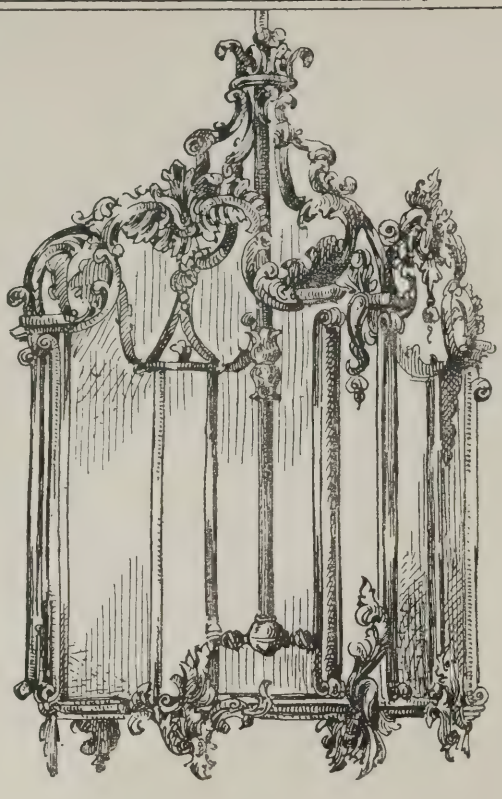
S. B. Bolas & Co. Photo: printers.

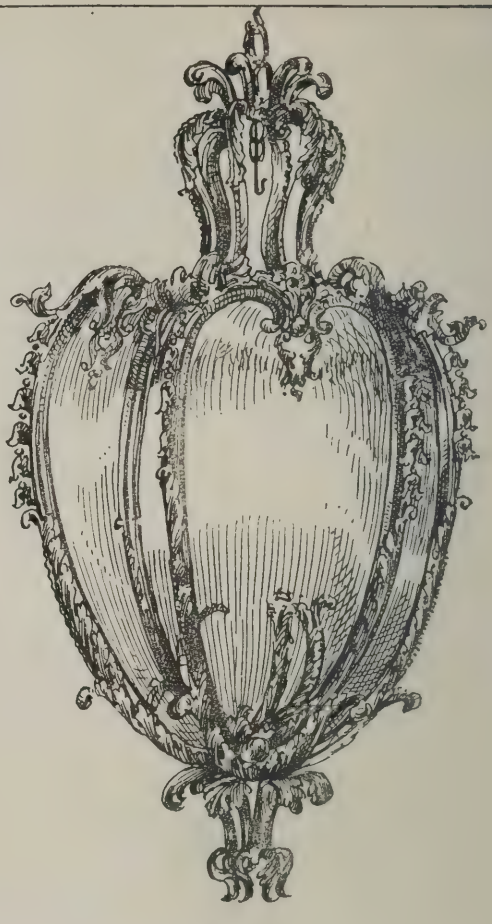
11 Ludgate Hill. E. C.

THE REPOSE IN EGYPT

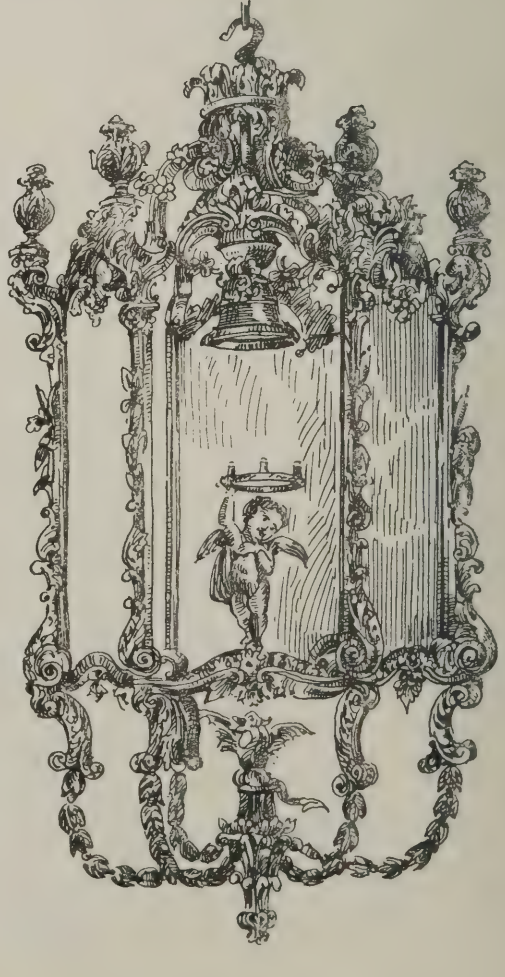
BY CARL MÜLLER.





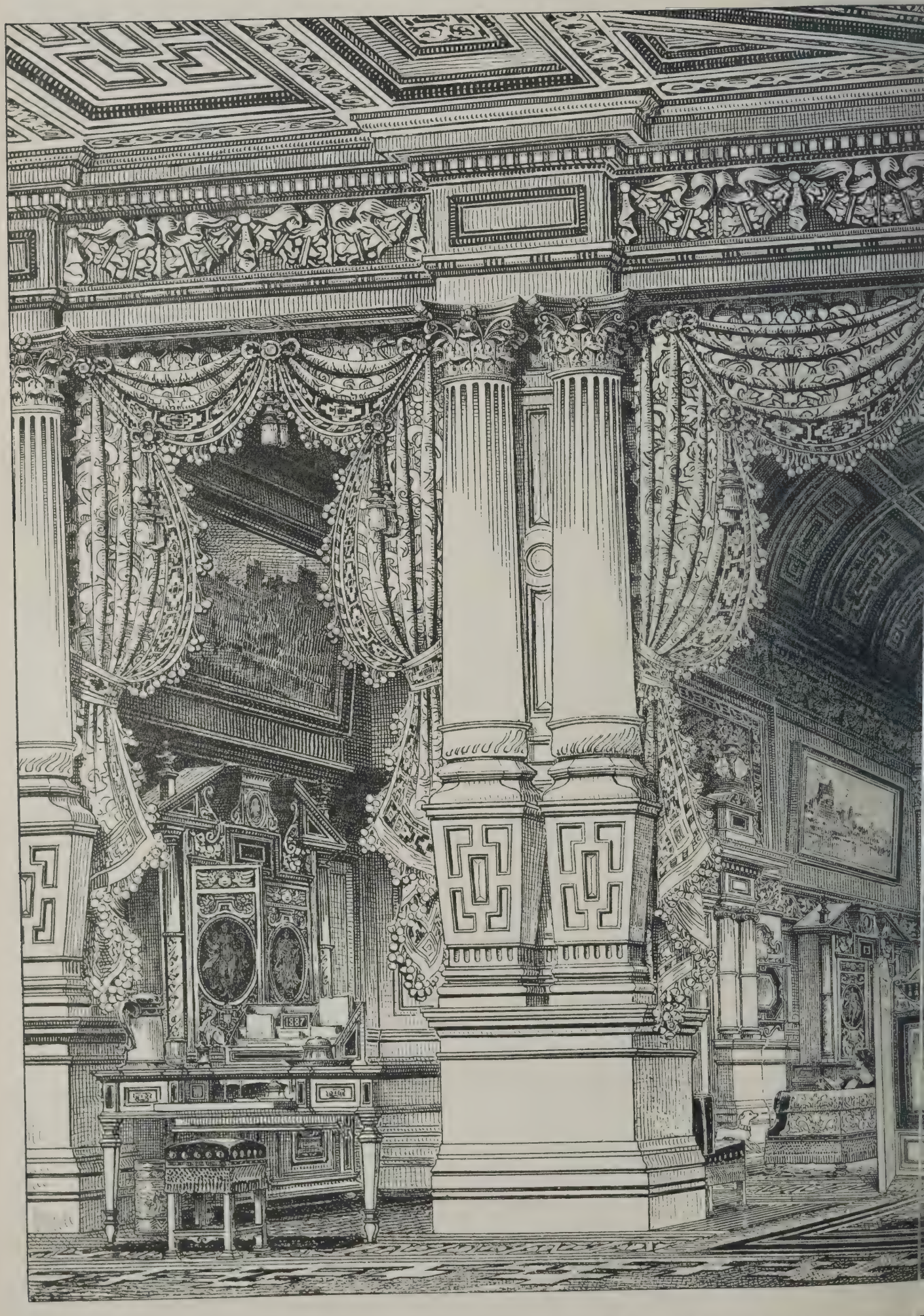






SKETCHES OF

MODERN · HALL LAMPS



AN ENTRANCE · COR

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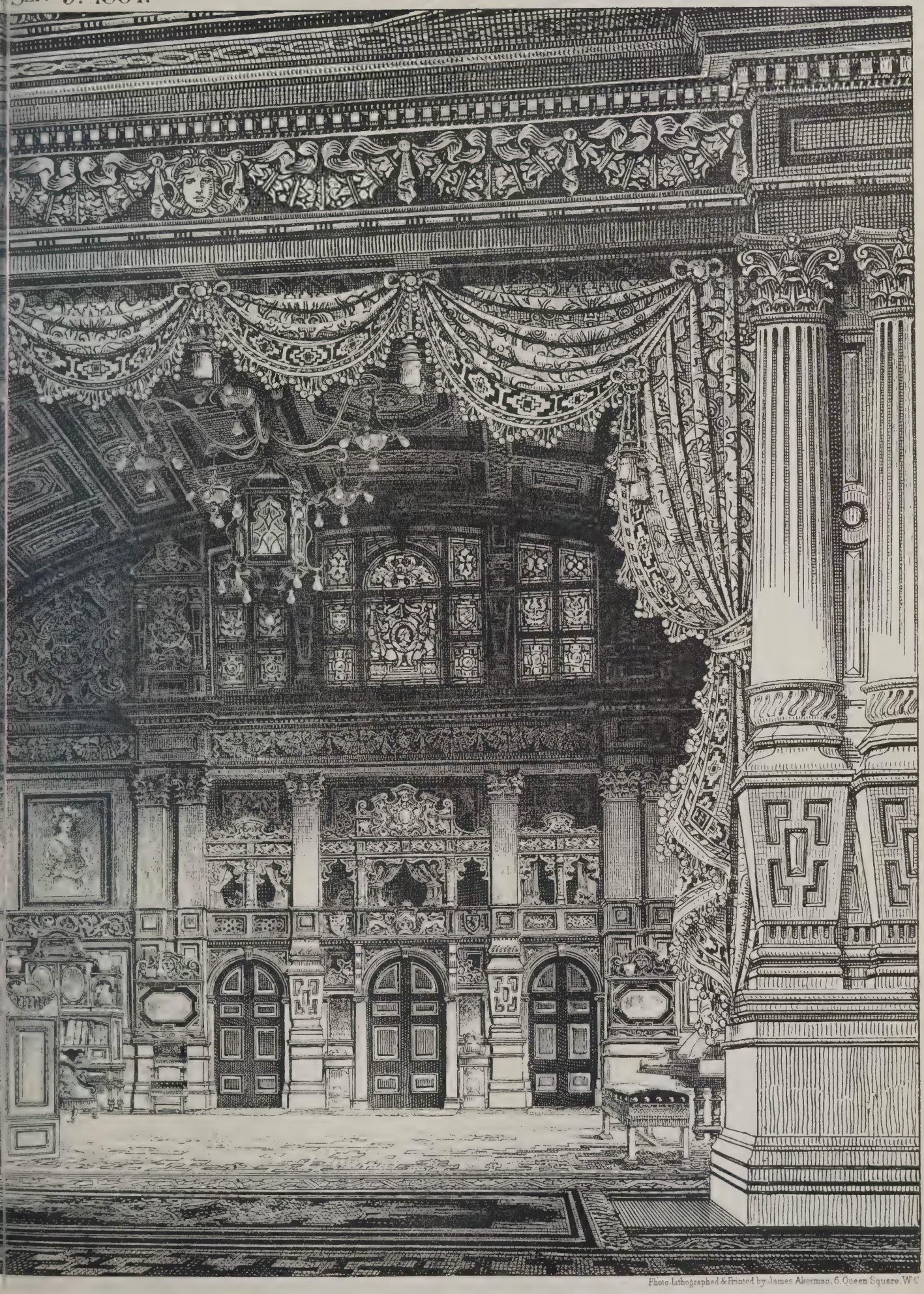
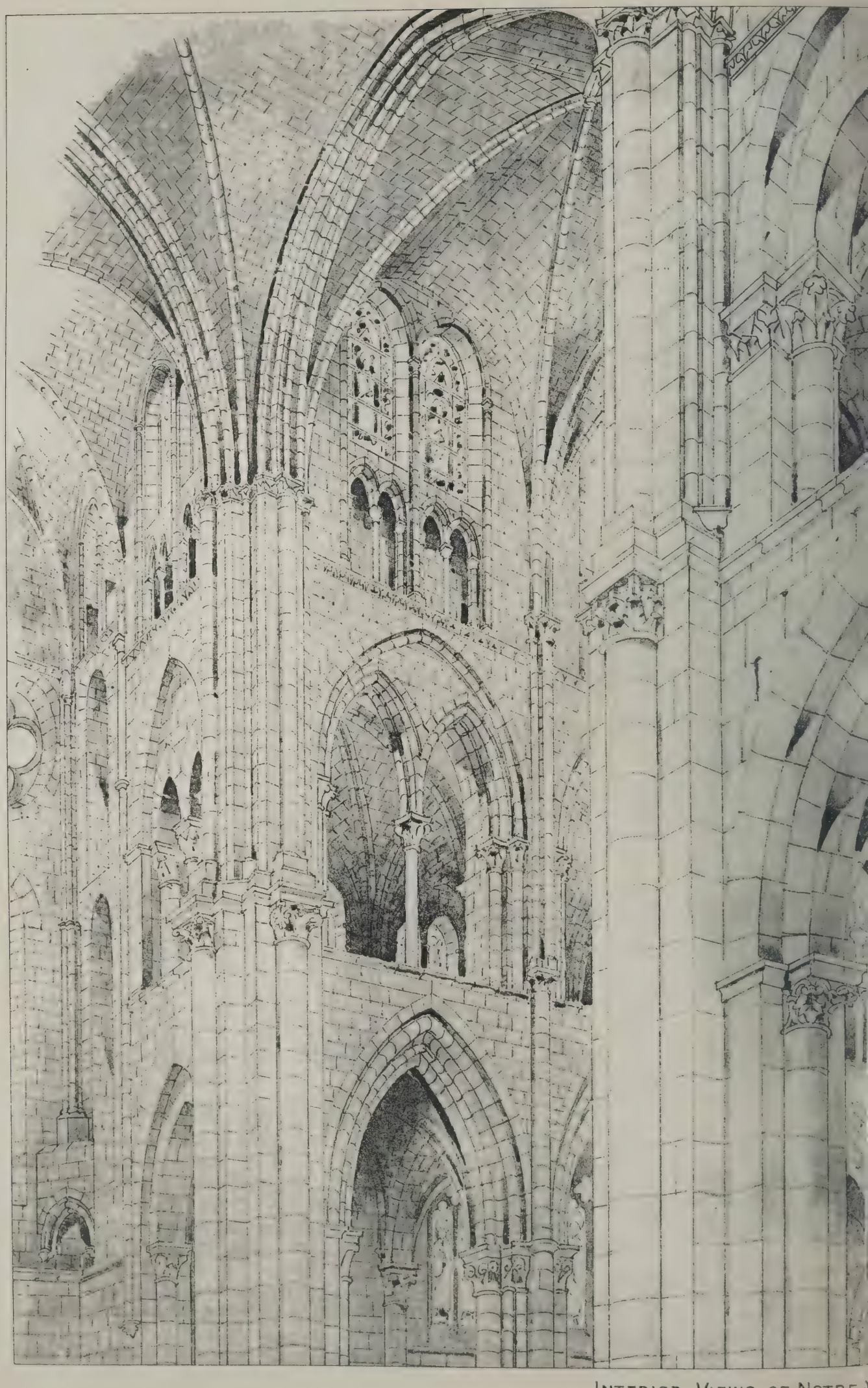


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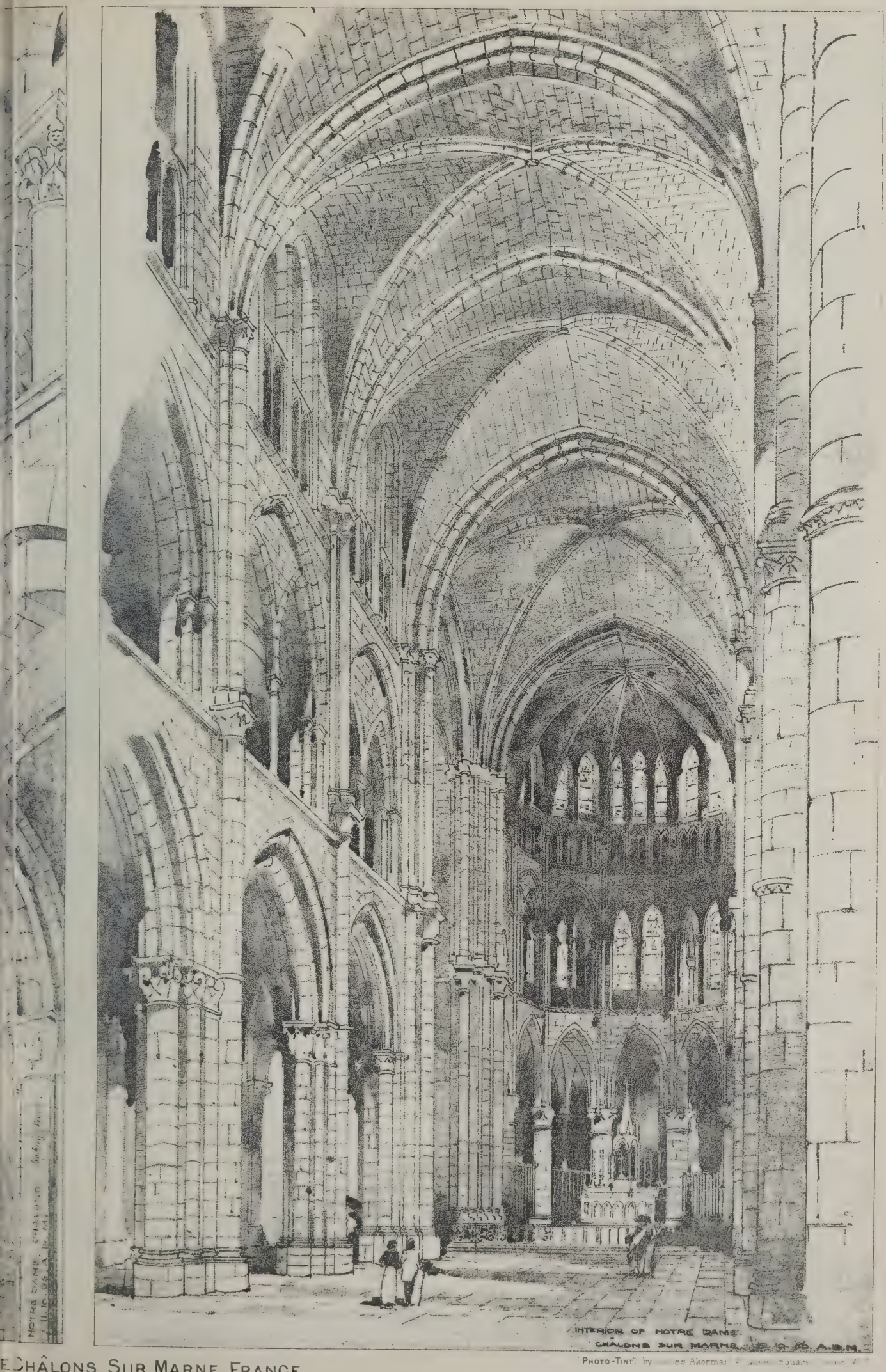
WALTER · HENSMAN · ARCHT.



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INTERIOR VIEWS OF NOTRE
FROM DRAWINGS BY ARN

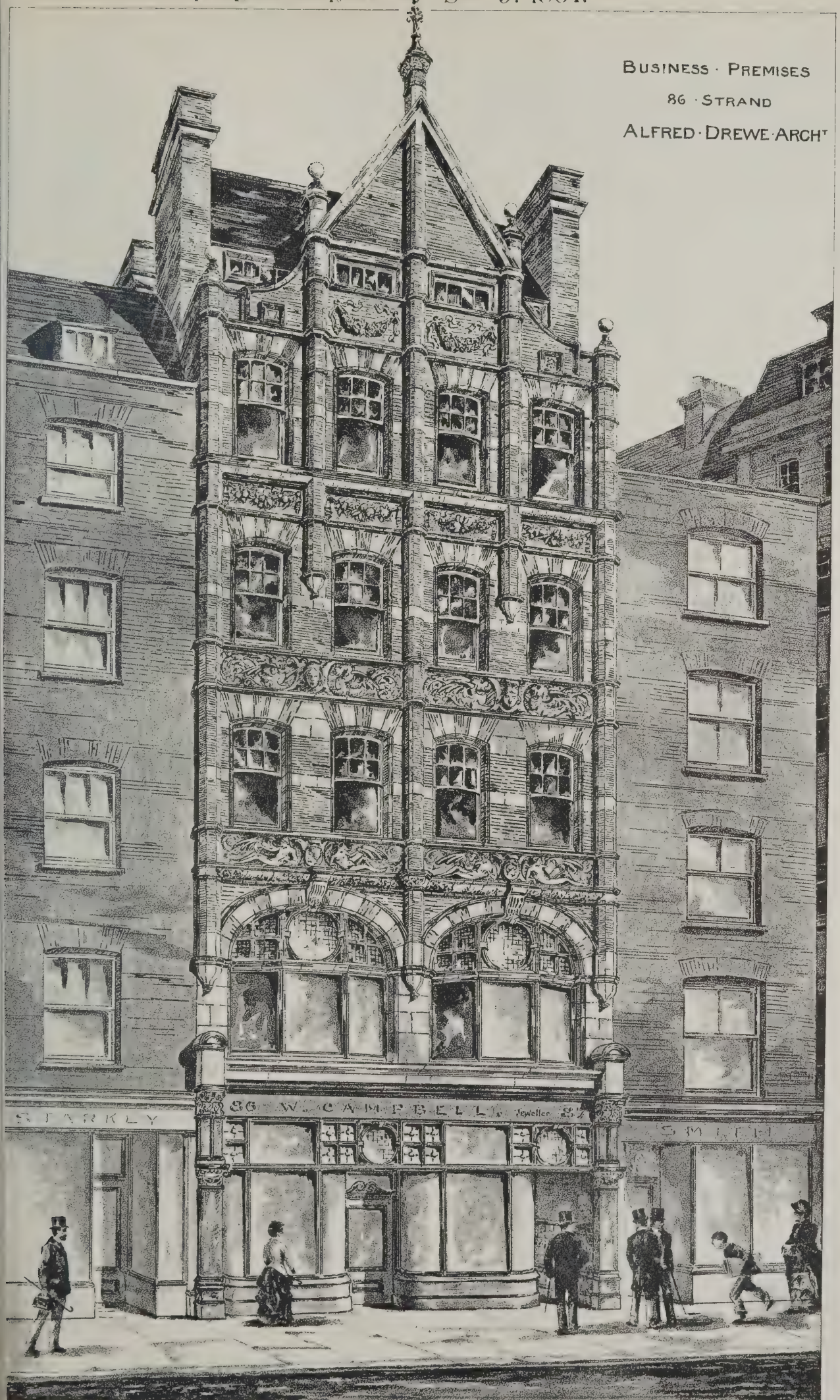


E CHÂLONS SUR MARNE, FRANCE.

B. MITCHELL, SOANE MEDALLIST.

PHOTO-TINT. by [illegible] Akerman [illegible]

BUSINESS · PREMISES
86 · STRAND
ALFRED · DREWE · ARCHT



'PHOTO-TINT' by James Akerman 5 Queen Square



Hill Brothers, Builders

·The·Triangle·High·Street·Streatham·S·W·

Wheeler & Hollands. Archts.

WAYSIDE NOTES.

AT a recent meeting of the British Association, Professor Osborne Reynolds delivered a very suggestive address touching the latest advances in mechanical science—suggestive, that is to say, of a possible similar paper on the progress made in architecture of late years. According to an opinion expressed by the late James Fergusson, in his "History of Architecture," there is no valid reason why our art should not be advanced towards perfection, in the same way as is that of steam-engine making or ship-building. Yet it is doubtful whether anyone would be bold enough to come forward and declare that architecture has steadily progressed since the best periods of the Middle Ages.

It is probable that the difference between Mr. Fergusson's idea and stern reality, is all the difference between theory and practice. Theoretically, architecture *could* be advanced. Practically, however, it would appear that it cannot be. The science of building advances, but the art of architecture varies ever in excellence. Neither can we ever hope for a different state of things till the millennium when all architects will subordinate the commission of 5 per cent. to the well-being of their art. At present we may have a marvellous degree of technical excellence in stone and wood-cutting; but in regard to the possibility of our carving forms of superior beauty to the productions of the old masters, as the sculptors at Conches said, it is impossible.

What's in a name? The Society of Architects hold a meeting on Tuesday next to discuss the advisability of prefixing to their *nom de guerre* the definite adjective with a big, big T. The Society certainly has the right to make the addition, taking into consideration its rapid growth and wholesome energy. But is it well to worry about trifles when so much work remains to be done? These are the sort of "reforms" we look for at the Institute, and not from St. James's Hall. I am glad to see the long list of thirty-one new members nominated for election next Tuesday.

The proposed visit of this society to York—albeit that it is to be held curiously late in the year, and dangerously so in respect of the chances of fair weather—is a highly commendable undertaking. The conferences, to be held at the same time, will be both entertaining and instructive. It is sincerely to be hoped that the discussion on "The Architects and Engineers Bill" will greatly help the cause of registration. Without a noble desire to pull together, the members of the architectural profession fail to take advantage of the most powerful and effective engine of modern economic science—viz., co-operation.

The visits contemplated in connection with the Society's stay at York include some most interesting old buildings. To those who have never been there, the city itself will be found a storehouse of old architecture. Then there are Ripon, Kirkstall Abbey, and Beverley Minster, besides other lions of the district, all of great interest; but the finest object included in the programme is undoubtedly Fountains Abbey.

No one can possibly become weary of seeing this beautiful ruin. Time has obliterated all the hard angles and every crude piece of human handiwork; rain and storm have softened every feature and moulding; lichens and many-coloured mosses glisten on the weatherings, and delicate plants thrive in the crevices of the grey stonework. Nature has long since adopted Fountains Abbey as her own child. She has washed and purified the creation of man, and now supports the aged stones with the strong arms of clinging ivy-stems, and lovingly protects them with shields of matted foliage.

Operations at St. Mary-le-Strand seem now fairly under way. Those persons who have never seen the interior of this church would be surprised at the elaboration of the internal architecture, which, excepting the arched ceiling of wood and plaster, is executed entirely in solid Portland stone. It is a pity that the place is decorated in a somewhat garish manner. As regards the danger of the condition of the exterior of the fabric, I have seen some pieces of stone from the cornices and coping that were simply pulled away by hand, and certainly seem to indicate the existence of considerable unsound work in the old masonry.

The church was the subject of a lengthy article in the *Times* of Saturday last, and on the same date, also, a letter from a well-known architect, stating that the vases were removed eight years back, and not fifteen years as I stated. Should any reader enter into a discussion about these "tea-urns," it will be well to keep distinct the eight vases that were at one time on different stages of the tower and those that were upon the main coping of the building. The former are the ones that were removed some fifteen years back by the worthy Mr. Bell, the parish beadle.

It has of late been rather fashionable for young students to decry the advantages of R.I.B.A. membership. No young architect, with his head screwed on the right way, will give credit to such remarks. Substantial benefit accrues even from the privilege of having A.R.I.B.A. after one's name, and I would remind intending candidates that on the 21st of November another exam. will be held by the Royal Institute. It is true there is Gwilt to be "carefully perused," but there are worse things at sea.

One very great benefit that the young practitioner would doubtless find by possessing the mystic initials is in his early competition work. The sealed letters accompanying the competitive designs for a new town hall in the provinces are opened, and Mr. Inexperienced, of London, is found to have won the prize. Now, if Mr. I. has A.R.I.B.A. after his name, the committee, perhaps with misgivings it is true, appoint him architect to the work. Had he not had the initials he would most likely have been compensated in some way, and a senior member of the profession have got the job.

How is that, although the City Fathers have now virtually no architect to advise them on building matters, the office of that official remains? On a board on a piece of vacant ground near the Guildhall there appears a notice, apparently quite recent, that application should be made to the office or department of the architect in the Guildhall. If there is no architect, and I understand that the Corporation decided to have none, it seems rather a paradox that there should be an architect's department.

Progress appears to be being made with the new Tower Bridge. Any belated traveller crossing London Bridge at night will notice a lurid glare in the black waters of the "Pool," where the works are being pushed forward. Another light on the river indicates the whereabouts of the new Thames subway. According to a report of a meeting of the Subway Company, the works are progressing rapidly.

What a miserably mean piece of business is the result of the sitting of the Committee on the Admiralty and War Office site. And who, after all, is to do the work in connection with the patching up of the old buildings? In all fairness one would think the preference should be given to Messrs. Leeming. But does the Office of Works require a job? Perhaps.

The complaints as to the tardy action of the Metropolitan Board of Works in passing theatre plans are doubtless well founded, and many architects must have been inconvenienced by the delay caused in getting their plans through the Board, either theatre or otherwise. But in the case of the former buildings, it is better for the public that there should be delay than that the plans should be "passed" in a hurry. One begins to get a little indignant with someone or something, be that person or thing a Government Inspector, an architect, a theatre lessee or manager, a standing set of by-laws, or defective stage appliances and machinery—one begins, I say, to be somewhat exasperated when, with the memory of appalling disasters in the past fresh and vividly before one, we hear of still greater wholesale human sacrifices near at hand, and the whole country is sickened by details of corpses burning till they are no more to be recognised than the charred remains of burnt timber. It is time that strong measures were taken to absolutely *prevent* any possibility of such scenes recurring; it is time that someone or another should be held responsible for the awful loss of life at such fires as that at Exeter; and it would be well that there should be someone to account for each human moth that perishes in the flames of these lamps that are fed from reservoirs in Hell and trimmed by emissaries of the Devil.

GOTH.

CHIPS.

An addition of some interest has been made to the attractions of the Old Manchester and Salford section at the Manchester Exhibition. Messrs. Darbishire and Smith, the architects of this section, have decorated and fitted up the reproduction of the chapel which formerly stood on Old Salford Bridge, so as to give a clear idea of the chantry chapel of the time of Edward III. The windows are of stained glass, lent by Messrs. Edmundson and Son, of Manchester; and the altar, its cross, the vessels, manuscripts, hangings, and priests' vestments are all actual examples of 14th-century work, lent for the purpose.

Mr. Francis Wiswale, C.E., now resident engineer at Goole for the Aire and Calder Company, and late engineer to the Bridgewater Navigation Company, has entered into an engagement with the Manchester Ship Canal Company, whereby he will resume his duties in connection with the Bridgewater Canal, which company has recently been acquired under the powers of the Ship Canal Act. The construction of the ship canal will involve important alterations to the Bridgewater Canal.

The task of conveying the Imperial sarcophagi to the Farnborough Hill Mausoleum has been safely accomplished by the constructors of the tombs, Messrs. Alexander Macdonald and Co., of London and Aberdeen, and the massive red granite structures are now in position on either side of the altar in the subterranean mortuary chamber. The Emperor's tomb (the Queen's gift to the Empress) was taken to Farnborough from Chislehurst partly by road and partly by rail, the coffin remaining in the church with the Prince Imperial's. The new sarcophagus was brought to London from Aberdeen by sea, and then transferred to the London and South-Western Railway, whose Farnborough Hill Station is within ten minutes' walk of the mausoleum. This, the Prince Imperial's sarcophagus, was made to the order of the Empress.

A new barrack is being built at Schleswig on the ruins of the old castle of Gottorp, erected in the 16th century, and in demolishing the old foundations the workmen laid bare a stone bearing a perfect Runic inscription. The stone stands nearly 4ft. high, and is 1ft. broad. It has an inscription in the usual characters on two faces, which reads as follows:—"Osfrida made this mound, the daughter of Vinthingar, to Sigtrig, the King, her son, on the holy place."

New board schools at Rawmarsh, Rotherham, were recently opened. They accommodate 300 children, and cost, exclusive of site, £2,300. Mr. J. Platts, of Rawmarsh, was the architect.

The local authority of Appleby have adopted a report by their engineer, Mr. Watson, for the improvement of the water supply of the district, subject to analyses of the proposed source. Mr. Watson proposes the tapping of the Tebay Beck at an elevation of 1,200ft. above the sea, the laying down of three miles of pipes, and the construction of a reservoir to contain water for the whole district at a cost of £1,000.

St. Anselm's Chapel, in Canterbury Cathedral, is about to be restored, Canon Holland, a member of the Chapter, having offered to defray the cost of the work. The chapel lies just beyond the south-east transept, and is one of the few portions of the building that escaped the great fire which, in 1174, destroyed the first Norman choir of Canterbury Cathedral. An altar is to be placed in the apse of the chapel, where one originally stood.

A large block of shops, with offices and chambers over, is about to be erected on the corner plot of ground of Oxford-street and Charing Cross-road (having a frontage of about 160ft.), by Messrs. Marler and Bennett, of Sloane-street, from designs prepared by Mr. T. Marcus Houghton, of Imperial Buildings, Ludgate-circus, E.C.

The parish church of Sutton Maddock, near Shifnal, Salop, is about to be rebuilt with the exception of the ancient tower and spire. It was reconstructed in the last century, and is about to be restored to something like its appearance in the middle ages—so far as can be ascertained from the older work built up into the walls. Mr. T. Nicholson, of Hereford, is the architect, and Mr. Inwood, of Malvern, the contractor; the estimated outlay is £1,900. Memorial stones were laid last week.

Building Intelligence.

ABERDEEN.—Several additions are at present being made to the public edifices in the principal thoroughfares of the Granite City, and by the erection of these buildings the somewhat monotonous outline which characterises Union-street will be relieved by the introduction of less massive architectural features. At the east end of the street, where on the north side, within a stones' throw of the Municipal Buildings, a pile four stories in height has just been commenced by the *Free Press* Publishing Company. The front wing of the new building forms a square, a back wing towards Nether Kirkgate being oblong. To Union-street the frontage will be 60ft., the depth 100ft., and the height from pavement to parapet 55ft. The plans, prepared by Messrs. Ellis and Wilson, architects, provide for enriched cornices and windows marked out by projecting pilasters and entablatures. A moulded cornice will surmount the third floor, with attic story above, over the centre of which rises a gablet. The chief entrance is in the centre of the front, and the doorway is flanked by columns, and has above a projecting balcony and balustrade. To the west of St. Nicholas-street a block is also shortly to be built by the Commercial Bank of Scotland, from designs by Mr. Sydney Mitchell, Edinburgh. On the opposite side, Messrs. Ellis and Wilson are the architects for a large block for Mr. R. W. Mackay, warehouseman, intended for a warehouse and shops. The entrance to the New Market, formerly about the middle of the premises, is now to be changed to the east end of the property, and widened. A considerable enlargement will also be made to the block at the back towards the Green. At the junction of Union-place with Holborn-street, a new church in the Gothic style, after plans by Messrs. Pirie and Clyne, is being erected for the St. James' Episcopal congregation; while almost opposite, and also fronting Holborn-street, a new church is in progress for the St. Nicholas-lane United Presbyterian congregation, the architects being Messrs. Ellis and Wilson.

BOOTLE.—A new wing of the Bootle Hospital, containing four wards, has just been opened. The new wing has been erected at a cost, including fittings, boundary walls, and mortuary, of £8,930. Messrs. C. O. Ellison and Son, MM.S.A., Liverpool, are the architects. On the left-hand side of the principal entrance is a porters' room, with windows commanding the approaches, and on the right-hand are reception rooms for patients, while just within the main corridors are the operation rooms. There are four general wards, with duty-room between and commanding them, although entered from a corridor; also several single-bed wards and specially separated wards for erysipelas cases, all lined, together with the corridors, baths, and w.c.'s, with Minton's tiles, and the conveniences are shut off from the wards by ventilation corridors. In addition to the wards, new rooms are provided for the matron, nurses, and servants, with a dayroom for patients. The entire basement is set apart for the outdoor department, and consists of waiting rooms, surgical and medical examination rooms, operation-room, consulting-room, and dispensary. The heating is partly by hot water pipes and partly open fires. The ventilation is by perpendicular shafts going up alongside the chimney stacks and by horizontal tubes above the ceilings, connected with an air shaft in the tower, through which is carried an iron flue from the boiler supplying the hot water. The work was carried out by the late Mr. Alderman Leslie, of Bootle, and Mr. Wildman was the clerk of works. We illustrated the hospital in our issue of Jan. 21 of the present year.

BOURNEMOUTH.—On Tuesday week the new refuse destructor, which has been erected at the rear of the Cemetery, was formally started in the presence of the Bournemouth Improvement Commissioners. The contract for the destructor and shaft complete was about £2,400 (the contractors being Messrs. Crook and Sons, of Southampton), the system adopted being that of Fryer's. The destructor proper is sunk 7ft. into the ground. The heat from the furnace, and also the clinkers, will be utilised in making bottom coats for the tar paving. The chimney shaft is 137ft. in height, 8ft. 6in. in diameter at the base, and 4ft. 6in. at the top (internally). The exterior of the shaft, for a distance of 25ft. from the cap, is finished in red and white glazed brickwork in diagonal pattern. The plans were prepared by Mr. G. R. Andrews, surveyor to the Commissioners, and the clerk of the works was Mr. Walden, of Boscombe.

BRADFORD, YORKS.—The new Central Post Office, near Forster-square and the old parish church, was opened on the 1st inst. It is Italian in style, and has been built from the designs of Mr. Henry Tanner, of H.M. Board of Works, the contractors being Messrs. J. and W. Beanland, of Bradford. The main front, which is 224ft. in length, is built of cleansed ashlar and stone from local quarries. The building is three stories high, and in the centre there is a turret flanked with Mansard towers. The public office is 60ft. in length and 30ft. in width; it has a mahogany counter, which extends along three sides, and a mahogany writing-desk, 25ft. in length, underneath the windows, divided into 14 compartments, for the use of persons who have to write out telegrams. A room, 155ft. in length, behind the public office, is provided for the letter sorters, parcel receivers, and other servants, and is furnished in pitch-pine. On the floor above, a room corresponding with the public office has been fitted up as the telegraphic instrument room, and in the other portions of this floor are offices for heads of departments, &c. The upper story is set apart as a battery-room. There are two main entrances at the front of the building, beneath the towers, each leading into vestibules separated from the public offices by folding doors. At the southern end there is a portico, where are placed the outside posting-boxes. The basement is mainly utilised as kitchens and store-rooms.

EDINBURGH CASTLE.—The new Government buildings at the gateway of Edinburgh Castle, which are to afford additional guard-room and other accommodation, have just been commenced. The scheme, which has been matured in the Royal Engineering Department, includes the removal of the present approach and bridge, the outer and inner gates, the north and south flankers, with their gun platforms and steps, the straw store, the guard-room, portions of the escarp and main ditch, and of the wall at its northern end. The constructive part of the scheme embraces the erection of a new bridge over the moat in line with the Lawnmarket, the building of a new guard-house, and of a high screen wall on each side, within which will be placed a number of low houses, only one of which will be visible from the Esplanade. The new bridge over the ditch will consist of three arches with drawbridge. The masonry part will be 35ft. in length, and the drawbridge 12ft. The roadway will be 10ft. in width between the walls. Over the entrance will be the new guard-house, built in the Castellated style, and rising just below the Half-Moon battery to a height of 50ft. Beneath the building will be a circular arched courtway, through which the road from the bridge to the Castle will be carried. Over the key of the arch is a large panel, on which the Scottish lion rampant will be carved. The building to the Esplanade will present a solid wall of coursed rubble work, pierced here and there with small loop-hole windows. At the eaves level there is a corbelled and embrasured parapet with gargoyles, on the inner side of which is a narrow passage between it and the higher part of the building. This upper story, at a height of 35ft., shows a second balcony flanked by round turrets. Over this rises the roof, in the centre of which is a crow-stepped gable. The entrances and principal windows of the rooms in the guard-house will be on the Castle side. On the north of the entrance at the ground level is the officers' guard-room, lighted by a window with stone mullions and transoms. On the south side is the men's guard-room, with ceiling 16ft. high, and lighted by two windows. The second floor contains a court-martial room, having a large balconied three-light window, with stone mullions and transoms. This room will be lined to a height of 10ft. with redwood, and above that the walls will be of dressed Dumfries stone. At the extreme north end of the moat a new bridge of three arches and 13ft. in breadth has been constructed, and forms an entrance to the coal yard and straw store. The contract for the erection of these buildings, which will now be pushed on, has been given to Mr. Muirhead, North St. Andrew-street, Edinburgh.

SILLOTH.—The new steam flour-mills of Messrs. Carr and Co., on the north side of Silloth Dock, have just been completed. They are in two distinct blocks, connected by fireproof bridges; the warehouse, with 184ft. frontage to dock, and the mill proper, which consists of five stories, and is nearly 70ft. high from the pavement to the parapet. It is divided into sections, forming a roller mill proper, maize mill, silo for grain storage, engine and boiler-houses, and mechanics' shop. It is fitted with automatic roller milling plant, capable of producing 16 sacks of flour per hour. All the ceilings are filled with Robinson's cement. A third building is the engine house, which is decorated with coloured and glazed bricks and Burmantofts faience. The chimney shaft is 120ft. in height. The premises are lighted by the electric light. Mr. T. Taylor Scott is the architect, and the contractors were: Messrs. Beaty Bros., Carlisle—builders; Messrs. Tweedy, Cairns, and Co., Carlisle—ironfounders; Messrs. Homan and Rodgers, Manchester—fireproof floors, tanks, and engine beds; Messrs. R. M. Omerod and Son, Carlisle—"Robinson's" cement work; Messrs. Douglas and Grant, Kirkcaldy—Corliss engine; Messrs. Hawkesley, Wild, and Co., Rochdale—boilers; Messrs. J. C. Edwards and Son, North Wales—terracotta; Messrs. J. Robinson and Co., Leeds—Burmantofts faience and glazed bricks; Messrs. D. Burns and Co., Maryport—Birkby bricks. Mr. J. Halcrow was the clerk of works. We illustrated the premises by a double-page bird's-eye view in our issue for Feb. 11 last.

TOOTING.—New Roman Catholic collegiate buildings have just been commenced on the Hill House Estate at Tooting, an area of 18 acres, purchased by the Josephites for £20,000. The college buildings proper will cover a ground area of something like 25,000ft., having frontages of 200ft. and 125ft. respectively, the structure containing four stories besides a basement floor, and carried to a height of 60ft. above the ground level. The college chapel will form a distinct building, and the mansion on the estate will be preserved, undergoing, however, internal alterations to adapt it to the purposes of the college. Workmen are now employed in excavations preparatory to getting in the foundation walls, and the superstructure will shortly be commenced. Mr. Wm. Harvey, of Whitehall-place, whose design was selected in a limited competition, is the architect, and Messrs. Higgs and Hill, of the Crown Works, South Lambeth, are the contractors. The estimated cost of the college buildings, exclusive of the outlay for the land, is £70,000.

The foundation-stones of a new chapel and schools for the Wesleyan body at Trent Vale, near Hanley, were laid last week. The new building has been designed by Mr. T. Roberts, of Trentham. The chapel will be 60ft. long by 24ft. wide, and at the rear there will be a schoolroom 43ft. by 24ft., two classrooms being arranged between the buildings, each 15ft. by 12ft. The chapel will accommodate 250, and the schools 350. The exterior will be of red bricks, with blue brick weatherings and plinths. The roofs will be open timbered, the floors paved with wood blocks, and the heating will be on the hot-water principle. Mr. R. Bradbury, of Hartshill, is the builder. The total cost will be about £1,200.

The London, Chatham, and Dover Railway Company are about to proceed at once with the extension of their Nunhead and Blackheath-hill branch, from the latter suburb to Stockwell-street, Greenwich.

The Ravine Bridge in the Belle Vue Park, at Lowestoft, opened last week, was designed by Mr. R. Parkinson, engineer to the Eastern and Midlands Railway Co. It is of iron, with red brick abutments, and has a span of 70ft. and a width of 7ft. between parapets.

The borough surveyor of Eastbourne reported on Monday to the town council that the experiment of watering the streets with sea water has been a success, as the roads get firmer, and remain damp longer after the application of salt water than they do after the use of fresh water.

Mr. Wm. Jenkinson, of Huddersfield, has been elected clerk of contract works by the city council of York from among 46 candidates.

Engineering Notes.

LNWICK AND CORNHILL RAILWAY.—The e line from Alnwick *viâ* Wooler to Corn- on the Berwick and Kelso Railway, was ed for traffic on Monday. It is a single 36 miles in length, and has cost upwards alf a million. The stations are built of e quarried from the cuttings. Their order outh of Coldstream :—Mindrum, Kirk- ton, Akeld, Wooler, Ilderton, Wooperton, geley, Glanton, Whittingham, Edlingham, then Alnwick. The new station at Aln- has a platform 600ft. long by 50ft. wide, large waiting-rooms between the two plat- ns. At the entrance of the station the es are :—Station-master's, ticket and book- offices, and rooms for guards, porters, ps, and luggage. The building is covered n a roof of three spans, and has cost ,000. On the new line the inclines are p—one long one between Edlingham and wick being as much as 1 in 50, and there is iderable cutting, embanking, and bridging. re are over eighty bridges on the line, be- s culverts, &c. The contract was let to srs. Meakin and Deane in October, 1883, but as not carried through, and the railway has n completed by the North-Eastern Railway ctly, Mr. Thomas Harrison, C.E., being neer-in-chief, assisted by Mr. Charles A. rison, assistant-engineer for new works ; E. B. Forbes being the resident engineer. rails with which the line is laid down were ined principally from the Cleveland district e North-Eastern Steel Company, of Mid- brough ; Messrs. Bolckow, Vaughan, and pany ; and the Darlington Iron Company lying the greater portion.

HE ASSOCIATION OF SANITARY ENGINEERS SURVEYORS.—On Saturday a Midland rict meeting in connection with this associa- was held in the Council Chamber, at the n Hall, West Bromwich, Mr. J. Gordon, of ester, presiding. Mr. A. T. Davis, of tford-on-Avon, was appointed district etary, after which the company proceeded sit Messrs. J. and S. Roberts's foundry at n Village, Mr. J. Hamblett's brick and tile s, and also the works in connection with boating lake and swimming bath at Dart- th Park. Upon returning to the Council mber, Mr. Charles Jones, Assoc.Inst.C.E., of ng, read a paper on "Refuse Destructors their Results up to the Present Time." was followed by a discussion.

HE IMPROVEMENT OF THE TEES.—The ks Committee of the Tees Conservancy missioners have under consideration the tion of the improvement of the Tees from illesbrough to Stockton. Mr. Fowler, the missioners' engineer, has prepared a scheme h provides for an extra depth of 10ft., the ision of a turning place for large vessels, a deep-water berth at Stockton. The cost arrying out this scheme would be about 000. Mr. Fowler has been directed to are a scheme on a smaller scale, providing n extra depth of 2ft. and a turning-place deep-water berth. Ships drawing 22ft. water could then be accommodated on a ng tide. The Stockton Corporation have ded to reconstruct their quay at a cost of 500.

he foundation stone of the model dwellings for ans, which are being erected for the Glasgow Improvement Trust on the east side of the Market, was laid on Friday. The ground to cupied by the buildings, including playground out 1,600 square yards—is to contain 12 houses e room, 31 houses of two rooms, five houses ree rooms, and eight single and four double s. The designs were prepared by Mr. Carrick, City Architect, and his assistant, Mr. Mac- ld, and the contract has been taken by Mr. ster. The total cost is estimated at £8,000, the gross rental at £962.

J. G. F. Watts, R.A., is painting a new work resentation to the nation which he has named e Discoverer." It shows a figure looking into distance, with eyes fixed far away, as though ipating the hour of some new invention.

w Board schools in three departments are built in Prætoria-avenue, Walthamstow, designs by Mr. Longmore. The contract has taken by Messrs. Green and Lee, of Hackney.

COMPETITIONS.

DOUGLAS, ISLE OF MAN.—The proprietors of the Twemlow's Yard property have awarded the first premium of £35 to Mr. Clarke, architect, of Liverpool, for the best scheme submitted for developing the property to the best advantage for building purposes. The second premium of £15 has been awarded to Messrs. Stephen J. Holliday, architect, and H. Bertram Nichols, A.M.I.C.E., of Birmingham, joint authors of the plans placed second in order of merit.

KINGSLAND PARK, DUBLIN.—The *Irish Builder* says :—Towards the close of the past year the following architects were invited by the trustees of the "Shannon Fund" to send in designs for a new church of St. Kevin, at Kingsland Park—viz., Thomas Drew, R.H.A. ; A. E. Murray, F.R.I.A.I. ; J. F. Fuller, F.R.I.A.I. ; J. R. Carroll, F.R.I.A.I. ; and A. G. Jones. The fund being under the control of the Court of Chancery, a formal application was made to the Lord Chancellor (Ashbourne) to the effect that the unsuccessful competitors should be remunerated for their time and trouble in preparing drawings. His Lordship, in response, expressed his opinion that professional men should not be asked to give their time and experience without being fairly remunerated, and he accordingly made an order that the unsuccessful architects be paid fifteen guineas each out of the funds in court. As has been already stated, Mr. Drew took first place, and Mr. Murray second.

NORTHAMPTON. — The town council of Northampton have offered premiums of £20 and £10 for the best two sets of designs and plans sent in for the extension of the Town Hall, built in 1864 from designs by the late Mr. E. W. Godwin, F.S.A. Plans of the Town Hall and the adjacent properties, just purchased by the corporation, are being prepared by the borough surveyor.

CHIPS.

At the last meeting of Glasgow town council a letter was submitted from the secretary of the British Archæological Association intimating that the Association proposed holding its annual meetings in Glasgow in 1888, and asking what arrangements and facilities they might expect at the hands of the Corporation.

A peal of eight bells, which have been placed in Dibden Church, Hants, as a Jubilee memorial, were dedicated on the 1st inst. The tenor weighs 10½cwt., and the total weight is over 53cwt. Messrs. Warner, of Cripplegate, E., were the founders, and the total cost, including fixing, was £460. The old bell put up in 1837 has been exchanged for a peal of handbells for the ringers.

The statue of the late Mr. Samuel Morley at Bristol is to be unveiled on Saturday, the 22nd October, by Sir Joseph Weston. Mr. Havard Thomas, of London, is the sculptor.

A new stained-glass window is being erected in the north transept of Canterbury Cathedral, in memory of the late Lord Kingsdown, the eminent equity lawyer, as the gift of Mr. Loftus Leigh Pemberton, his nephew. The scenes in the medallions are illustrative of judicial or legislative acts, and are taken from the Old Testament.

A tablet has been placed on the house No. 42, Lothian-street, Edinburgh, setting forth that there Thomas De Quincey lived when in that city. The tablet, which was designed by Mr. Sidney Mitchell, architect, Edinburgh, is composed of six tiles accurately fitted together—the letters being in ivory white on an Indian-red ground. The inscription is inclosed by an egg-and-dart ornament, also in ivory white. The tablet is placed between two of the windows of the rooms on the second flat, which De Quincey occupied.

The new branch of the Caledonian system to Calderbank and Chapelhill was opened on the 1st inst. It is about three miles in length, but the formation of the line has been attended with considerable engineering difficulties, the chief being the viaduct, 80ft. in height, over the Calder Water. Mr. John Strain was the engineer, and Mr. A. H. Boyle the contractor. The line is to be continued to a junction with the main system at Newhouse by November.

The statue of the Queen at Aberdeen, having suffered from exposure to the weather, is about to be removed from the junction of St. Nicholas and Union-streets to the vestibule of the Court-house. The statue to Sir William Wallace about to be erected in the "granite city" will be erected at the north end of Union Terrace-gardens.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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RECEIVED.—R. and Co.—J. C. and Co.—W. L. Co., Ltd.—C. Bros.—W. and Co.—A. and W.

G. F. M. (Write the Secretary of the Society of Arts, John-street, Adelphi, for particulars as to the Whitworth scholarships. The District Surveyors' Examination is held at the Royal Institute of British Architects, 9, Conduit-street, W.)

"BUILDING NEWS" DESIGNING CLUB.

W. ELLISON FENWICKE A. W. COOKSEY, DAVID M COOPER, L. KITCHENER, AND OTHERS. (We are glad to find that you are so well pleased with our criticisms on the several designs, and that you take so much interest in the club, which will recommence as soon as the holiday season is over. The subjects are printed once a month under "Answers to Correspondents," and 28 days are given for members to prepare their designs given in each list.)—A COMPETITOR THREE TIMES. (Your suggestion shall receive careful attention. The number of subjects set has the advantage of meeting the taste of more members.)—AN ANXIOUS COMPETITOR. (The prizes will be awarded in due course, and very shortly, when the names and addresses of the successful competitors will be published. We have now printed all the illustrations from the present series which we propose to give.)—GEORGE WARD. ("Lightning Conductors," by Richard Anderson, and published by E. and F. N. Spon, 125, Strand, W.C., price 16s., is the book you ask for. We do not know the price of Mr. Jackson's work on "Dalmatia." Write to the publishers, the Clarendon Press, Oxford.

Correspondence.

THE ANTI-SHAM SECT.

To the Editor of the BUILDING NEWS.

SIR,—You quote largely in your article on "Internal Wall Surfaces" in last week's issue from the work of Lord Grimthorpe, who, it seems, pronounces his anathema (we take it for what it is worth, less professional discount) against, I take it, the principle inculcated in Ruskin's "Lamp of Truth." Without expressing an opinion in favour of either view, I do not forget, and am not likely to, the very ignorant remark (pardonable, of course, from an amateur) passed in a certain "Book on Building," which, on the subject of joinery, objects to bolection mouldings because—mark it!—they are shams, and make people think (*who* would think about it?) that the other parts of the door-panels, stiles, and rails *have*

been planed down (!), *and so left them standing.*
—I am, &c., Chas. R. Guy Hall.
15, High-street, Kensington, W.

THE A. A. AT BATH.

Sir,—"The Writer of the Article" has rather misapprehended the gist of my letter. Wood's fame is, I think, both restricted and local, and your writer, in dismissing him with a few lines, scarcely gave him the justice I consider due to him.

It was not that the descriptions of Allen and Wood were untrue, for your writer has fully substantiated his charges; but it was, I hold, unkind and misleading to state merely that one side, seeing that probably the bulk of your readers have no knowledge whatever of the man beyond what they could gather from this particular report, and so are unable to put as an offset the value of his work. For myself, I think the "Essay" bears a more amiable interpretation than what your writer would put on it; but that may be owing to my "personal equation."

Mr. Edwards, I fancy, takes up his pen to answer me without sufficiently considering what I said. No one would single out the *natural* properties of Bath as being specially beautiful. To take instances merely in Somersetshire, are not Clifton and Wells more indulgently endowed?

Although Bath owes its charms in part to other qualities, such as its parks, its historical associations, &c., it is pre-eminently its architecture that has raised it to its deserved place amongst the queens of cities.

If we consider the many elements of beauty—the beauty of grandeur in the hills, of breadth in the plain, of contrasted colour—that Malvern, for instance, has in tenfold degree as compared with Bath, we shall have increased respect for the architect who could invest his hills with the crown that their superiors have not attained. A fair comparison of the "natural situation" only would be with (say) Florence, where the hills and river are disposed somewhat similarly to Bath, in which case the comparison would be vastly unfavourable to Bath. Unless on the grounds purely of architecture, a comparison with Rome is unintelligible; equally so with Jerusalem (as I judge by Seddon's picture in the National Gallery). You might contrast Orvieto with Jerusalem—but not Bath. The influence of architecture in these comparisons is much more deeply felt than admitted.

Mr. Edwards terms my claim for Wood's worth exaggerated; but he misreads it. Wood's conceptions are noted for being grandiose, comprehensive, and in breadth of design comparable to Michael Angelo and Wren; of their other attributes he had little. So, in separating jewels in regard solely to their colour, a garnet may be classed with the ruby, the carbuncle, and the red topaz.

Why Mr. Edwards considers my opinion to be "hastily formed" I don't know; but in the hurry of his correction he fails to note that I referred to Camden-crescent only as a good point from which to see Prior Park.—I am, &c., Halsey Ricardo.

"B.N.D.C." CRICKET PAVILION.

Sir,—As a cricketer of 15 years' standing, and as an architect's assistant, I have naturally examined with much interest "Protoplasmic Globule's" design for the above, published in your issue of the 2nd inst. Against the exterior I have nothing to say; it is most suitable and artistic. But I contend that the plan, although it may be described as ingenious, is bad, and evidently the work of one little acquainted with the requirements of a cricket club. The ladies' accommodation is, however, good—in fact, much too good, for the players' interests are sacrificed. The members' dressing-room is the great blot; it is miserably small. It ought to be not less than 20ft. by 12ft. for a club of 100, and is better even larger. In my club (just 100 members) sometimes over 30 men come up to practise in an evening. It is obvious that a room 11ft. 6in. by 12ft. 6in. is totally inadequate for such a number. The visitors' dressing-room is just large enough, and has actually more floor space than the members. The sanitary arrangements, however, appear to me abominable. There is only one lavatory basin for the common use of visitors and members! That is stuck in a small closet, in the neighbourhood of a w.c. and two urinals. In order to get a wash the men will have to cross the landing of the staircase in *deshabille* and wait their turn. Imagine the chorus of "After you, please!" The visitors ought to have two basins at least, either in their room, or partitioned off from it. Then the members (say, for a club of 100) require, at least, six basins, and one or two bath-rooms, which "Protoplasmic Globule" has not provided at all, although there are plenty of useless fireplaces. The w.c. and urinals should be relegated to the outside. Inside, in that confined space, they are a dangerous nuisance; while it is no hardship to make active young men use outside conveniences in summer weather. The club-room is disfigured with lockers facing the open bar, and box seats. Lockers are quite useless unless placed in the dressing-room; they should then be in two heights, and the room lighted from the roof, or as high up as possible. The visitors' room is frequently used where there is no committee-room; hence the latter might be dispensed with (only being required once a week at most), and the space utilised for dressing-room. No bag-room has been provided by "P. G." What will members do with 30 or 40 bags encumbering the floor? A room, accessible from the dressing-room, ought to have been provided for these articles, with proper racks. Visitors, as a rule, like to have a view of the play from their dressing-room; but, of course, this is not necessary if otherwise unattainable. The terrace slopes at too slight an angle, as anyone with experience of the Lancashire County Ground at Old Trafford can see; the man behind will not be able to see when sitting down. I fear the design would stand a poor chance with a club committee, so little accommodation for members being offered for their money. Thus most clubs prefer the stereotyped plan, even if it should "lack interest," because it is the outcome of experience. I feel quite sure any architect of much cricketing experience will endorse what I have said. Apologising for the length of this criticism,—I am, &c.,
5th Sept. West Lyn.

HOUSE OF SIR WALTER RALEIGH, BRIXTON.

Sir,—The illustrations of the above-named house, which appeared in your journal, failed to convince me of its reputed age, and I therefore went to inspect it. I should suppose the house to be not earlier than the time of Charles II. The assertion of its having been Raleigh's, and that Queen Elizabeth came to visit him in her barge, is, it appears to me, simply trying from two negatives to make an affirmative. The Effra which rose in the immediate neighbourhood, and running down hill, never at Brixton carried anything weightier than air bubbles, I imagine, and cannot certainly now carry the big bubble set upon it. That it ever bore the Queen to Raleigh I really must deny. There is no vestige in the building of anything specially Tudor in character, and the which I should expect to see. The old window openings are quite modern looking, and seemingly intended to fit the sash boxings they now possess. The present remains do not seem sufficiently important for a man so fond of display as Raleigh, and certainly not fitting to invite a Queen to.

I am altogether incredulous as to both stories. I should like to hear the arguments of those who believe in the asserted antiquity of the place.—I am, &c. M.

THE WHITELEY FIRE AND RUINS.

Sir,—As I dared not approach the ruins on my first visit, reported in your excellent paper of the 19th ult., I have been again to see more of the side, or provision departments, and the back.

I am sorry to find that, with exception of the good concrete arched floor over the basement, all above seems to have been joists of wood, resting on iron girders from wall to wall, the floor of boards iron-tongued, and the joists covering with match-boarding underneath, or ceiling. This being so at both ends, and no indication of iron or concrete roof, I presume it, as well as floor, was also of wood. These iron girders and the stanchions are lined or covered with wood, the latter forming large window frames and dividing the shops. The girders across are blocked out with wood, forming the facia, lathed, plastered, and cemented.

With the shops in front, now cleared of fallen wood, &c., I could see the iron doors were twisted out of shape, so that fire could pass through, and how the fire could extend so easily and rapidly.

I write in the past and present tense, as there is plenty of charred remains to show what it was and is, by which it appears little was done to make this provision quarter of the great emporium fire-proof, and that the girders might well bend in the fiery ordeal in this part, and by weight of concrete in the other, for lack of the necessary protection of the iron.

Some of the window openings appear to have had wood lintels on the inside; but burnt clean out. These and the bond timber I saw are not consistent with really fireproof construction; though desired by the joiners, they could be dispensed with.

I venture to recite these deficiencies, the structure being set forth as fireproof. It is so misleading as to the use or propriety of adopting the system so necessary as a saving of the enormous loss of property, and more so in the name of humanity, the terrible sufferings, loss of life, and distress it causes, that can in future be avoided to a great extent by proper means, care, and judgment.

It is distressing to see the destruction of all printing and other machinery in the extensive engine department. This is said to be a loss of about £20,000 alone; there are signs of much woodwork having been used hereabout in floors, &c. Seeing the great masses of brick work fallen hereabouts there need be no wonder at the explosion-like sound when they fell—perhaps on or into a hollow space—especially if, as appears, levered over possibly by one end of unsupported girders away from the walls.

There is a stone staircase surrounded by walls, which, except doorways, appears intact while another in the open building is quite destroyed. This is a small lesson repeated.

The frequently-occurring sad disasters I hope is sufficient excuse, if I add, with your permission, that there seems so little done to make buildings of importance as fireproof as they could and should be, owing, I suppose to the increase of cost and how to do it effectually. Or surely good shops, warehouses, offices, and dwelling-houses would realise a proportionate rent or price for the greater degree of safety from fire with less insurance; and the greater durability would in the long run be economical—for theatres especially.

I say, and mean, with iron columns, girders or other supports, properly protected by incombustible substances, and the many appliances of the present time, there would be very little injury to the structure by burning of the contents only of really fireproof buildings. Such is the opinion of—
Broxbourne, Sept. 6. Jas. Pulham.

THE NUISANCE FROM SEWER VENTILATORS.

Sir,—Mr. Reeves is mistaken if he really supposes I wish to stifle discussion on the matter. I only wish him to write about it in a sensible manner, and so that people reading what he says can understand him. Others besides me cannot make sense of much that he says. His explanations on page 381 of "sewer ventilation, as distinguished from "drain ventilation, are superfluous. On certain points we can reason by analogy from the latter to the former. If Mr. Reeves is unable to do so, so much the worse for him.

I doubt still Mr. Reeves's mere statement that the ventilating pipe he spoke of at first was really wholly clear. His own silence after my reasons for that doubt fully justifies me.

I did answer Mr. Reeves's question about the additional power to be really got by raising the ventilating pipe 10ft. or so. If Mr. Reeves can answer his own question better, let him do so. For my part, I stand to what I said on page 3 until proof be given of error on my part.

Mr. Reeves started with the assertion that stalk pipes were utterly useless as a means of sewer ventilation. He, in my opinion, has utterly failed to prove this. I believe that in many cases—if properly put up, of course—they would be highly serviceable. For small public sewers which men cannot enter or walk through, I have some sympathy for Profes-

Attfield's idea that these might often be simply vented—as a cask is, by a small pin-hole on top—not ventilated. I do not support the idea, however, although I mention it, as showing a feeling in some quarters against over-ventilation of sewers and drains. I put the health and safety of the public before the absurd notion that it is better to leave a stinking sewer grating in street open, even although it should poison several people, than close it and put up a stalk-pipe in a proper manner.

I can believe what Mr. Reeves says on page 382 as to the air going in at the higher points of the sewers, instead of going out as expected; but this would not always be the case. And where did the air that went in go to? Also, what sort of ventilating shafts does he refer to in this case?

Towards the close of his letter on page 382 Mr. Reeves asks me if I could assert that an upward current would be got when the air of the sewer was of 30° or 35° lower temperature than the outer atmosphere; but I would here ask him why he mentions such a great difference, seeing Mr. Baldwin Latham, in his work on "Sanitary Engineering," says:—"So that on an average of the whole year the sewer possessed a temperature of 5·11° only above that of the atmosphere."—I am, &c.,

Glasgow, Sept. 2. W. P. BUCHAN.

CHIPS.

Mr. Julius Spencer, of Keighley, joiner, has been appointed Surveyor and Inspector of Nuisances to the Haworth, Oakworth, and Oxenhope Urban Sanitary Authority. There were 130 applicants.

The death is announced, at his residence, St. John's Wood-road, London, in the 70th year of his age, of Mr. Frederick Bromley, the distinguished mezzotint and line engraver.

A group of cottage homes for pauper children, built midway between Selby Oak and Harbourne, were inaugurated by the King's Norton Board of Guardians on Thursday, the 1st inst. Mr. G. F. Cox, of Temple-street, Birmingham, is the architect, and the homes, which are four in number, and accommodate 80 children, are built of brick with red tiled roofs. Mr. Job Hartley, of Small Heath, Birmingham, has been the building contractor, and Messrs. Currall and Lewis have been the road contractors.

Works of enlargement and renovation are about to be carried out at Stirling Castle under the direction of Col. E. Donald Malcolm, C.B., Commanding Royal Engineer of Scotland.

The ratepayers of the City of York have again refused to adopt the Free Libraries Act, the result being 2,015 for and 2,832 against. Upwards of £5,000 which had been subscribed towards a free library will now be returned to the subscribers.

The Rickmansworth extension of the Metropolitan Railway was opened on Thursday, the 1st inst. The new section from Pinner to Rickmansworth is six miles in length, and there is an intermediate station at Northwood.

In deepening the bed of the river Glen between Pinchbeck and Spalding preparatory to the erection of a new bridge, the workmen found among the foundations of an older structure fragments of carved stonework, the torso of an effigy, broken stone coffin lids, and other débris, believed to be portions of the Spalding monastery, destroyed in 1553.

The work of clearing the site of the new Congregational chapel and schools in Dyer-street, Cirencester, preparatory to building operations, has commenced last week. Mr. G. Scott, London, is the architect, and Mr. J. H. Kingerlee, Oxford, the builder. The edifice will cost upwards of £3,000.

Mr. J. H. Whiteway, of Kingsteignton, South Devon, died at his residence at Teignmouth on Tuesday week, aged 78 years. Mr. Whiteway (trading as Whiteway and Co.) has been the owner for the last 40 years of extensive clay works in the parish, employing some 100 workmen, and shipping off on the average 20,000 tons of clay yearly.

A monument to the late Mr. F. C. Borckhardt, of St. Alban's city, who met with his death on the Matterhorn last year, has just been placed in the English church at Zermatt. It is of stone, with white marble cross, and bears an inscription in English. The relatives of Mr. Borckhardt have also sent out a memorial pulpit to be placed in the English church at Zermatt. It is of carved oak, carried out by Mr. Woodburn, of Liverpool, the brass work having been executed by Messrs. Hart, Son, Peard, and Co., London.

Intercommunication.

QUESTIONS.

[9386.]—**Railway Gauges.**—What is the gauge of the Russian railways both in Europe and Asia, and can one of the readers of the BUILDING NEWS also state the gauge of the Indian railways, and oblige?—AN ENGINEER.

[9387.]—**Civil Engineers.**—What is the necessary education that a civil engineer requires? After completing the studies at the day college for such subjects as required, can you enter an office without serving an apprenticeship?—ANXIOUS ENGINEER.

[9388.]—**Book-Keeping.**—I shall be glad if any of your readers can recommend a good system of book-keeping for architects, and the price of same.—N. C.

[9389.]—**Height of Shaft.**—Will any of your practical readers kindly say to what height a shaft of 4½in. brickwork 22½in. square (2½ brick outside) can safely be carried up above the roof; good mortar and good bricks?—J. M.

[9390.]—**Perspective.**—Can any of your readers kindly inform me how to set Mr. Stanley's centrolinead?—C. H. F.

[9391.]—**Buenos Ayres.**—Can any reader of the "B. N." kindly tell me how to obtain the fullest information with regard to emigrating to Buenos Ayres as an architect and engineer surveyor? Also the best books on the geology and architecture of the country?—IGNORAMUS.

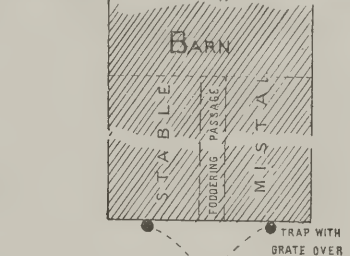
[9392.]—**Surveying.**—A piece of land has an area of 1,000 square yards. One side is 30 yards long, and another 28 yards. I want to know the lengths of the remaining sides, and the rule for ascertaining same.—MINERVA.

[9393.]—**Salisbury.**—Is it possible to ascertain what sort of stone has been adopted in constructing the famous tower and spire? When I examined the upper portion I concluded, too carelessly, that it was Portland limestone from the Chilmark, Wardour, or Tisbury quarries; but not being aware of the great difference in the crushing strength of the three different beds, I did not notice particularly enough the exact nature of the stone used for the four angle piers at the intersection of nave and transepts, and as this is of considerable importance in stability calculations, especially in the case of the weak pier at the S.W. angle, I shall be extremely obliged to "E. L. G." or others familiar with the subject for any information.—WILLIAM GRIFFITHS.

REPLIES.

[9348.]—**Boundary Line.**—"G. H. G." is by no means clear unless he admits a joint ownership where both parties repair and maintain the fence; but when the rights of ownership are acknowledged or proved, the owner of the fence can claim 1ft. from the centre, as the fence must stand on his own ground, but according to the law of boundaries any portion of the hedge hanging over beyond that distance can be cut off by the adjoining owner as it is a trespass, but that does not give the adjoining owner any claim on the fence. There is no doubt originally the fence was planted 1ft. within the line, and it is in most districts the custom in setting out plots for building or other purposes to stipulate who shall fence, and that the quickset (if a hedge) shall be 1ft. within the line.—Z.

[9361.]—**Sanitary Stabling.**—As there has been no response from an abler source to what I should have considered an important question—viz., that of keeping the excrement and liquid of cattle away from the building instead of placing dung-pits against outer walls of same, as is too frequently done, I thought as a means of eliciting other replies I would give an example of the plan I have adopted in connection with farm buildings and stables carried out by me during the last sixteen years. In the plan shown the manure pit was placed some seven yards away from end of building, and under it was fixed a tank covered with a landing, hollowed and pierced for a grating to allow the liquid from the pit to sipe into it. The drains from the stands or stalls also delivered themselves into tank, and were cut off from the latter by intercepting traps fixed external to building. By placing the lengthway of tank, the breadthway of manure, place the projecting end of former allows for a pump to be placed outside the inclosure wall for the purpose of raising the liquid at intervals to put on the land as required.—T. PATCHETT, Architect, Halifax.



PLAN



SECTION

[9375.]—**Tall Column or Chimney Shaft.**—The method of calculating the stability of chimneys is given in R. Wilson's "Boiler and Factory Chimneys." Probably, also, the subject is discussed in Bancroft's "Tall Chimney Construction" and Edwards's "Treatise on Chimneys." I have no personal knowledge, however, of these two works. The discussion in the B. NEWS (Vol. XLV.), on the effects of wind pressure on an obelisk may be consulted with advantage.—A. G. T.

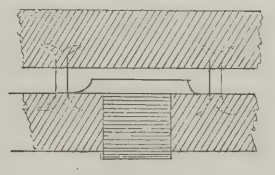
[9380.]—**Concrete.**—Assuming that the reduction is to be made in the quantity of cement only, and that the original bulk of cement is required to be retained, the proportions will be—For the blocks, 6·86 to 1, and for the outer concrete, 7 to 1.—A. G. T.

[9382.]—**Soil Ventilation.**—Covering the basement with asphalte will not obviate the necessity of thorough ventilation, as, although it may prevent moisture rising from the soil, it may not prevent, but, on the contrary, will tend to assist, the condensation of the aqueous vapour contained in the air. In any case, it would be advisable to support the ground joists at intervals only instead of allowing them to rest their whole length on either earth or asphalte.—A. G. T.

[9382.]—**Soil Ventilation.**—It is usual, in many cases desirable, to ventilate the space between the flooring boards and asphalte, and to provide for a circulation of air. The underside of sleeper joints should be a few inches above the asphalte. It will not make a good job to run the asphalte on the soil, as hinted in the question. A bed of stone chips or broken bricks should be laid and well pounded down, blinded on the top with fine stuff, and left level for the asphalte. The asphalte should be tempered soft with oil, to form a tough layer, which will yield under any load or settlement before it breaks. The asphalte should be laid regular in thickness, and close to all the brick or stone walls.—CLERK OF WORKS.

[9382.]—**Soil Ventilation.**—It is both necessary and desirable to make provision for ventilating below the joists of ground floor, even supposing the soil is covered with asphalte; and several smaller gratings are better than one or two large ones, in order that there may be no dead corners.—W. P. B.

[9384.]—**Half-Timbered Work.**—I here show a sketch of a half-timbered wall, a plan which I have carried



out in some small villas, for the edification of James Thorneloe, who is inclined to be contentious.—G. H. G.

CHIPS.

The church of Wimborne St. Giles was reopened on Wednesday, after being restored internally by the Countess of Shaftesbury in memory of the late earl.

The Jubilee was celebrated at Southport on Wednesday by the opening of schools of science and art, the public recreation grounds, and the marine park and lake. The cost of the schools was £9,000; the recreation grounds, £3,000; and the marine park and lake, £12,000.

A stonemason, named Curtis, engaged in the restoration of St. Alban's Abbey, on Monday evening fell from the outer high scaffold, and was killed.

Messrs. Arrol and Co., who have obtained the contract for the making of the railway between Queensferry and Inverkeithing, in connection with the Forth Bridge, intend to begin operations shortly.

The Glasgow Archæological Society visited Newbattle Abbey, on the invitation of the Marquis of Lothian, on Tuesday. At the abbey they were received by Mr. Paterson, estate factor, and Mr. Ramsay, clerk of works, who showed them all the objects of interest, particular attention being paid to the foundation of the old chapel, which, on being recently discovered, was laid out as an ornamental garden. The party were afterwards conducted through the abbey, and the magnificent collection of historic paintings and works of art were greatly admired. The party afterwards drove to Crichton Castle, and examined that ruin.

The Elham (Folkestone) Board of Guardians have decided to expend £2,500 in the erection of three cottage homes in the village of Cheriton for boarding out pauper children.

LEGAL INTELLIGENCE.

ANCIENT LIGHTS.—PHILLIPS V. THE CIVIL SERVICE CO-OPERATIVE SOCIETY (LIMITED).—(Before Mr. Justice Kekewich, September 2, sitting as Vacation Judge.)—Mr. Bramwell Davis, for the plaintiff, said that it had been agreed between the parties in this action that the interim injunction granted on August 24, restraining the defendants from raising their building in the Haymarket so as to obstruct the ancient lights of the plaintiff, should be discontinued, and the matter should be referred to an architect, to be named by his Lordship, to assess the damages (if any) caused by the defendants, and to decide who should pay the costs.

BRIDLINGTON QUAY, EAST YORKS.—A court of arbitration will be held at the Alexandra Hotel on Thursday next, the 15th inst., at 10 o'clock, to inquire into the value of the site of the skating rink about to be taken by the local board under their compulsory powers. The court consists of Mr. Harry Jones, of London (until lately a partner of Sir Henry Hunt), acting as umpire; and Mr. F. S. Broderick, York diocesan surveyor, arbitrator for the board; and Mr. A. Scargill, of Sheffield, arbitrator for the owner, Mr. Parker. Counsel and a large number of witnesses have been retained on each side, and it is expected that the case will occupy two days.

IN RE RICHARD CURTIS.—In this case, in which the debtor traded as a builder and contractor, at 100, Aldersgate-street, under the style of Curtis and Co., the first meeting of creditors was held before Mr. Wreford, assistant receiver, last week. The debtor stated that having previously been a surveyor, he in April, 1886, commenced building as above without any capital of his own, but depending on borrowed moneys and advances under his building agreements. Further, that his building operations were unsuccessful, chiefly in consequence of actions in respect of "ancient lights," particularly in the case of his works at Snow-fields. The official receiver considers that the mortgaged property is not likely to realise nearly the amount at which it is estimated by the debtor. The accounts showed unsecured liabilities, £3,348 14s. 5d.; and debts fully secured, £3,594 10s.; against assets (surplus from securities), £2,490 5s., leaving a deficiency of £858 9s. 5d. No offer was made, and the proceedings resulted in bankruptcy, Mr. A. L. Blow being appointed trustee of the estate, together with a committee of inspection.

ARBITRATION CASE AT ELSTREE, HERTS.—(Hancorne *v.* the Barnet Rural Sanitary Authority, and the Trustees of Mr. J. Campbell *v.* Same). The first claim in this cause was for compensation for damages to Mr. Hancorne's leasehold interests in Tile House Farm, Elstree, by the construction, by the Rural Authority, of a sewer through that farm; and the second claim was in respect of the damages to the freehold interests in the property. Mr. Daniel Watney (Messrs. Watney and Sons), surveyer, of 33, Poultry, sat as umpire in both cases. In the first case Mr. Bartley Denniss appeared for the claimant; Mr. Fox for the Rural Authority. The following valuations of the damage were made, in evidence, by experts on either side. For the claimant: Mr. Joshua Baker (Messrs. Joshua Baker and Sons, surveyors, St. Stephen's Chambers, Telegraph-street, E.C., and Kilburn), £945 17s. 6d.; Mr. Buckland (Messrs. Buckland and Sons), surveyor, 23, Hart-street, Bloomsbury, same valuation. For the Rural Authority: Mr. Edward Tewson (Messrs. Debenham, Tewson, Farmer, and Bridgewater), surveyor, of 80, Cheapside, £118; Mr. Charles R. Humbert (Messrs. Humbert, Son, and Flint), surveyor, of 1, Serle-street, Lincoln's-inn-fields, and Watford, Herts), £135 15s.; and Mr. F. Venables (Messrs. Prickett, Venables, and Co.), surveyor, of 60, Chancery-lane, and Highgate and Barnet, £134 8s. The umpire has published his award for £240. In the second claim Mr. Lockwood, Q.C., M.P., and Mr. W. B. Lane were counsel for the claimants, and Mr. Cripps for the Rural Authority. The valuations of the experts were:—For the claimants, Mr. W. J. Beadel, M.P., surveyor, of 97, Gresham-street (arbitrator for the claimants), £3,554; Mr. Robert Vigers, surveyor, of 4, Frederick's-place, Old Jewry, £3,522; Mr. Alfred Savill, surveyor, of 39, New Broad-street, £3,604. For the Rural Authority, Mr. F. Venables (arbitrator), £411: Mr. Charles R. Humbert, £596. The umpire has published his award for £1,752.

Mr. John Jackson, contractor, of Eastbourne and Clement's-lane, E.C., has just signed a contract with the Argentine Government to lay about 450 miles of railway. There are three lines: one northward, from Chilcas to Jufuy, 150 miles; one westward, from Dean Fumes to Chelectcito, 250 miles; and a small branch railway from Chumbicha to Catamarcas, about 40 miles. The lines are to be completed in four years, at a probable cost of two and a quarter million pounds. The permanent way is to be of English manufacture.

WATER SUPPLY AND SANITARY MATTERS.

ACTON, W.—The chairman of the Acton Local Board performed on Friday the opening ceremony of intended new sewerage works to provide the parish of Acton with a complete system independent of the sewers of the Metropolis. The area of the parish comprises a high and low level district, situated respectively north and south of the Uxbridge-road, the works for purifying the sewage being situated in the lowest part of the parish. The sewage from the high-level district runs into the works through an egg-shaped sewer, 3ft. by 2ft.; and that from the low-level through a circular sewer, 2ft. 6in. in diameter. The sewage is then pumped up by two 35H.P. engines into a channel leading to the tanks, where it is mixed with chemicals and then run into the tanks to allow all solid matter to settle. The purification is effected by a combined process of precipitation and filtration, a special feature being the absence of lime in the ingredients used for this purpose. The material used for precipitation is the magnetic ferrous carbon and compound sewage salts supplied by the International Purification Company. After precipitation in the tanks the surface liquid is passed through a filter-bed composed of granulated magnetic spongy carbon, and the effluent is discharged by an outfall sewer into the River Thames. The sludge left at the bottom of the precipitation tanks is run into a well at the back of the chemical buildings, from which it is pumped up by a small engine and forced through Drake and Muirhead's patent sludge presses, after which the solid cake is passed into the adjoining room to be dried and ground for manure. The works, which have been carried out under the direction of the local board by Mr. W. N. Lailey, the board's engineer, are capable of treating the sewage of a population of 20,000 persons. The undertaking has necessitated an expenditure of £100,000.

CHICHESTER.—Major Hector Tulloch, Inspector for the Local Government Board, held an inquiry on Tuesday last respecting an application made by the corporation of Chichester for sanction to borrow the sum of £2,250 for the erection of an infectious hospital. The city surveyor, Mr. Stringfellow, produced the plans, which the inspector stated had received the approval of the Local Government Board. Considerable opposition was raised by members of the Ratepayers' Association and others as to the site selected by the council, and alternative sites were suggested, which, however, did not appear to favourably impress the inspector.

CODNOR SEWERAGE.—A meeting of the ratepayers of this Derbyshire district was held last Monday to consider a scheme of sewerage submitted by Mr. W. H. Radford, C.E., of Nottingham, as an alternative to one previously drawn out by the surveyor to the Basford Guardians, who are the authority in the district. The ratepayers unanimously approved Mr. Radford's scheme, being the cheapest and most efficient in their opinion. Cost of works, £3,900. The Basford Guardians last Tuesday decided to send the two schemes to the Local Government Board, accompanied by an intimation that the local vestry preferred Mr. Radford's, and asking them to choose the best scheme.

HALIFAX.—Pursuant to instructions from the Corporation of Halifax, Mr. Geo. H. Hill, of Manchester has made a report on the present and future capabilities of the waterworks, and the necessity or otherwise of extending the works, and in what direction. His conclusion is that the present works can be relied upon, in years of severe drought, to give but little more than four million gallons per day. If deficiency in storage can be provided, 5½ million gallons per day can be obtained. In fifteen years from the present time from 6½ to 7 million gallons per day will probably be required for the present district of supply.

LEICESTER.—It was announced at Tuesday's meeting of the town council that the Local Government Board have authorised the following loans:—£10,400 for distributing carriers, effluent water culverts, drainage, and roads; £18,200 for trunk sewers and the purchase of a site for the pumping-station; £33,050 for the general works of sewage disposal (pumping station, rising mains, &c.); and £33,150 for machinery; and further that they are prepared to allow the execution of the works, except so far as regards the proposed overflow-culverts for relieving the sewers in times of heavy rainfall by the discharge of water into the Soar. It was decided to proceed at once with the sewage disposal scheme. The Water Committee reported at the same meeting that they were considering as to the best source of an additional water supply, and also whether any temporary augmentation of the present supply should be provided, and as to available sources, and requested the council to authorise them in their investigations and inquiries to consult the borough surveyor, Mr. J. Gordon, when thought necessary. This was agreed to.

STATUES, MEMORIALS, &c.

CHESTER.—Memorials have been built in the north aisle wall of choir in this cathedral to the memories of the late bishop (Dr. Jacobson) and the late dean (Dr. Howson); they are both executed in the local red sandstone, and are flush with the face of old wall. The late bishop's memorial consists of two panels, divided by a transom, the upper one containing an excellent medallion by Mr. Boehm, R.A., mounted in a solid Dove marble frame; the lower panel contains the inscription. The late dean's memorial is a single panel, surrounded by a decorated, enriched moulding, inclosing a brass. Both have been carved from directions of the cathedral architect (Mr. A. W. Blomfield, M.A.), by Mr. Wm. Haswell, Magon, Chester.

PARLIAMENTARY NOTES.

THE ADMIRALTY AND WAR OFFICES.—In Supply on Tuesday night, on a supplemental vote of £18,500 for the preparation of plans for the erection of new offices for the Admiralty and the War Departments, Mr. Dillwyn moved the reduction of the vote by £9,000. After some remarks by Mr. Shaw-Lefevre, Mr. Plunket said that he was asked in the Committee to find money for the preparation of plans with a view to carry out the recommendations of the Committee that had considered the subject. He did not wish to commit the House to any approval of the sketch plans of extension prepared by Messrs. Leeming and Leeming. The amendment was by leave withdrawn, and the vote was agreed to.

CHIPS.

It has been decided that a new Liberal Club shall be erected for Colne, Lancs. The building, which will be erected in New Market-street, will accommodate more than 1,000 persons. The architect is Mr. Parsons, of Burnley.

The parish church of Gladsmuir, destroyed by fire in March, 1886, has just been rebuilt, and the new edifice was opened on Sunday. The new building seats 600 persons, and the work has cost £2,500.

Mr. G. A. Wood, head master of the School of Art, Hertford, has been appointed to the head mastership of the Sidney Cooper School of Art Canterbury.

The town council of Middleton, near Manchester have applied to the Local Government Board for power to borrow £2,000 to purchase land for pleasure grounds and Free Library site, and £1,000 for site for Municipal Buildings. A sub-committee has been appointed to consider the sewage question and it has been suggested that it would be to the advantage of the borough to join the Manchester sewerage scheme.

A meeting of the directors of the Clyde, Crinan and Ardrishaig Railway was held in Lochgilphead on Monday, when orders were given for laying out the line, to Mr. Forman, the engineer, who is now on the ground.

Four Glasgow churches—Free St. Matthew's, Free West, Cathedral square United Presbyterian and Frederick-street Baptist—were reopened on Sunday after having been renovated.

Several old buildings situate between the Wakefield and Lanthorne towers have been demolished in the Tower of London. They were used as prisons and as places for administering the rack, the wheel, and other methods of torture, down to the time of James II. Of late years they have merely been occupied as store rooms and warehouses for the purposes of the garrison.

The memorial stones of a Wesleyan chapel which is being erected at Sutton Coldfield, were laid on Monday. The chapel, which stands at the corner of Newhall-street and the Parade, is to be built in the Early English Gothic style, from the designs of Mr. Thomas Guest, of Birmingham. Seating accommodation will be provided on the floor for 300 persons, and a gallery will seat 2 more. The size is 37ft. by 54ft., exclusive of apsidal chancel. Beneath the chapel a school-room, with classrooms, steward's vestry, and lavatories, will be provided. The materials are pressed brick facings with Bath stone dressings. The total cost £1,675.

A set of oak choir stalls has been placed in Brewood Church by a former parishioner in commemoration of his residence in the neighbourhood for 23 years. They were constructed by Jones and Willis, of Birmingham and London.

Good progress is being made with the second section of the Eltham Valley Railway, now being made by the South Eastern Company between Shorncliffe and Canterbury. The first section, that between Shorncliffe and Barham, has just been opened. Mr. Wright is the chief engineer, and Mr. F. Waller the mechanical engineer.

Our Office Table.

THE lamentable loss of life at Exeter heatre on Monday night affords a fresh proof at with every precaution that can be devised y experienced specialists in the way of wide d numerous exits, there is no effectual way protecting a panic-stricken crowd from locking themselves in, and that even iron drop rtains would but delay the progress of flames hen once fire has broken out in a theatre. hree times within seventy years have theatres Exeter been destroyed by fire. When the old ouse in Bedford-circus was burnt down in ebruary, 1885, it was decided to consult Mr. C. Phipps, F.S.A., in preference to a local archi- ct, on the ground that he had made the design- g of places of entertainment a special study. he building was constructed on a new site, olated on three sides, in stone and red brick, at a st of £5,500, and was opened in October of last ear. In size the auditorium was rather larger an that of the Olympic in Wych-street, London, nt the stage, dressing-rooms, and vestibule were ore spacious. The regulations of the Metropo- tan Board of Works were carried out by Mr. hipps in every particular. The weak point in e planning, as at the Victoria Hall, Sunder- nd, proved to be the gallery stairs, which were ivided by a central wooden handrail, and con- sted of 42 steps with three intermediate land- gs, the flights being at right angles and ithout winders. Among the many sugges- ons made by correspondents for the prevention f similar disasters in the future, the most prac- cally useful one is to substitute the electric ght for gas, thereby preventing the beginning a conflagration ; and a second, of little less alue, to protect the stage fittings and artists' resses by saturating them with tungstate f soda, or some other of the so-called incom- ustible solutions. The fire at Exeter, as in ost theatre burnings, broke out among the enery, and although the details will never be nown, was, there can be little doubt, due to ntact of tinder-dry canvas with a gas- ame.

MR. J. J. HISSEY, of Eastbourne, supple- ents Prof. Tyndall's recent letter on the roper mode of constructing lightning con- uctors with a few simple but useful sug- estions of precautions. Mr. Hissey recom- ends that, to insure as far as possible perfect rotection, all iron or lead work on the roofs buildings should be in connection with the nductor ; that where the chimney-stacks are rge the ordinary point should not alone be lied upon, but a copper band as well should carried round them ; that the conductor ould be nailed to the building, and on no count disconnected from it by means of glass porcelain holders, which are worse than eless ; that continuous copper bands should employed in preference to wire rope ; and nally, that the conductor should terminate in large copper plate (as Prof. Tyndall advises), is plate being placed deep in the earth, so as insure as far as possible the ground around being always moist.

A SPECIAL feature of this year's exhibition connection with the Royal Cornwall Poly- chnic Institution, which was opened at Fal- outh by Lord Robartes on Tuesday, is the lustration of the potting materials and ttery of Cornwall and Devon. These counties e the sole source of the china clay and stone the United Kingdom, the production ex- eding 300,000 tons a year, and the Newton strict of Devon, with Dorset, are the chief urces of supply of pipe or potter's clay to the affordshire potteries. At the Falmouth Ex- bition, Messrs. Martin, of the Lee Moor Clay orks, make a typical display of clay and stone id the various by-products. The Chytane ina Clay and Brick Works show tiles, fire id architectural bricks, and blue vitrified ving. The St. Day Fire Brick and Clay mpany, Mr. E. A. Martyn, of St. Porth, dis- ay building and paving bricks. Mr. Johns, Falmouth, illustrates the manufacture of ilding bricks. Among the art pottery stands ay be noted the Royal Barum ware shown by r. Brannon, of Barnstaple ; the Aller Vale re by Messrs. Phillips ; the Watcombe racotta from Torquay, and Bovey Tracey ttery. Mr. Harry Hems, of Exeter, shows a life-size bust in Italian statuary marble of the late Ven. H. Woollcombe, archdeacon of Barnstaple, destined for the hall of Ashbury House, North Devon.

IN reply to Mr. Walter Emden's complaint as to the neglect of the Metropolitan Board of Works to deal with plans deposited for approval a fortnight before the Board adjourned for the recess, the Hon. A. de Tatton Egerton, M.P., explains that the whole of the building business of the Metropolis is not brought to a standstill by the vacation. The Building Acts are administered by the district surveyor, and only special cases of great responsibility are reserved for consideration by the Board. Mr. Emden rejoins that while no doubt the responsibility for theatre plans is great, he does not understand why a body of gentlemen, for the most part with no practical knowledge of such subjects, should be more capable of deciding what is necessary than their officers, who hold their position because of their special knowledge as practical experts. The present routine, he reiterates, involves great and unnecessary delay and loss of time and money to the building public.

THE catalogue of the 17th amateur exhibition of pictures held under the auspices of the Liverpool Corporation opened on Tuesday, has, by a singular coincidence, exactly the same number of entries as last year, 1,279. Of these pictures 60 are from the Royal Academy, 40 from the Grosvenor Gallery, 50 from the Royal Institute of Water Colour Painters, 15 from the Royal Water Colour Society, and 20 from the Royal Society of British Artists, while there are also some works from the New English Art Club. Besides these, there are fifty works specially painted for this exhibition. One of the more ambitious works is Solomon J. Solomon's "Samson," which has a special interest, as having been added by Mr. Atkinson's generosity to the permanent collection in the Walker Art Gallery. "Impressionist" works make a strong display, and include J. S. Sargent's "Carnation, Lily, Lily Rose," purchased by the Chantrey Trustees ; "Oriental Poppies," by W. J. Hennessy, and W. Stott's "Summer." Landscapes form a large proportion of the canvases, and portraits a relatively smaller one than usual ; but the water-colours are numerous, and, as a rule, excellent in quality.

A SELECTION from early Chinese and Japanese illustrated books is now arranged in cases in the King's Library of the British Museum. The selection has been made with a view to showing the close connection between the artistic schools of China and Japan, as art in both these countries had its origin in the attention paid to caligraphy, it being but a short transition from drawing the ideograph of some object to the picture itself. The first case is devoted to specimens of block printing, the forerunner of wood-engraving. Here are shown the earliest known specimens of printing—namely, three bahrani of the Chinese version of a Buddhist Sutra, printed by order of the Empress Shiyautoku, as early as 770 A.D. An early example (1337 A.D.) of printing from movable types from the Korea is the version of a Chinese encyclopædia, and specimens of Japanese block-printing, of the 14th century, are also on view. Among the more beautiful specimens is a volume of the Great Imperial Encyclopædia (A.D. 1726), in 5,000 volumes, one of the treasures of the British Museum, the illustrations in which are excellently executed. In the other cases are specimens of Japanese engravings of the Sesshin, Kano, and Korin schools, many of them illustrating Buddhist legends and details of Japanese life. Special mention must be made of the works of the artist Makio Ken (1771 A.D.), and of his faithful drawings of Japanese life. A concise handbook to the selection has been prepared, containing an historical sketch of the development of Japanese art.

MR. JOHN WILLIAMS, of Hendresytham, near Llantrissant, engineer of the Taff Vale Railway, died on Monday in London, aged 67 years. Mr. Williams was for many years connected with the Taff Vale Railway as engineer and land valuer for the company as far as new works were concerned, and he had the responsibility of carrying out all matters connected with Parliamentary proceedings of the company. He went to Cardiff in 1846, and assisted Mr. Brunel in the construction of the railway from Cardiff to Pontypridd. He then went with Mr. Brunel and assisted him in the construction of the Bristol and Exeter and Somerset railways. He was only absent three years, when he returned to Cardiff again, connected himself with the Taff Vale Railway Company, and has been connected with it ever since. He was the engineer and superintended the construction of the Dane Valley, the Llantrissant and Treforest, and other branch lines in connection with the Taff Vale system.

THE New York Board of Health has just revised the plumbing rules by the light of the experience gained since they were promulgated in 1881 and after obtaining the view of the Master Plumbers' Association of that city. The amendments are all in the direction of greater stringency, and it is worthy of attention that all plumbers practising their business in New York are registered, and have to renew their license annually. Iron pipes are specified for all house-drains, and these are to be "extra heavy" where it passes over filled-in or made ground. A curious item in the revised regulations to English eyes is an explicit authority to the Board of Health to omit in some cases the trap, which, according to another rule, is to be of the "running or half-S form," from the main house-drain. If after the filing of plans the proposed work is not begun within six months, the authorisation lapses, and the approval of the board has to be again obtained—a rule devised to defeat attempts by jerry builders to fraudulently change the scheme after approval has been obtained, trusting to lapse of time to enable the work to pass unchallenged.

MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—Society of Architects. Special general meeting at the Society's Rooms, St. James's Hall, Piccadilly. 7 p.m.

ARCHITECTURAL ASSOCIATION,

9, CONDUIT STREET, W.

Visit to "Ascot" and "Mentmore."—The train will leave Euston to-morrow at **1.0** p.m., instead of 2.15, as announced last week.

The Last Vacation Visit will be paid on Saturday, September 17, to Minley Manor, Hants (Messrs. Devey and Williams, architects), and "Bramshill," one of John Thorpe's celebrated houses.

Train from Waterloo at 11.45 a.m. Names of those who wish to go must be sent in to W. J. H. LEVERTON, 15, Whitehall-place, before WEDNESDAY, with Postal Order for 3s. 6d. and stamped envelope.

THOS. EDWARD PRYCE } Hon. Secs.
FREDERIC R. FARROW }

SOCIETY OF ARCHITECTS.

A Special General Meeting of the Society of Architects will be held in St. James's Hall, Piccadilly, on TUESDAY, September 13th, 1887, at 7 o'clock p.m.

EDGAR FARMAN, Hon. Sec.
G. A. T. MIDDLETON, Secretary.

CHIPS.

Foundation stones of a new Free Methodist chapel were laid at Yatton, Somerset, on Monday. The chapel is to be Gothic in style, and seated for 200 persons. Mr. W. A. Green, of Clevedon, is the contractor.

A large hotel is about to be built on the Ocean View Estate, near Felixstowe station, from plans by Mr. A. J. Butterworth, jun., of Ipswich and Felixstowe. It will have a frontage to the sea of 136ft., and contain 40 bedrooms, besides other apartments.

Dr. Francis Edmond, of Kingswells, has presented to the trustees of the Aberdeen Art Gallery a portrait of John Philip, R.A., and his wife, painted by the artist himself. Two fine engravings by Barlow of paintings by Philip have also been added to the same collection.

Mr. Joseph Maltby Bignell, architect, died at his residence in Orland-road, Clapham, at the age of sixty years. For the past three years he had been incapacitated from the exercise of his profession by ill health.

Holy Trinity Church, Birkenhead, was reopened on Sunday after renovation and decoration. Messrs. E. Legge, Son, and Co., of Birkenhead, carried out the works.

In the list of Scotch sequestrations, the name appears of W. G. Wilson, Glasgow, architect, the first meeting being fixed for Monday next, at the Faculty Hall, Glasgow.

The foundation stone of a new Dominican priory will be laid at Newcastle-on-Tyne to-morrow (Saturday) afternoon. The priory will be built of red brick with terracotta, and will, when completed, cost £8,000. Messrs. Dunn and Hansom, of Newcastle, are the architects, and the contract for the first section of the work has been taken by Mr. Foster, of Croxdale, at £3,000.

CHIPS.

The following dissolutions of partnership are announced in Tuesday's *Gazette*:—Strode and Co., Osnaburgh-road, Regent's-park, and St. Paul's Church-yard, gas engineers, as far as regards J. Mackenzie; and Hunt and Ellis, Maresfield-gardens, Hampstead, builders, as far as regards W. Hunt.

The *London Figaro* gives in its issue of Sept. 3rd a portrait and biographical notice of Mr. Thomas E. Collcutt, the architect of the Imperial Institute, who is described as "a coming man who is exceedingly likely to achieve, by the exercise of his own gifts, world-wide and enduring celebrity."

The ceremony of laying the foundation-stone of the Jubilee Clock Tower, to be erected at Gravesend in commemoration of the Jubilee, was performed on Tuesday by the Mayor.

On Tuesday morning considerable interest was manifested in the ascent of St. Mary's steeple, Bridgwater, by a steeple-jack named Parker, of Oldham, employed by Messrs. Trask and Son, of Ilminster, the contractors for the tower restoration. The ascent was successfully accomplished in about two hours.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ACTON GREEN.—For the erection of the first portion of the proposed Church of St. Alban the Martyr, Acton Green, London, W. Mr. E. Monson, jun., A.R.I.B.A. Grosvenor House, The Vale, Acton, W., architect:—
Dorey, J., Brentford (accepted)... £3,500 0 0

ACTON GREEN.—For the erection of five cottages in Montgomery-road, Acton Green, W. Mr. E. Monson, jun., A.R.I.B.A., Grosvenor House, The Vale, Acton, W., architect and surveyor:—
Thomas, G., Acton Green, W. (accepted) ... £1,075 0 0

BARNET.—For coach-house and stable, for Mr. Emm. Mr. E. B. Julian, architect:—

Gray	£165 0 0
Roger	165 0 0
Marriott Bros. (accepted)	140 0 0

BARNET.—For alterations, Lyonsdown, Barnet. Mr. A. Allen, architect:—

Dainton	£1,965 0 0
Ellwood	1,795 0 0
Wilkins	1,565 0 0
Marriott Bros.	1,560 0 0
Ansell	1,555 0 0
Mattock	1,491 0 0
Noble	1,472 0 0
Harris	1,227 0 0
Richardson, J. O.	1,221 0 0

BERMONDSEY.—For new shop on forecourt and sundry alterations and repairs to house and shop, No. 234, Southwark Park-road, for Mr. W. H. Jacks. Mr. E. Crosse, 32, Bermondsey-square, S. E., architect:—

White, A., and Co., Rotherhithe ...	£195 0 0
Almond, J., Bermondsey	185 0 0
Smithers, G., Bermondsey (accepted)	180 0 0

BERMONDSEY.—For rebuilding to back additions and underpinning walls and piers, and new water supplies to houses, Nos. 46 and 48, Camilla-road, for Mr. H. Haukin. Mr. E. Crosse, architect:—

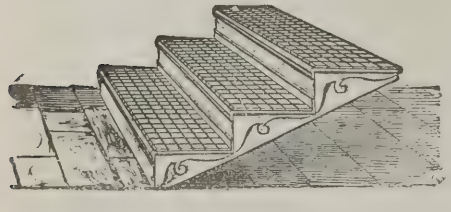
White, A., and Co., Rotherhithe ...	£196 0 0
Smithers, G., Bermondsey	187 0 0
Almond, J., Bermondsey (accepted)	185 0 0

BEDDINGTON.—For proposed alterations and repairs Brandries Hill House, Beddington. Mr. C. Innes, 27, Queen-street, City, architect:—

Prestige and Co., Pimlico	£3,819 0 0
Dawson and Son, Beddington ...	3,818 0 0
Maides and Harper, Croydon ...	3,752 0 0
Smith, J., & Sons, South Norwood	3,597 0 0
Macey and Sons, Strand	3,327 0 0
Messom, T. J., Twickenham ...	3,195 0 0

BLACKBURN.—For the painting inside of the offices, staircase, and corridor, at Richmond Chambers:—
Cunliffe, W. H.... ... ... £41 15 0

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Monkwearmouth
Moorgate-street
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HE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1706.
FRIDAY, SEPTEMBER 16, 1887.

REBUILDING SCHEMES.

THE demolition of whole streets of houses and the formation of new thoroughares have much changed the western parts f London. New routes have been opened hrough neighbourhoods which not long ago ere dense and squalid in the extreme, but in hich trade of a superior class is being carried n. The district most affected by recent alteraons is that lying to the north and east of rafalgar-square. Charing Cross-road, which asses through a very densely-populated part nd intersects several thoroughfares, such s Cranbourn-street, Newport-street, and haftesbury-avenue, has brought into promience several obscure blocks of buildings hich scarcely before had the honour of asking in the sunshine. Till lately they ere shut out from the public gaze, obscured y adjacent buildings of a manufacturing lass, and their architectural pretensions were nsignificant. All at once they have been exosed to view and to traffic; their value as roperty has immensely increased. A great any of the old premises abutting or facing he new road are not much better than actories and third-class shops, and will have o give place to new and important buildings ooner or later. Immediately behind the ational Gallery these properties are cut at considerable angle, and along the line of ew road we may count not fewer than half--dozen sites which are now to be let for uilding purposes. One long strip of land, n the hands of J. Grover and Son, builders, ot far from the National Gallery, is to be uilt on, and buildings to suit intending enants are to be erected, and for manufacuring and business purposes the sites are well dapted. Farther northwards is Cambridge-ircus, where Charing Cross-road and Shaftesury-avenue cross each other. The vacant sites re especially valuable here, as the frontages re large. Boards announce that buildings will e erected to suit intending occupants. Mr. itzroy Doll, architect, of Gower-street, and Messrs. Martin and Purchase, architects, of ueen Victoria-street, have important corner ites to deal with. In all, there were sixty ites in these new thoroughfares which the Metropolitan Board of Works had at their isposal, and twenty-five corner plots all to be et on 80 years' lease, and comprising an area n the whole of three acres. We may venure to hope that the Metropolitan Board of Works will exercise their power in preserving ome degree of harmony in the elevations of he new buildings as to general treatment nd height. In the circus particularly there s an opportunity of carrying out a complete esign in the different quadrants. John Nash as intrusted with the design of Piccadilly nd Regent-street; why should not a general esign for the quadrants be carried out in his case? The authorities could very easily ave made this a condition of leasing the nd.

Very shortly another measure is likely to e carried into effect which will greatly tend o alter the present appearance of Westminster. We allude to the Westminster arliament Street Improvement Bill, which roposes to authorise the widening of Parament, Charles, and Delahay-streets, and the aking of new thoroughfares. By this Bill arliament-street is to be widened on the estern side, Charles-street is to be widened n the south side between Parliament-street nd Delahay-street; the latter street is to be idened on the east side, and two new streets made, one from Charles-street to Great George-street opposite Little George-street, and the other made partly upon the site of the latter, terminating in Broad Sanctuary. The unopposed passage of the Bill through Committee the other day we announced. The Bill empowers certain individuals named to carry out the scheme, and its effect will be to alter the whole area between the new Government offices and Great George-street. Without doubt the contracted entrance from Whitehall to the Houses of Parliament quite destroys and impairs the stately width of Whitehall, to which it forms a narrow neck. By the abolition of King-street, an entrance worthy of the great Government thoroughfare may be made; but the street had better remain as it is than that the site should be handed over to speculative builders. We have nothing to say against a plan that will widen the approach and will lighten dreary and narrow streets by a new street from the Broad Sanctuary to Charles-street; but at all costs we trust the scheme of the undertakers will be a real improvement, and that the architectural taste may be worthy of the occasion. The framers of the Bill, it is true, have made it a provision that the plan and designs shall be approved by Her Majesty's Commissioners of Works, and be in harmony with the Home and Foreign Offices; but we all know what official architecture generally is, and the kind of harmony that is striven after. Those offices themselves, the result of a compromise, are by no means equal to the genius of their architect, or worthy of the Government who empowered him to turn a Classicist for once in his life, and if the new entrance to Parliament-street is made to agree with them, we are inclined to doubt whether monotony and dreariness will not be repeated. We should have thought that the widening of Parliament-street was enough at a time, without the opening of a new street to the Broad Sanctuary. If the block which encroaches on the view and roadway on the west side of Parliament-street were removed we hardly see the necessity of making a new street further westward. In Bills for alterations of important sites, especially those affecting several public buildings, the public have a voice. The widening of approaches and thoroughfares is now called for, even when the sacrifice of ancient and historic buildings is at stake; but do not let us pull down until we are quite sure the change is to be an improvement. If old landmarks must be removed to make way for increased traffic it ought to be undertaken with the greatest caution, and not before seeing the effect of the change. The Metropolitan Board of Works or their professional advisers have wisely adopted the plan of getting models of the schemes prepared, as they have done in the Piccadilly-circus scheme, to which we referred last week. We are sure that no plan of a site unaccompanied by accurately-drawn views and models can give a proper or adequate notion of a change that is contemplated. The process of widening a street even is not always an unmixed advantage; we lose something of the interest and associations that cling to buildings which nestle near great public edifices; the partial glimpse of a great cathedral or public building is more gratifying to the eye than a sudden disclosure of the whole of it. In a word, the picturesque elements are destroyed. Some time ago an able plea was advanced on this ground for not opening up the area round St. Paul's Cathedral, and the same plea can be urged in all cases of street improvement. Public convenience is, however, very exacting. All that we ask in return for these alterations is that an effort should be made to see that they are really designed in a sufficiently liberal spirit, and do not mar the buildings in the locality. The study of the elevations ought to be taken into as much consideration as the plan, and the latter ought not to be settled till the general perspective of the grouped buildings from several points of view has been seen.

THE CUBING OF PUBLIC BUILDINGS.

THE plan of obtaining approximate estimates by the method of cubing has now attained to something like a system. At first it was a very tentative and by no means reliable method of estimating buildings. Surveyors and architects of the past generation used to carry in their pocket-books a few of these golden rules of calculating, little imagining that in later times the rough-and-ready cube unit would become a general mode of arriving at approximate estimates, and be introduced into text-books and figure in Government reports of Select Committees. The experiences of a generation or two have enabled the profession to arrive at tolerably accurate rates of cubing for different classes of building, though it ought not to be overlooked that a particular locality may very materially impair the correctness of this mode of estimation. The rates must be taken as general guides in forming an estimate of cost, and in all cases the experience of the architect can alone give value to the system. Then the cube rate cannot be relied upon for work of exceptional elaboration. The cubes generally published are intended to apply chiefly to buildings of a plain character in their several classes, and it would be of value if this circumstance were taken into account in fixing upon the rate. Precision can, however, only be attained by a generalisation from extensive experiences, and the evidence which appears in the report of the Select Committee on the Admiralty and War Office sites affords some very useful information from an official source. We may here allude to the instructive evidence given by Mr. John Taylor, the Surveyor of Public Buildings in Her Majesty's Office of Works. In his examination on the estimate for the new blocks of building behind the present Admiralty, that gentleman is reported to have said that the cost of a plain brick building would be at the rate of a shilling per cubic foot. Now this may be taken as a fair rate for a large public building on an open site such as that alluded to. In this plan a large quadrangular court is shown with a screen or colonnade, to which we recently described in referring to Messrs. Leeming's able alternative design, prepared at the suggestion of the committee. This court is not included in the superficial area taken of building, though it would have to be drained and paved, and the colonnade would also be a rather expensive item. The actual building area covered in this estimate is 45,250 superficial feet, while the open court is 195ft. by 155ft. We leave our readers to make the average rate per cube foot under these circumstances; the actual building or covered space would, of course, work out something less per foot than a shilling. We simply refer to the figures given. Messrs. Leeming's design was also taken at the same rate, with certain additions for portions that could not be cubed conveniently, such as the ornamental portions, which are lumped. Mr. Taylor stated that, taking the work all round, including the extras, the rate was a shilling, or thereabouts. Then, comparing the rates for a five-story and a four-story building, the additional story somewhat reduces the cost per cube foot, so that an ornamental exterior like that of Messrs. Leeming's first design would not be necessarily more expensive per foot than a plain building one story less in height, as was elicited by Mr. Shaw-Lefevre. A great deal of valuable evidence was given as to the matter. Further on in the report we find that 1s. 2d. is taken as the cost per foot cube for a plain building, but including all arrangements for ventilation, electric lighting and other provisions. We may quote a portion of the question of Mr. Isaacs and reply

thereto, as relating to this question of cubing: —"Having regard to the character of Messrs. Leeming's building, and the fact that the whole of the façade is to be in stone as against the façade being in brick, does it strike you that the figure in one case bears no comparison with the figure on the other—the 1s. 2d. against 1s? But I take it that if everything in the nature of open spaces and courts were taken in this design as they have been in plan A, this would come to more than 1s. per cubic foot on the actual measurement of the building." Again, Mr. Taylor, replying to another question, observes the first design is a complete structure; the other one, to which very considerable additions are proposed, and where alterations and new buildings are combined, the cost per foot cube would be higher than in the case of building on a site entirely cleared, where the contractor could proceed from the foundation upwards without hindrance. With repect to buildings erected in the Northumberland-avenue, Mr. Isaacs stated that the buildings there have cost as much as from 1s. 4d. to 1s. 6d. per foot cube. But there is no comparison between a large block of offices and an elaborately fitted-up hotel. The one is comparatively simple to the other, the decoration to the hotels in the avenue would alone increase the cost per foot. The evidence upon the relation of size or dimensions to cubing rates is of interest. It is certainly a difficult point. Mr. Taylor, in his evidence, remarks: "I think the probabilities are that the cubing of a building 100ft. high would be higher than that of a building 50ft. high. It altogether must depend upon whether the larger building and the higher building has rooms of nearly the same size as the smaller building. No doubt the higher building would require thicker walls; but immediately you get away from comparatively small rooms into very large cubic spaces, then the difference in price is not great." In a fewer words we may say that the cost per foot cube of a building depends mainly upon the divisional internal walls and floors; the more numerous the rooms into which the space is divided the greater the cost. Height is certainly a factor of cost, as a high building requires thicker walls; scaffolding and labour become expensive. But if we take two buildings, one twice the superficial area of the other, but of the same height, the difference per foot would entirely depend on the interior divisions and elaboration of plan. But to say that the cubing of a bigger and higher building is *pro rata* higher than for a smaller and lower one is a proposition that does not always hold. It is so only when the rooms are about the same dimensions in both cases. It would, for instance, be absurd to cube a large public hall with the usual rooms at a higher ratio than a small villa residence because it was larger or higher. In plain English, the greater the internal space and vacuities the less charge must be placed on the cube foot.

With regard to ornamental façades of wrought stone, a considerable addition per foot must be made upon the cost of a plain brick front. To cube both at the same figure would be wrong. The evidence in the report, for instance, goes to show that a considerable saving in cost would be effected in the carrying out of the first design for the Admiralty if the towers were cut off and the engaged and separate columns of the façades were dispensed with, though at a material sacrifice of architectural character and dignity. A plain gauged brick front with stone dressings like that of the old building is estimated to cost about 2s. 6d. per foot superficial, though the difference between such a facing and the stone front would make a difference per foot cube of only 1d. The Home and Foreign Offices cost, it is stated, 1s. and one-twelfth of a penny per foot cube, or practically a shilling a foot. Other rates are given that are of value. The General Post Office new building cost 8½d. per foot, the Bow-street Police Court 11d., the Marylebone Police Court 9d., all by Mr. Taylor; St. Thomas's Hospital cost 9d.; the Royal Exchange is said to have cost 11d. The Houses of Parliament cost as much as 2s. 6d. per foot cube, the British Museum 1s. 6d., and the recent additions under Mr. Taylor 10d.; the 8d. in addition to the original cost of the latter is made up for by the expensive colonnade. Those who know these public buildings will see how materially the cubic space tends to reduce the unit of cost per foot cube.

In speaking of estimating by the cubing system, it must not be understood that we really think it prudent to calculate the cost of buildings in this way, but only for the sake of comparison, and as a very useful and often safely approximate guide. Government architects and surveyors have generally adopted the system, and in the departments of the public service there are excellent opportunities for making comparisons and tabulating results. Sir William Harcourt in his questioning was too sceptical to believe that such a system could be depended on, and asked whether any builder in the world would take a contract upon an estimate founded upon cubing. We may answer that half the estimates now made by architects and surveyors in their private and public capacities are made by cubing, and that contractors are to be found who would willingly take the risk of carrying out work in that manner. The two most perilous rocks upon which the cuber comes to grief are those of taking a figure without the verification of experience, and not making any allowance for internal elaboration of plan and decoration.

IRON DOORS FOR WAREHOUSES.

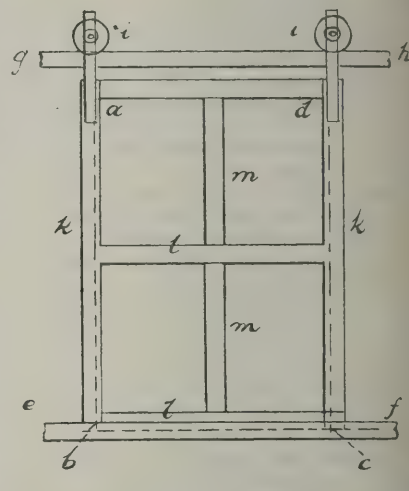
WITH the advent of large warehouses some forty years since came the natural anxiety about fire, and therefore fireproof buildings, as they were called, were designed. Assuming that a building may be made to resist attacks of fire externally, it is necessary so to arrange the internal construction that a fire in one part shall not extend beyond the limits of the room in which it occurs, and for this purpose iron doors were introduced. In this article it is not our intention to enter generally into the question of fireproof buildings, but to confine our observations to the doors used to prevent the spread of conflagration.

At the period to which we have alluded, there was a curious idea that iron was a fireproof material, and therefore that by its use fires, even in the largest buildings, might be localised; about the first proof to the contrary occurred in the great fire at Cotton's Wharf, Tooley-street, London. This fire is in many respects worth studying; it was discovered about five p.m. on a Saturday afternoon, and was supposed to originate by some jute or flax becoming ignited by the solar rays concentrated by a lenticular fault in the glass of the windows; the iron doors did *not* limit the fire—they softened, and the whole premises were enveloped in flames, the heat being so intense that engines had to play upon the Custom House on the opposite side of the Thames, and it was at one time feared that the stones of London Bridge would crack from the intense heat given off by burning tallow, &c., that flowed in torrents on the river. That fire lasted for a month. A *really* fireproof door would have saved the catastrophe, and this instance must stir us to the consideration of the possibility of making a fireproof door, and how to carry out successfully our ideas.

In the first place, a description of these doors as usually constructed will be appropriate, with critical remarks upon their utility or otherwise. Of these doors there are two classes: those which slide, and those which swing upon hinges. We shall first deal with the sliding doors.

The simplest form of this class is shown in Fig. 1; the doorway or opening through the wall which divides one department from another, is indicated by the dotted lines *a b*, *b c*, *c d*, *d e*. This opening is overlapped by the door on each side and at the top, by three or four inches, and at the bottom it runs in a groove *e f*, generally formed by sinking a channel-iron in the floor. These doors are

Fig 1



used in pairs, one on each side of the opening. Each door consists of an iron plate usually ¼in. thick (which for a door 6ft. high and 4ft. wide is quite insufficient), being the minimum set forth under the Building Acts, which is stiffened by stiles *k k*, and rails *l, l, l*, and intermediate stiles *m, m*; this stiffening is really very slight, as the rails and stiles *only meet*; they are in no way connected one with another, and, in fact, the construction is *copied from the look of a wooden door*. Straps are attached to the stiles *k k*, to which are fitted grooved runners *i i*, working on a runner-bar *g h*, which is dowelled into the wall above the opening of the doorway. The stiles and rails are usually made about ⅜in. thick, and riveted flush to the plates so as to show a smooth surface. The edges of the doorways are generally protected by angle-iron frames sunk into them, and against these frames the doors *are supposed to fit*. We will now consider the effect of these doors in case of fire.

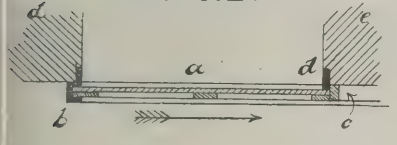
In the first place, the doors cannot fit closely to the angle irons, for there must be a certain amount of play allowed in the channel iron guide in which the bottom of the door runs, and, even if this were not necessary, brickwork is not executed in such a way as to allow an hermetic fit between the door and walls. We will assume the wall to be 18in. thick, and the doorways 7ft. high by 5ft. wide, and constructed as just described—it, of course, being assumed that the *floors are fireproof*, for if they are not, the fireproof doors could not limit the spread of the flames, which will naturally attack the ceilings more fiercely than the walls.

If the material stored in the room protected by these doors is not highly combustible and capable of generating intense heat, but of a smouldering character, they will afford a sufficient safeguard, and are therefore, suitable for warehouses in which are stored such merchandise as paper and heavy cloth goods, and other similar materials; but if the goods are of a light, easily inflammable character, the heat will be generated so rapidly as to cause twisting and buckling of such said doors, when there will be apertures through which the flames may pass, or the intensity of heat may be such as to melt the cast-iron wheels supporting the doors on the runner rails, when the doors

emselves will fall down, and a clear pas-ge be left for the flames. Considering this, is safer to place the wheels at the bottom the doors instead of the top, as the heat ll there be much less ; but in such case the me of the door must be made much stiffer, it is standing up instead of hanging, and sufficiently heated to become soft would ible or bend, and fall out of the top ove, so that perhaps the best way would to have the wheels on the top of the door, t make them of wrought iron, which l bear a much higher temperature without lting than cast iron.

A similar, but much better, class of door is o in use. It is shown in horizontal tion in Fig. 2, as it appears when closed.

Fig. 2.



s the door, which runs in grooves both and bottom, being supported by wheels before, but the top groove having its tal thickened laterally so as to join the ll above the door. In closing the door, *a* s into a vertical iron groove, secured to side *d* of the doorway, and at the back door has a lip, *c*, which shuts against a tical bar *d* fixed to the brickwork on the e *e* of the doorway. In opening the door s moved in the direction of the arrow.

This is a very great improvement upon the mer, and approaches in character more rly to a flame-tight valve, and further the r being framed (when closed) on three s in grooves, it is better adapted to resist kling by heat.

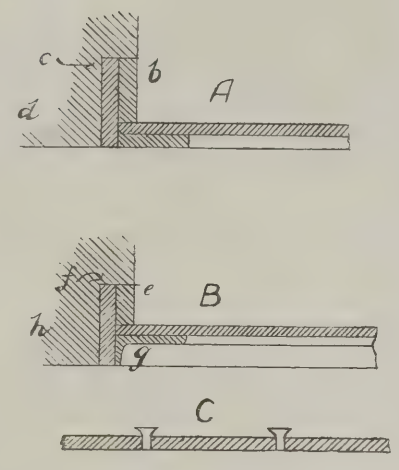
t is almost superfluous to observe that ler no circumstances should there be wood-k *between the iron doors in contact with* the n work, for in such case, the iron work oming highly heated, the wood-work ld be ignited by contact. Yet even in se doors there are interstices through which an pass, for there must be some amount of y between the door edges and the grooves, such work is not generally planed. planing out the grooves taper and ning the edges of the doors to fit, they ld easily be so set as to jam on being ed, and thus a practically air-tight valve uld be formed, and if there were no other t the fire would die out for want of air to l it, and the only damage would be that e by the fire itself ; whereas under other umstances the damage done by water used xtinguish a fire is very great, and fire e cannot be used without large inlets, ng unlimited supplies of air.

We will now turn to the second class of rs—hinged or swinging doors. Doors of class are made of the same thickness as foregoing, but swing on hinges formed ully like those of an ordinary iron-safe , though when the doorway has a ed head, hinges similar to those used common house doors are employed. loor of this description naturally affords ter facilities for rendering it air-tight those dealt with above ; but there is the same lack of resistance to buckling occurs in the sliding form, for the stiles rails are arranged in the same way ; the ing which should carry the plates of the s is really carried by them.

eferring for a moment to Fig. 1, if the tends to draw the plate inward, there thing whatever to prevent the apparent s (which are really only surfaces of con- between the stiles and rails from ing ; thus the centre rail *l* would be n forward without any resistance what-from the stiles *m m*, and this being the side of the door exposed to the fire (the flat side being towards the doorway opposite the corresponding door on the other side of the doorway), it would be first heated, and therefore the buckling would be in this forward direction.

In Fig. 3, A shows in horizontal section the edge of an ordinary swing door, closed

Fig. 3



against the vertical bars *b* and *c* fixed to the brickwork *d* at the side of the doorway. Taking the total thickness of door and style as ⅞in., very little buckling by heat would be required to render such closing ineffectual.

A better arrangement is shown in the door B, where the vertical stile is formed of an angle iron, *g*, closing against the bars *e* and *f* fixed to the wall *h*. Here we have the whole width of one limb of the angle iron *g* pressing against the bar *f*, and by splaying this angle iron as shown, the fit will be more air-tight, and if such a frame be carried round the four sides of the door, great resistance to buckling will be afforded.

No doubt the objection will be urged that doors thus made would be more expensive than those in use, and it is a fact they would be ; but the question that should present itself to the practical mind is : If we must put up iron doors nominally fireproof, whether it is not worth while to make them really so—whether, in fact, it is, financially speaking, more advantageous to render merchandise *absolutely secure from spread of fire*, or to do no more than the Building Acts insist upon.

The door should be thus made : the frame made of light, say 2in. by 2in. by ⅞in., angle irons welded at the corners, the rails and intermediate stiles being of the same material welded at all joints so as to form a solid frame capable of *standing alone* ; to this the panel plates are to be riveted, being studded over the surface with studs of the form shown at C (Fig. 3) to afford a key or hold for about 1½in. thickness of fireproof cement. Such a door would be absolutely safe, as it would bear many hours' exposure to intense heat before the iron itself was affected by the temperature.

The objection to swing doors in warehouses is that they occupy too much room, and for that reason sliding doors, which are easily stowed away, are adopted. The sliding doors may also be made with frames similar to those just described, but allowing the panel plates to project sufficiently to run in the horizontal grooves and into the end vertical groove, the face of the door and all exposed ironwork, except the wheels and runner bars, being coated with fireproof, non-conducting composition. Such compositions have been tested, and 2in. thickness upon a cast-iron column is sufficient to resist the fire and keep it cool for something like eight or ten hours. By "cool" we mean that when the cement was broken off the iron was not unpleasantly warm to the hand. In regard to the cost of such doors, it will be seen that by a slight alteration in the construction of the outside framing, the door can be cemented on both sides, so that one door will serve where now two doors are used.

THE CHURCH AND HALL OF DINTON, BUCKS.

By Frederick George Lee, D.D., F.S.A.

DONYNGTON, Dynton, Donitone, Danintone—for such are some of the old modes of spelling the name of this place in ancient deeds and documents—lies midway between Thame in Oxfordshire, and Aylesbury, in the county of Bucks.

The parish church and hall, a picturesque mansion-house, stand a short distance from the high road to the south, surrounded by stately elms, noble horse-chestnut trees, and ancient oaks. Both church and mansion-house are of singular interest ; and, though neither are of any great or unusual pretensions, each is worthy of more detailed consideration than—with the exception of certain notices in local publications—it has as yet received. Hence this brief paper.

The Manor of Danitone (as it is termed), and also that of Waderuge (now Wallridge), were at the period of the Norman survey possessed by William the Conqueror's brother, the Lord Odo, Bishop of Baieux. They had previously belonged to one Aveline, a noble or knight mentioned as living in the reign of King Edward the Confessor.

At the survey in question, Helto, a native Saxon, appears to have been the tenant of these manors, which, with other considerable possessions, contained a mill, valued at four shillings ; and also seem to have comprised the reputed manors of West Dynton or West Lyngton* and Forde, names still in use down to the present time ; though the local manorial rights and customs—real or supposed—are in abeyance, or lost.

"Dun" or "Doning" is said by those who have studied the subject to mean a hill or circular slope, fortified by inclosed stakes or hurdle fences ; "Tun" or "ton" a settlement of several families, a village, or town. In 1858, on a slight eminence north of the church, the late Mr. J. Akerman, Secretary of the Society of Antiquaries, found buried several skeletons and undoubted Anglo-Saxon remains, including a glass vessel and bronze spear-head.

The adjoining Manor of Opeton, now Upton, had belonged to Earl Harold. It was, and is, a mere small hamlet. It contained eighteen hides, had a mill valued at four shillings, a fishery for a thousand eels, and pannage for two hundred hogs. It was anciently divided into Upper and Lower Upton—a division not now existing. One portion, at the Norman survey, was held by William Peverill, the other by Miles Crispin. There appear to have been at least three other manors in the parish—Aston Moleyns, Blomere, and Moreton or Moretown. Various ancient and renowned families held these at different periods, and it can be proved that the chief manor of Dinton has belonged in turn, descending one to the other, to the following races :—Warine de Monchensi, William de Valence, John, Lord Grey, Sire John Devereux, Walter Fitzwalter, Thomas Whittingham, Sir William Warham, John Montgomery, Sir John Darrell of Lillingstone Darrell, Edmund Verney, John Mayne,† John Vanhattem, and at the present time to the family of Goodall.

The other manors, or reputed manors here belonged, at different periods, to the families of

* The House of Westlington, for some years the chief residence of the family of Francklin—members of which were High Sheriffs of Bucks in 1729 and 1803 respectively—is now the property and residence of Henry Bode, Esq., J.P., who married the senior co-heiress of the late Mr. John Francklin.

† Amongst my "Bucks MS. Collections" I have a note that the first Mayne was apparently a London scrivener and money-lender, who took as security for money lent the mansion-house of Dinton Hall, then called "Verney's Place," from John, Edmund, and Robert Verney, in the 17th year of Queen Elizabeth.

Dover, Ingoldsby,* Greenaway, Lee of Moreton,† Verney, Pye, Beke or Beck, Francklin, Serjeant, Sumner or Somner, and Saunders.

Dinton Hall stands on the immediate south side of the parish church, surrounded by high brick walls to the west and north, and with a remarkably open and beautiful view of the Chiltern Hills, stretching from Wendover to Stokenchurch, to the south. The gardens and wilderness adjoining the Hall are notable as containing a remarkably fine collection of choice and out-of-the-way shrubs and flowers, making it a place of great interest to the botanist. Beyond this, again, are fish-ponds in low-lying meads, and much picturesque timber here and there. The view from this southern aspect of the Hall looks out over the two Kymbles, Hampden, and Checquer's Court in the distance, with the lovely scenery of the adjacent Velvet Lawn, one of the most beautiful spots in the whole of Buckinghamshire, and towards the long range of the Chiltern Hills.

The house itself, which has been very much altered from time to time, is of considerable antiquity. Possibly parts of it, the underground western cellars, may have belonged to a Norman mansion. Colonel Goodall, its present owner, believes that a rectangular stone construction of a singular and not very definite character—the use of which, too, is not very apparent—may be of the time of Edward the Confessor. I myself having inspected it, am unable and unwilling to express any opinion on the point. The late Mr. Street, R.A., judging from fragments of stone mouldings, believed that the northern part of the house—that over which its nine gables now stand—was, in part, of as early a date as the year 1475. The main portion of the mansion was no doubt erected on old foundations in the reign of King Henry VII., and this seems to have been again altered *tempore* James I., some of the older fittings being evidently of that period. In the eighteenth century the old windows of the southern front with stone mullions picturesquely cusped were removed, and plain, narrow sash windows inserted and painted white, which effectively destroyed the finest features of this portion of the building, containing the Hall itself. Other portions were pulled down or seriously disfigured. The current taste of the middle of the last century unfortunately was not conducive to the preservation of old English houses of a Tudor or Jacobean character. About thirty years ago, however, the whole of the mansion was thoroughly restored, with general good taste and with due regard to what remained of its antiquarian and archæological characteristics.

Simon Mayne, whose father, as already stated, appears to have purchased the Manor from the Buckinghamshire race of Verney, resided here in the latter years of Queen Elizabeth's time and in the earlier period of James the 1st's reign, but died 13 July, 1617. His eldest son, born in 1612, bearing the same name, succeeded him in the estate. The former is said to have suffered much from the forced loans of Elizabeth's later years, and to have thus become somewhat impoverished; so that when the heir, a minor, succeeded his father, his patrimony was found to be burdened with heavy mortgages and other charges. In this particular the lot of the Verneys had become in turn the lot of the Maynes, a distinctly "Reformation race." Hence, during the Civil War, the second Simon Mayne was most active on the Parliamentary side of the strife. Being M.P. for Aylesbury, and a man without undue scruple or sensitive conscience, he was appointed one of King Charles I.'s judges, and subsequently affixed both signature and seal to the vellum warrant of execution. During the Commonwealth, he continued to be one of the "Parliamentary committee-men" for Bucks; but, at the Restoration, was brought to trial with other of the chief regicides, found guilty, and had sentence of death duly passed upon him. In the Pardon of Charles II., Mayne was exempted by name, and died in the Tower of London (where, since his sentence, he had been confined), in April, 1661, aged 49. He was buried in Dinton Church.

A man named John Bigg, belonging to a family of gentle-people, clerk and secretary to the second Simon Mayne, is believed by some to have been the actual executioner of King Charles I. The whole of the evidence on this subject, when combined, seems slight.

Thomas Hearne, the antiquary, of St. Edmund Hall (A.D. 1713), describes him thus:—

"He liv'd at Dinton, in a cave underground; had been a man of tolerable wealth; was look'd upon as a pretty good scholar, and of no contemptible parts. Upon the Restoration he grew melancholy, betook himself to a recluse life, made all other cloths in the same manner as his shoe, lived by begging, but never asked for anything but leather (which he would immediately nail to his clothes), yet kept three bottles that hung to his girdle—viz., one for strong beer, another for small beer, and a third for milk; which liquers used to be given, and sometimes brought to him, as was his other sustenance, notwithstanding he never asked for them.

"I have heard several accounts of this man from those who well knew him. Some person in the neighbourhood of Dinton have his picture drawn.* He put off all his clothes at once, they being all fastened together, and so in like manner put them on."

He was born 22nd April, 1629, and buried at Dinton, 4th April, 1696.

The manor and mansion were purchased from another Simon Mayne, a poverty-stricken son of the Regicide, in the year 1727, by John Vanhattem, whose ancestor, Leibert Vanhattem, of Holland,† had been a naval officer in the fleet of Admiral de Ruyter,‡ and came over from that country with William, the husband of Princess Mary Stuart. This John, who died in 1747, left an only son and heir, and two daughters. The son in question served as High Sheriff of Bucks in 1760, and was knighted by George III. in 1761. He died in 1787, and a daughter married the Rev. William Goodall, of Berkhampstead, brother of a courtly and celebrated Provost of Eton, who came out of the county of Norfolk. Their eldest surviving son, the Rev. John Joseph Goodall, M.A., Pemb. Coll., Oxon, was the father of the present possessor, Lieutenant Colonel Goodall, who married a niece of the late Dr. Lee, Q.C., of Hartwell Park, and granddaughter of Sir Percival Hart-Dyke, of Kent, Bart.

The mansion-house, 154ft. in length, is extremely picturesque, and its interior at once stately and comfortable, the old architects having ever studied the comfort of those who employed them, and having given thought to their plans. Its collection of choice china and various curiosities, including a sword of Oliver Cromwell, a shoe of John Bigg (the other being in the Bodleian Library), antique furniture, tapestry, carvings in wood, stained glass, fossils, embroidery, are of considerable interest. An "Album," first commenced by the Rev. William Goodall, grandfather of the present Lord of the Manor, is full of subjects of interest, local records, drawings, and autographs. The old hiding-place, near the chief eastern block of chimneys, opened when the house was restored, has been closed up. It was no doubt built as a place of personal security, and was entered by a trap door through the movable steps of a staircase. The chief rooms, including greater and lesser hall, dining-room, chief drawing-room, library, morning room, and others are of good proportions, and contain everywhere several objects of art and interest.

For the following account of the pictures I am indebted to another hand. My recent examination of them was too brief and superficial to enable me to pass a judgment upon them. That which follows ought to be accurate and sound:—

"There is a collection of some two hundred pictures at Dinton Hall, mostly by Dutch artists, the greater part of them having been brought over from Holland by the ancestors of Sir John Vanhattem, whose only daughter and heiress married the grandfather of Lieut.-Colonel Goodall, the present owner. Amongst the finest are the following: 'The Infant Moses trampling on the Crown of Pharaoh,' by Rembrandt; 'Vandyck,' with a sunflower in his right hand, showing a chain with his left, by himself; 'A Storm at Sea, with Wrecks,' by W. Vandervelde; 'Teniers' Villa,' by David Teniers; 'Adam and Eve in the Garden of Eden,' by Breughel; 'A Hawking Scene,' by Wouverman; 'St. Francis at his Devotions,' by Gerard Dow; 'Diogenes in the Market-place of Athens Searching for an Honest Man,' 'Jans Victor, 1654.' Landscapes by Hobbema, Salvator Rosa, and Ruysdael. 'A Man Playing a Violin,' by Terburg; "Head of Melancthon," by Holbein; 'St. Cecilia,' with the heads of her husband and brother being shown to her in a large dish, by Domenichino. Portraits of Oliver Cromwell, Cornet Joyce, and Thurloe, by Walker; of Admiral and Madame de Ruyter, by Nason; William III. and Queen Mary, by Sir P. Lely; and several other portraits by Vandyck, Sir Peter Lely, and Sir Godfrey Kneller. Flower pieces by Baptiste, and battle pieces by Vandermeulen. Many of the pictures are on copper and panels. Arms in painted windows: England and France, William Warham, Archbishop of Canterbury, Sir James Darrell, and several others that I do not know."

The church and advowson of St. Peter's, Dinton, had been bestowed upon the convent of Godston, Oxon, by Agnes de Monchensi under Henry I., and this donation was confirmed* by a charter of Richard II. (see "Monasticon Ang.," tom. iv. 364). Subsequently, a vicar was appointed to serve the church, the great tithes remaining with the convent, and he himself receiving ten marks *per annum* and certain lesser tithes from Moreton, Aston Moleyns, and Waldridge.

The ancient family of Doyley, of Chiselhampton, Oxon, obtained the patronage of the vicarage about the year 1547, it being conveyed to two brothers of that name, John and Robert (Patent Roll of Edward VI. No. 29). Subsequently, it passed to the family of Serjeant, of Waldridge Manor, in Dinton, none of the members of which are buried in the church. The Crown, however, appears to have reserved or obtained the right of presentation, for Queen Mary nominated a vicar in 1553, possibly by lapse. It afterwards passed to the Maynes by purchase, and when Simon Mayne, the Regicide, was exempted from the king's pardon, the vicarage again lapsed to the Crown. The Lord Chancellor is its present patron.

The church itself, dedicated to God in honour of St. Peter, is a building of more than average interest. It consists of nave, chancel with south aisle and south chapel, a bold square tower standing at the west end, having a stair turret at the north-east angle. There is a south porch of some antiquity, with stone sediles on either side, and a specially remarkable, highly-sculptured Norman doorway leading into the church. An excellent copper-plate of this is in existence, drawn by Brett and engraved by Basire; and a somewhat feeble wood-cut by Whittock.

The base of the much-worn churchyard cross, to the south of the porch, is evidently of great antiquity; but no sufficient indication of its exact age are now apparent, the mouldings and chamfers being obliterated or destroyed

* Richard Ingoldsby (temp. Henry VIII.), son of another Richard, married Winefred, daughter of John Greenaway, of Leckhampstead and Dinton (Noble's "Memorials of the Regicides," Vol. II. p. 211). His great-great grandson was created a baronet Aug. 30, 1660. This is presumed to have become extinct. But the surmise is doubtful.

† The Lees of Hartwell are presumed to be descendants of the Lees of Moreton, one of whom, Ralphe, subsequently settled at Saunderton in Bucks. A grant of arms, "Coate and Crest," was made to Ralph Lee, of Saunderton, gent., who was also of the City of London, in the reign of Queen Elizabeth, A.D. 1572. The Lees of Moreton had not borne arms. Harl. MSS. 808.

* There is said to have been, I may add here, an original oil painting of him at Winchendon Priory, about three miles from Dinton, the seat of Sir Scrope Bernard Moreland, but the pictures at this house having been dispersed early in the present century, it is apparently lost. See, for other information concerning him, Thomas Hearne's letter to Browne Willis, dated "Oxon, 12 Feb., 1712-13," in the Bodleian Library, *sub anno* 1713.

† There is a contemporary portrait in oil, side-faced, of this gentleman preserved here.

‡ In the noble church of St. Lawrence Alkmaar, in North Holland, a fine specimen of 15th-century Gothic though cleared out of most of its old fittings and *ornamenta*, there remains suspended a remarkably good model of the ship in which Admiral de Ruyter's greatest naval victories were secured. His portrait, as a national benefactor, was anciently hung in the vestry of this church, but has been removed to the public portrait gallery. A curious and rare volume, which in the case of my own copy has a good copper-plate portrait "The Life of Michael Adrian de Ruyter, Admiral of Holland," 18mo., London: Printed for I. B. for Dorman Newman, at the King's Arms, in the Poultrey, 1677, gives a plain and readable account of a very distinguished sailor, one who had risen from a comparatively humble position to become a successful admiral, respected and regarded with admiration by all his grateful fellow-countrymen.

* See "Record of Bucks," Vol. III. p. 93.

he nave is 63ft. 6in. in length, and the h aisle is almost the same. The width of e and aisle combined is exactly 41ft. sured within the walls. The chancel is t. long by 16ft. wide, the lower walls of latter being of remarkable thickness and lity. The level of the churchyard is much re the floor of the church.

he south porch is Norman. The chancel, xcellent proportions, is in the First Pointed e, with small well-splayed lancet windows either side, and a window of three-light ets at the east end. The chapel at the east of the south aisle is of Second Pointed k; while the bases of the pillars of the appear to be of the same period, but the and much-worn mouldings have been in s materially altered. The south windows also in the same style. The northern win- s of the nave, of two and three lights ectively, are of the Third Pointed Style, very poor. In 1843 they contained in their ls several interesting fragments of stained s—angels with musical instruments or ing the *signa* of the Passion, the arms of See of Canterbury, the arms of Ingoldsby inton, and numerous very curious Tudor ered quarries.

the east wall of the chancel there was ntly an aumbrye or tabernacle of stone he Sacrament in the centre, immediately id the high altar, which appears to have t about 2½ft. away from it*), another rye in the north wall of the sanctuary for cred oils and vessels for the Eucharist, a credence and piscina, one above the ; under a single-pointed arch in the t wall, immediately to the east of tone *sedilia* for the sacred ministrants. v fragments of very Early glass remained e southern lancet windows, some of which red to represent the "Coronation of the n," so recently as 1843. The type of glass he same as that in the south transept of In Cathedral. In the south aisle an lic shield, barry of six, Argent, and Or, kings' heads crowned within a garter. ulpit, which, until the recent restoration church, had been placed over and above inister's and clerk's pews, against the of the nave, facing south, now stands on l-designed stone basement at the south f the chancel-arch, facing west. The s and clerk's pews have been abolished. ont, carved in local stone, circular in † is of large dimensions, and stands near uth porch. It is of Early English or Pointed work, with quatrefoils round its portion, the lowest part being wrought rved grooves. The Communion-plate s of an Elizabethan silver cup and cover r design; a silver dish and two large and me eighteenth-century flagons for wine ter. These latter were given in 1772 by n Vanhattem, Knt. The salver had been usly presented by Thomas Ingoldsby in

e is some modern glass in the chancel onnor, representing a series of Scriptural nd persons, rather confusing than illus- . It requires a small treatise to describe plain it. Too much has been obviously ted in a small space; while the deep —the dark reds, blues, and crimsons— nore light glass as a due and proper Below is represented the Incarnation, s in the Manger; while above this is a , with Mary and John; and over this, Our Lord in glory. But it wants the ity, breadth, and effect of the old glass- s and their art.

lancet windows of the chancel contain of saints—on the north side, SS. Eliza- ohn the Baptist, Anna, and the B. V. on the south, SS. Katharine, Euphemia, nes. These, of no particular merit, ven by Mrs. Acton Tindal, a writer of one of the daughters of a previous ie Rev. John Harrison. These likewise O'Connor.

races of the old platform of three steps have ved. Everything here, including the floor level, he old Communion-table, dated 1606, is now in , and is used as a vestry-table, a new Commu- redos, costly, appropriate, and effective, and l is in excellent order.

f the same type as the fonts of Ellesborough, Haddenham, Crendon, Cuddington, and Monk's h—all in the County of Bucks.

A window by Hardman—containing figures of Faith, Hope, and Charity—is good, though the subjects—abstract graces—are difficult of representation and ineffective. It would have been better to have had figures of saints, in whose earthly lives faith, hope, and charity were eminently remarkable.

That by O'Connor to members of the Raper family, at the east end of the south aisle, is glaring and gorgeous, but vulgar.

There remain in chancel, nave, and tower, monuments, some of them of great antiquarian interest, to the following. But several of these were removed and misplaced when the late Mr. G. E. Street restored the church, and took greater liberties with memorials of the dead than seems justifiable. The clergymen and churchwardens being the legal custodians of such (for the privilege of erecting which people in bygone times obtained legal faculties and paid heavy fees), should have refused permission for such needless change and destruction to have been carried out.

1. Simon Mayne, Esq., died 13 July, 1617.
2. Mistress Mayne (Coluberry Lovelace, daughter of Richard Lovelace, of Hurley, co. Bucks, brother of Lord Lovelace), died 10 Jan., 1628.
3. Francis Lee, of Moreton, died 23 Aug., 1508.
4. John Lee, of Moreton, died 6 March, 1505.
5. William Lee, of Moreton, died 9 Oct., 1486.
6. John Vanhattem, Lord of Dinton, died 7 Jan., 1747.
7. Colonel Richard Beke, died 29 Nov. (year obliterated).
8. Elizabeth, his wife (daughter of Sir Thomas Lee, of Hartwell Park), died 30 May (year obliterated).
9. Richard Serjeant, Esq., died 28 Aug., 1668.
10. Anne, his first wife, daughter of Sir Richard Ingoldsby.
11. Jane, his second wife, daughter of Sir Edward Harrington, died 5 May, 1681.
12. Richard Ingoldsby, Esq., died 14 April, 1703.
13. Richard Greenaway, Esq., died 30 Jany., 1551.
14. Joane, his wife, daughter and heiress of John Tylney, of Leckhampstead.
15. Dame Elinor Lee, wife of Sir Thomas Lee of Morton, died 6 April, 1633.
16. William Griffin, of Morton, died 10 May, 1781.
17. Elizabeth, his wife, died 11 Dec., 1776.
18. Sir John Vanhattem, Knt., died 4 Dec., 1787.
19. Thomas Greenaway, Esq., died 26 April, 1538.
20. Elizabeth Greenaway, Esq., died 23 May, 1539.
21. John Kingsley, died 28 Dec., 1719.
22. Anne Ingoldsby, daughter of John Limbrey, of Tangier Park, Hants, died 21 May, 1741.

In concusion, it may be confidently put on record that the state of the fabric generally is excellent. As in so many other parishes, however, the earth round the foundations of the church is constantly being added to by burials —one of the chief reasons for the internal dampness of these buildings. It would be well if every village owned so carefully-restored a sacred edifice as Dinton Church.

BUILDING MATERIALS.—IV.*

By W. Y. Dent, F.C.S., F.I.C.

In my last lecture I directed your attention to cements, some of which derive their binding properties from the formation of hydrated compounds of silica, alumina, and lime, and others from simple hydration, or combination with water only. There is, however, another cementing material in very common use, which is of an altogether different character, upon which I have a few remarks to make, commonly known as asphalte, its value depending upon the binding properties of bitumen. Under the general term of bituminous substances are included a variety of inflammable materials found in nature, such as pitch, tar, asphaltum, naphtha, petroleum, differing from each other in consistency, and in various other respects, but all possessing a peculiar and characteristic odour; of these, naphtha is the most fluid, and asphalte the most compact and solid. The largest deposits of this character are those of the Dead Sea and the lake of Trinidad; this tar lake is more than a mile and a-half in circumference, and of unknown depth; the bitumen near the shore is solid, but decreases in consistency as it approaches the centre, where the temperature is higher. Extensive bituminous deposits are also found in Auvergne and other places in France, at Seyssel, near the Rhone, and elsewhere. The petroleum wells in America and Russia have probably had the same origin as bitumen. These bituminous deposits are supposed to have resulted from the action of heat and moisture on vegetable substances under pressure, the products of such action, which under ordinary circumstances would have been evolved as gas, having been compressed into a liquid or solid form. When bitumen is mixed with chalk, it forms a compact semi-elastic solid, which is not affected by alternations of temperature nor reduced to powder by attrition, and such a material is, on account of its plasticity and tenacity, as well as from its being impervious to water, particularly suitable for floors, pavements, and other purposes where it is liable to be exposed to a great amount of friction. No artificial mixture of bitumen and calcareous matter is so well adapted for the manufacture of the description of asphalte used for road-making purposes as the natural deposits found at Val de Travers and at Seyssel, its superiority being possibly due to the very perfect manner in which the carbonate of lime is incorporated with the bitumen, owing to the enormous pressure under which these deposits have probably been produced. The native asphalte rock consists for the most part of carbonate of lime, more or less impregnated with bitumen, the quantity of which varies from about 6 to 12 per cent.—that from Val de Travers, in the canton of Neuchatel, containing rather more bitumen than the Seyssel. The prepared asphalte, as sold by the makers, is termed "mastic," for the manufacture of which the asphalte rock is crushed under a steam hammer, and ground to powder by edge runners. The powdered rock is then carried forward by means of an endless screw to cast-iron vessels placed over a fire, in which it is mixed with suitable proportions of fine sand and bitumen, and kept constantly stirred for from two to three hours, when it is run out into blocks of 120lb. in weight. When the mastic is used it is re-heated with more bitumen, in order to render it sufficiently fluid, more or less coarse sand being mixed with it according to the purpose to which it is going to be applied. Coal-tar pitch is sometimes used instead of mineral bitumen, but this deteriorates the quality of the asphalte, coal-tar pitch being a hard brittle substance which does not possess the toughness of mineral bitumen; it softens readily when exposed to heat, and pavements made with such asphalte are liable to become soft and adhesive under the influence of a hot sun. Good asphalte should withstand a temperature of from 140deg. to 160deg. Fahr. without being affected to any appreciable extent, and should not become so fluid as to run down below a temperature of 260deg. Fahr.

PRESERVATION OF WOOD.

The best means of preserving timber from decay, and enabling it to resist for the longest possible period those changes that are included under the term eremacausis—which may be regarded as a species of slow combustion of the constituents of the wood with the oxygen of the atmosphere—is a subject that has for many years occupied the attention of chemists and engineers. Wood consists of a mass of cells or fibres, the newer portions of which are filled with the particular kind of sap appertaining to each special description, which, when the life of the plant ceases, can no longer resist the influence of the surrounding air and moisture, but begins to be subjected to a process of oxidation as the air gains access to the juices of the sap through the tissues of the wood. These juices consequently begin to ferment and decompose, the albuminous constituents, or those containing nitrogen, being the first to undergo this change, which proceeds from these to the mucilaginous, such as sugar, starch, and gum. This fermentation is assisted by the moisture contained in the wood, and is attended with the appearance of fungoid growth, when it is generally known by the term "dry rot." This dry-rot fungus possesses the property of secreting moisture, even from a moderately dry atmosphere, and hence, when once the growth of this fungus commences, it proceeds with rapidity, since it is able to procure for itself the moisture that is essentially necessary for its increase. Unseasoned wood contains within itself the elements of decay, and affords the conditions necesssry for the development of the dry-rot fungus. When such wood is placed in situations where there is not a free circulation of air, this fungoid growth soon makes its appearance, and the germs spread rapidly in every direction, the wood becoming in a comparatively short time reduced to the condition of fine dust. When wood is thoroughly

* Being the Cantor Lecture delivered before the Society of Arts.

seasoned, external moisture is necessary for the commencement of this process of decay; but perfectly dry wood shows but little tendency to alteration, as we find to be the case with the gopher wood found in Egyptian catacombs. Timber of slow growth is less liable to decay than when it arrives quickly at maturity, this being the case even in timber of the same description. It has been stated that telegraph poles made from trees grown in the comparatively rich soil of Devonshire begin to decay in a shorter time than poles made from the larches grown in the Highlands. When timber is immersed in water containing air in solution, and the air is constantly being renewed, the woody fibre will in course of time be converted into a dark brown substance, to which the name of *humus* has been given, this being one of the constituents of vegetable mould. It is well known that the decay of wood under such circumstances is rapid, as is the case in tidal waters, or in other situations in which the wood is alternately exposed to the action of air and water, as compared with wood immersed in deep water, or in still water that is not changed. The air contained in such water becomes exhausted of its oxygen, and the process of decay is arrested, or may never take place to any extent. Accordingly, it is found that piles driven in deep water, or in clay or mud, will remain sound for an almost indefinite length of time, as was exemplified in the elm piles of old London Bridge, which, when taken up, were found to be in a sound condition after the lapse of 800 years. Only a few years ago two canoes, each formed from a single log of oak, were recovered in good condition from the bottom of a loch in Aberdeenshire, where they are supposed to have been lying for 1,000 years. More recently, a boat, similar in character to these canoes, was discovered at Brigg, in Lincolnshire; and in 1881, in making excavations for steam docks at Liverpool, a portion of a ship was found which must have been embedded for at least 200 years, the elm beams of which were in a perfectly sound condition. Besides being liable to gradual decomposition by the ordinary and natural processes of decay, timber is liable to be injured by the attacks of boring worms, the most formidable of which are the *Teredo navalis* and the *Limnoria terebrans*, and also in hot climates by that very destructive insect, the white ant. The capabilities possessed by different kinds of wood of resisting these attacks vary considerably. Those descriptions which contain a large amount of resinous matter, such as the greenheart timber of Demerara, and pitch pine, *Pinus rigida*, are less liable to such attacks than much harder woods which are of a less inflammable character. The greenheart timber contains so much empyreumatic oil that it is known by the name of torchwood, on account of its burning freely like pitch pine, and there is no doubt that it is from the presence of this oil that it derives the power which it possesses of resisting these attacks to a greater extent than most other descriptions of wood. There are other woods that are reputed to have similar capabilities of resistance, of which there were a number of very fine specimens in the Colonial Exhibition. Amongst these may be mentioned the billian, a hard very dense wood, and the russak wood from North Borneo; the cypress pine from Queensland; sneezewood from the Cape of Good Hope; horseflesh mahogany from the West Indies; the karri (*Eucalyptus diversicolor*), growing sometimes to the height of 300ft., and the jarrah (*Eucalyptus marginata*), of which there was a beautifully polished specimen in the Colonial Exhibition from Western Australia. This wood was used for a portion of a jetty at Perth, on the Swan River, Western Australia, and remained perfectly sound after the lapse of thirty years. Greenheart timber was for a long time considered to be safe from the attacks of boring worms, but the experiments carried out some time ago by the Dutch Government with this as well as other descriptions of wood show that none of these woods can be thoroughly depended upon when placed in situations most favourable to the increase of these destructive agents. The extension of the railway system gave rise to the employment of an immense number of wooden sleepers, and the rapidity with which they were found to decay rendered some means of preserving them an absolute necessity, and accordingly we find that various methods have from time to time been proposed for the preservation of timber, some of which have been carried out in practice with more or less successful results. The efficacy of any such process depends upon the power of the material employed to so change the sap as to render it not susceptible of putrefaction, while it imparts to the wood such properties as will be unfavourable to fungoid growth, and will render it to a considerable extent repellent of water. The first process to receive any extensive practical application was that known as kyanising, which was the subject of patents taken out in 1832 and 1836 by Mr. Kyan, and consisted in steeping the wood in open tanks in a solution of bichloride of mercury, commonly known as corrosive sublimate. The impregnation of wood with a salt which is known to be so fatal to animal life could scarcely fail to prove effective; and this process was for many years very generally adopted. The cost was considerable, as to render the process efficient it was necessary to employ a solution containing 1lb. of the mercury salt to four gallons of water, and a load of timber was found to absorb as much as from 6lb. to 7lb. of the salt. This process has for many years been to a great extent superseded by others of a less expensive as well as more effective character, since although the use of corrosive sublimate was perfectly successful in dry situations, it did not always prove so satisfactory when the wood was subjected to the action of sea-water. Chloride of zinc is a salt which has long been known to possess considerable antiseptic properties, and in 1838 a patent was taken out by Sir Wm. Burnett for the use of this salt as a preservative of wood. In carrying out his process, he adopted the apparatus first proposed by M. Bréant in 1831. The wood was placed in closed iron cylinders into which, after exhausting the air, a solution of zinc chloride was admitted, and then forced into the pores of the wood under a pressure of 150lb. to the square inch. This process was employed on a considerable scale for many years, but it has now given place to more efficient methods, although it is still used to some extent in Germany. Some years ago a number of experiments were carried out by Dr. Boucherie, who very ingeniously availed himself of the force of the ascending sap in growing trees, by causing it to draw up various solutions. A large incision was made in the lower part of the tree, round which a trough of clay was placed, filled with the preservative solution to be tried, and this was carried up with the ascending sap. When experiments were made with felled timber, the trunk was immersed in a closed vessel which was filled from a reservoir placed at a considerable height above, so as to obtain a pressure of 30 or 40ft., and in this manner Dr. Boucherie succeeded in replacing the sap of the timber by solutions possessing properties which were likely to preserve the wood. Of the various salts experimented with, copper sulphate gave the best results. This method of applying the solution was adopted for a short time in France; it possesses the advantage of requiring no machinery, and of being capable of application upon the spot, and hence it has sometimes been found useful for newly-cut wood required for telegraph poles. The peculiar action which copper salts exert upon cellulose had long been known, and in 1837 a patent was taken out by Margary for the use of sulphate of copper as a preserving agent for timber. This salt was extensively employed for many years, the impregnation of the wood being accomplished by the use of exhaust and force pumps, and it subsequently became the process most generally adopted in France. The effect of copper salts in the preservation of vegetable fibres from decay is strikingly illustrated in the case of what is known as the Willesden canvas. Fabrics of canvas or paper can be made perfectly waterproof by the action of a solution of the copper salt employed in the Willesden process, they are free from liability to mould, are not injured by wet, and are rendered capable of resisting the attacks of vermin of every description. This canvas has been used in the most trying climates, such as Egypt and India, and was employed by Stanley in fitting out his expedition to Africa. The copper solution employed is prepared by simply dissolving hydrated oxide of copper in strong liquid ammonia. The goods to be subjected to this process are passed through a bath of this solution, at such a rate as to cause the exter portion of the fibres of the canvas or paper become pectised or gelatinised, without allowi for sufficient time for the action of the copp salt to proceed so far as to injure the streng of the material; the canvas is then passed o drums, such as are used in ordinary pap mills, and dried, whereby the film of pecti cellulose is converted into an insoluble varni The paper or canvas can be made of any quired thickness by passing two or more at same time through the bath, pressing th together, and then drying, thus producin material of sufficient strength for the purpo of light roofing. By far the most importan all the methods now employed for the pre vation of timber, and adopted almost to exclusion of all others in England, Belgi and Holland, is that known by the nam creosoting, which consists in impregnat wood with an oily liquid termed "dead oil," heavy oil of tar, obtained in the distillatio gas-tar. The efficacy of pitch, tar, and b minous substances generally, as preservat from decay, has been recognised from a v remote period, as we learn from the histor records of the Egyptians, Greeks, and Rom The Egyptians undoubtedly displayed great skill in the manner in which they ducted their processes of embalming. Bitu in one form or other, appears to have largely employed, and their success c hardly be more strikingly exhibited than i case of the heart of an Egyptian mu which, after having been preserved for 3,000 years, began to decompose upon removal of the antiseptics employed. I writings of Herodotus and Pliny we fi description given of pitch, tar, and resin from the latter celebrated writer we learn the Romans were acquainted with the fact timber was less likely to decay when continuously under water than when ex alternately to the action of air and water also that they knew something of the des tive powers of the teredo. The applicati tar distillates to the special purpose o preservation of wood was proposed as far as 1754, when a patent was taken out varnish prepared from the American pitch and for a product obtained from the distil of tar to be applied as a preventative of in wood. In 1838, and again in 1848, p were taken out by Mr. Bethell for the tar liquor. There is perhaps no pra application of chemical science to man turing operations that has yielded such sp results as have attended the investigatio the nature and composition of coal-tar. years ago no one would have ventured t mise that in what was then regarded almost valueless, dirty, and evil-smelling product obtained in the purification o would be found the source from which be produced a most splendid series of o products that would not only rival the c obtained from indigo and madder, but in cases supersede them altogether, and cre entire revolution in the whole system of d

(To be continued.)

ENDURANCE OF METALS UND STRESSES.

AT the closing meeting of the Sect Mechanical Science of the British ciation last week, the report of the com appointed for the purpose of obtaining mation with reference to the endur metals under repeated and varying stres the proper working stresses on railway and other structures subject to varyin was presented by Mr. A. T. Aitchison, th tary. The committee having considered evidence procurable up to the present ti arrived at the following conclusions:— those cases in which the dead weight i less than the live load it is the practice neers to adopt a lower working stress t tons per square inch, as permitted by th of Trade. (2) In those cases where t weight is large compared with the l the results of experiments on the fa metals indicate that a higher working permissible with the same degree of s with the lower stresses in smaller st In small bridges, where the effect of w sure is practically insignificant, the n

ress, being due to the passage of the live load, of frequent occurrence; while in larger ructures, where the wind pressure is a very nportant element in arriving at the maximum ress, it is clear, from the infrequency of heavy ind pressure, that the maximum stress but rely occurs. (3) If the working stress per- issible be arrived at from the consideration of e experiments upon the endurance of metals der repeated changes of load, then the proper lling load to assume is certainly that which ay be reasonably expected to come upon the idge a great number of times. (4) With gard to dynamic action, the shocks re- lting from bad rail points are of import- ce. Rails in 60ft. lengths are occasionally ed over bridges in order to avoid injurious ects from this cause. The Committee recom- nded (*a*) that in the case of very small rders and cross girders where the forces erating upon them are either all tensile or compressive, the maximum stress to which ought-iron should be subjected by the qui- ent weight of the moving load, added to the ight of the structure, ought not to exceed r tons per square inch. (*b*) That in the case bridges or structures of such magnitude that dead weight is more than twice that of the ving load, the stress upon wrought iron may safely increased to nearly six tons per square h. (*c*) That in those members or parts of uctures which are exposed to stresses alter- ing from tension to compression, the maxi- m tensile stress, added to the maximum mpressive stress, should not exceed four tons square inch; nor the maximum tensile ss or compressive stress, considered inde- dently, exceed four tons per square inch. In computing the strength required to st wind pressure, considering that very high ssures are of rare occurrence, the stress upon ught iron from the effects of wind may ly be taken at six tons per square inch. (*e*) teel of suitable quality a stress 30 per cent. ter be allowed.

RESISTANCE OF STONE TO CRUSH- ING, AS AFFECTED BY BEDDING.

T the recent meeting of the British Association at Manchester, Prof. W. Caw- ne Unwin, F.R.S., read a paper on "The stance of Stone to Crushing, as Affected by Material on which it is Bedded." He rved that twenty years ago it was common xperiments on crushing to bed the test imens of rigid materials like stone on lead s, with an idea of securing uniform dis- ution of pressure on the faces at which the hing pressure is applied. Prof. Unwin has held the opinion that to support blocks rushing on a plastic substance is wrong in iple. Hence in experiments on the ning of stone, and of Portland cement and rete, he has adopted the plan of preparing faces on which the crushing pressure acts a thin layer of plaster. This can easily orked to smooth and parallel surfaces, used ceive the iron plates of the crushing es directly if necessary; but the author ally interposes a sheet of millboard, h is a very hard and only slightly com- ible material. It seemed desirable to try was the difference of the crushing strength ocks supported in these two ways. Two of 4in. cubes of Portland stone and York- grit were obtained of very uniform ity. The results of the tests are given . The author was surprised at the very reduction of strength which occurred a thin plate of plastic material like lead d on the faces to which the crushing sure was applied. It would be seen that rushing pressure of blocks between lead was in one case only three-fifths, and in er only three-sevenths of that of blocks ed with plaster and crushed between ard. One block was cemented carefully en two rigid iron plates with parallel ces, and this carried a little more, but y little more, load than the block prepared plaster and crushed between loose mill- rd. An examination of the mode of ure of the blocks shows why the lead has angerous an effect on the strength. The k crushed between millboards sheared ximately at 45° in the way well under- d forming regular pyramids; but the blocks crushed between lead broke up into a number of vertical prisms with nearly vertical faces. The lead flowing under the crushing pressure produced by friction a tension in the block at right angles to the crushing pressure, tearing the block in pieces and completely altering the angle of fracture. The pressure of fluidity of lead is known to be from 1½ to 3 tons per square inch, and these pressures were exceeded in the crushing experiments.

The result seems important, because it is still a common practice to use lead, or deal, or some other plastic or compressible material in crush- ing experiments, and it is not generally known that this has the effect of diminishing the crushing resistance. The following table was appended to the paper:—

CRUSHING OF STONE BLOCKS FOUR-INCH CUBES (APPROXIMATELY).

Description of stone.	Crushing load in tons.	Stress in tons per sq. ft.	
PORTLAND—			
535	57 665	516·384	Between two mill boards on each face.
536	52 600	469 872	One plate of lead on each face
538	45 65	408·8	One plate of lead on each face ⅛in. smaller than face all round.
537	33 50	299 952	Three plates of lead on each face.
YORKSHIRE GRIT—			
539	79 72	712 080	Between two mill boards on each face.
542	80 05	716·86	Cemented between two strong iron plates with plaster of Paris.
540	56 20	504·432	One lead plate on each face.
541	35 90	322 272	Three plates of lead on each face.

The lead plates were 0·085in. thick.

MR. E. A. FREEMAN ON CHURCH RESTORATION.

SPEAKING at the last meeting of the Bath and Wells Diocesan Charity Societies at Wells, Mr. E. A. Freeman referred to church restoration generally, and to the restoration of St. Alban's Abbey in particular. The question of the restoration of churches was, he re- marked, a difficult one. He thought they might say negatively that our churches should not be treated as St. Alban's had been treated by Lord Grimthorpe. They would lay down that negative proposition, and he supposed very few persons, except Lord Grimthorpe perhaps, would dispute it. But they could not merely put down a negative proposition; they must also attempt to lay down some kind of rule, or, at any rate, they must use their discretion in particular cases. When they came to the restoration of a church, or of any ancient building, or of any ancient object, which is still used for any modern purpose, they had two things to consider, neither of which they could wholly sacrifice to the other; they had the claims of the past and they had the claims of the present. They must treat a church, or, for the matter of that, any building put to modern uses—say a town hall, hall of a college, or any other building that was still, so to speak, alive; they must do what they could to preserve it as a memorial of the past, and still make it useful for the present. And they must further remember that, in keeping up any house or building which had for many centuries been used for a particular purpose, and was still being used for that purpose, they were keeping account of the past and keeping up the his- torical continuity far more than if they pre- served the actual stones and wood of the building and ceased to put it to its uses. He did not know how some of those who laid down a rule against all restoration would meet that proposition. Supposing a part of some great building—say West- minster Abbey, and it was a conceivable case—fell in and became a ruin. Such a case was perfectly possible, but the extreme oppo- nents of restoration, if they were consistent, would say: "Let St. Peter's Church at West- minster fall down and become a ruin rather than that any new work should mingle with the old." Now he thought in such a case as that it would be sinning against historical con- tinuity a great deal more than they would do if they carried out needful and unavoidable repairs. To break the connection with the past, to have no longer the place which was the very centre of English history, the place of the crowning of our Kings, the place through so many centuries of the burial of them—to break our connection with them would be, as it would be if it became a ruin, a greater sin against history and a sin against the past than to make any restoration which was absolutely and physically required. But we must not go further than that. Our ancient churches and buildings were put into our hands as a trust, and we must be very careful not to tamper with them heedlessly, and we assuredly ought never to innovate without great and extraordi- nary cause. We should as a rule keep ourselves to making good any absolutely physical repairs. If a thing was dangerous, if a thing was un- sightly, let them make it good; but of all things they must not go and "innovate" out of their own heads; they must keep to the deposit put into their hands, and not substitute some- thing else for it. It seemed to him that the rule sometimes might be difficult to follow in a particular case; still, as a general rule they would keep up a continuity of history better by restoring, when the restoration was done with the greatest care, putting in no new work that was not absolutely necessary and making no innovations out of their own heads. That, he thought, was a sound principle. A great deal had been done at one time and another which had certainly not been according to that principle, but he hoped they were now getting a little better.

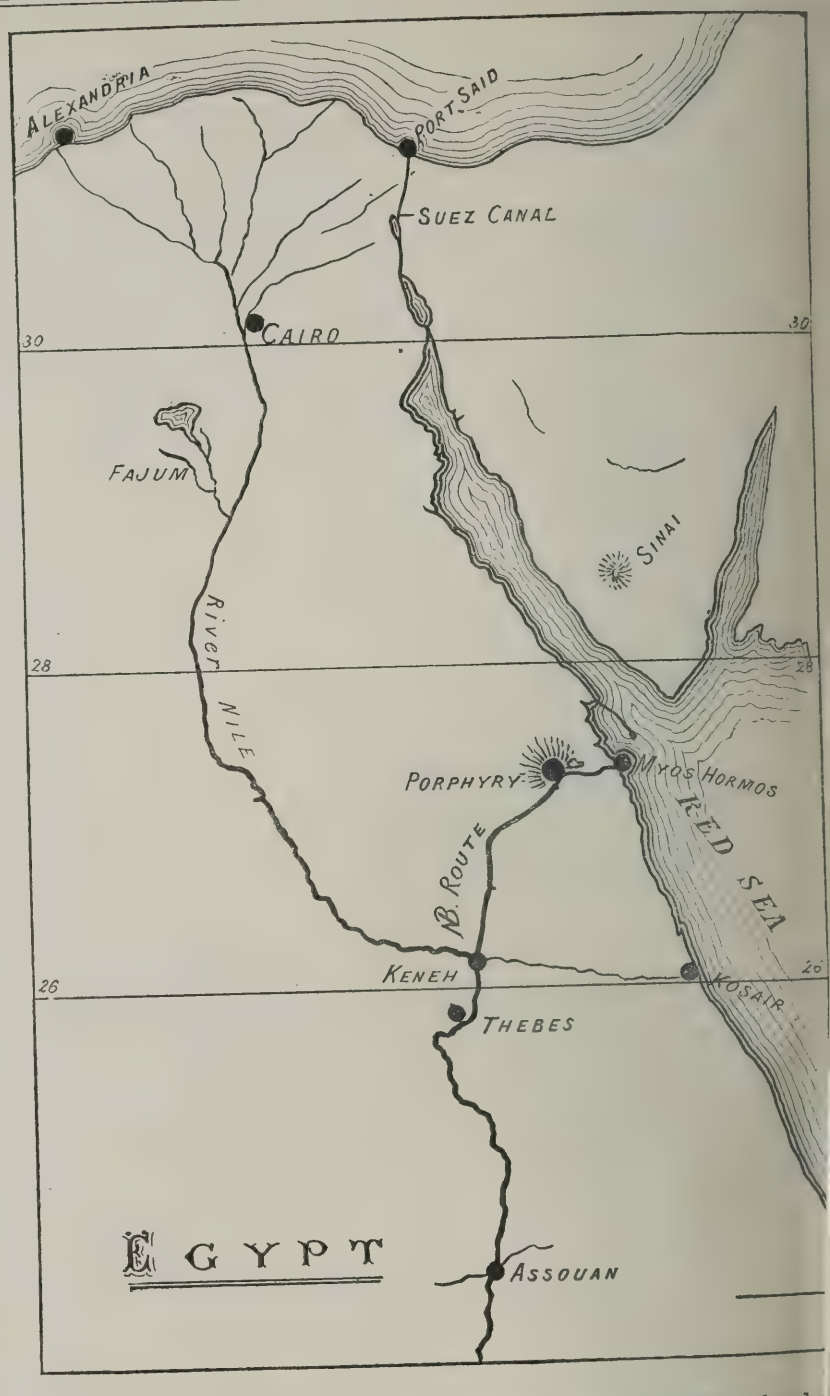
EGYPTIAN PORPHYRY.*

By W. Brindley, F.R.M.S.

MANY persons ask the question, What is Egyptian porphyry? the reply being, It is a red, purple-coloured stone of considerable hardness, susceptible of a high polish, contain- ing white and pink crystals of feldspar, in a silicious paste. It was called Porphyry from its colour, the Imperial purple, the heir ap- parent after Constantine the Great being named "Porphyrogenibus," or born in the porphyry- room, which was at Constantinople. In archi- tecture, under the Cæsars, it was the most valuable material the Empire could produce, and has remained so down to the present day, it being much sought after by the collectors of the world. Grand examples are seen in the monolith columns of St. Sophia, Constanti- nople, and in some of the edifices of Rome. It was also used for sculpture, sarcophagi, &c., and during the Middle Ages immense quan- tities were cut up for costly pavements, similar to the one in the sanctuary of Westminster Abbey, where also a slab may be seen in the tomb of Henry III., concerning which Dean Stanley remarked, "It lit up the Abbey." Ancient writers differed as to the where- abouts of the old quarries, Pliny saying they were in Egypt, and capable of producing blocks of any size. These quarries were actually rediscovered by Burton and Wilkinson in 1823, and visited by Lepsius in 1845, but as neither of them had brought away specimens nor taken any notes as to the quantity of porphyry remaining, their information was not of the practical value it might have been, and as in late years it has been announced that the quarries have been discovered, first in one country, and then in another, it became somewhat perplexing. I have had the pleasure of examining rock specimens of all the locali- ties mentioned by various modern authorities, and have found that none of them are antique porphyry. I therefore resolved to follow the footsteps of Wilkinson. In company with my wife in February of this year, I arrived at Cairo, and was fortunate, through Sir Evelyn Baring, in being introduced to Mr. E. A. Floyer, a gentleman actually conversant with this desert, and who was able to supply me with a map from Kenah on the Nile, to Gimsa on the Red Sea. We then proceeded to the first cataract of the Nile, especially to see the ancient granite quarries that supplied Egypt with material for temples and obelisks. Here

* From a paper read before the British Association on "Egyption Porphyry and its Uses," with an account of a recent visit to the ancient quarries across the Eastern Desert in Egypt.

I observed that these quarries not only supplied the deep red, but the rose, and the dark grey also, the colours often coming in contact upon the same block. The so-called obelisk and other large blocks remaining in the quarries are all of Roman date. The system of quarrying was, in my opinion, by metal wedges, and not wooden, as is generally supposed, the same method being used to break up the immense granite statue of Rameses at Thebes. Returning now to Keneh, where our caravan was formed first of nine camels, which ultimately grew to fifteen and nineteen attendants, all food, water, tents, and bedding, with provender for the camels having to be carried for three weeks, in case of emergency. After several delays, caused through the obstruction of the Mudir, and the obstinacy of the Bedouin Sheiks, we at last started on our way, and, passing through streets of potters, soon reached the outskirts of the desert. The first day we went through a wide plateau, with a well-trodden camel road; the next day we encamped at an ancient Roman station (protected by a picturesque fort on an adjoining height), where fragments of Egyptian porphyry were found. The following day at noon an important station, with reservoir, fort, and wells (now dry) was passed; the road now lay through an extensive open plain. In the evening the low rocks of the igneous range were reached, the gradual ascent to this place from the Nile being 800ft. Next day our road till noon was between hills of red granite and black shale trap rocks; here part of a porphyry column was passed. At luncheon time another important station called the Monastery was reached, where lay a number of porphyry blocks, partly buried in the sand. A ride of fifteen miles through picturesque rocks, with the high mountains in the distance, brought us to the charming valley of Wady Gitta, hemmed in on three sides by precipitous mountains 5,000 to 6,000ft. high, the valley leading to a gorge in which is a dripping well of excellent water, with ferns, figs, and palms. Here the camels drank, a day's rest being taken in this valley, where there is another Roman station. Soon after leaving Gittar we reached the watersheds, the altitude being 2,400ft., the drainage going respectively to the Nile and the Red Sea. We were now by the side of the immense porphyry mountain of Gebel Duchan, and arriving a few hours afterwards at an old Roman station with an interesting fort at the foot of a mountain pass, we decided to encamp, whilst I made my excursion on Gebel Duchan to find the old quarries. The desert route passed over, with its forts and wells, must be older than the Christian era; as Strabo, who visited Egypt in the reign of Augustus, remarks about this route to Myos Hormos (which was the highway to Thebes) as follows: "Now watering-places are provided, water is also obtained by digging to a great depth, and rain-water is found, although rain rarely falls, which is also collected in reservoirs." I began my mountain ascent at 5.30 the next morning, in company with a Bedouin and a Luxor Arab. We followed an ancient Roman road, which went directly from a well near our camp to the pass of the mountain. At an altitude of over 2,000ft. we found a station similar to those in the desert. From here to the summit of the pass the road is a narrow zigzag track on one side of a ravine, and very difficult of ascent, being partly covered with fallen rocks. At 8.30 we arrived at the top of the pass, the height being 3,100ft. Here is a square watch-tower. I had now got very disheartened, not having found in the ascent a fragment of porphyry. The view on the other side revealed a regular amphitheatre of rocks, all bare, like an extinct volcano. In the bottom could be seen an old town (the Medunch), where my companion thought I was going; but espying by the aid of a good field-glass porphyry colouring on the opposite mountain, I resolved to go there. To this my attendants most positively objected. I was further encouraged by seeing that the old path divided half-way down—one part going direct to the town, the other to the purple-tinted mountain opposite. We went on to the junction, where my companion stayed. I took from them my cold tea, lunch, and sketching-satchel, and made them tempting offers of good "backsheish" if they would accompany me, but without avail, so I proceeded alone; but in seven minutes I heard a noise, and found they were following me. On arriving at the foot of the opposite mountain my delight knew no bounds, the grounds being strewn with broken pieces of the most sumptuous porphyry, while a little further on was the actual pitched way or slide, some 15ft. wide, down which the blocks came, with piers at the sides for lowering them. A number of blocks lay here, some of large size and others broken, with several workmen's sheds adjoining. This road for a short distance was very good; but after a while it became strewn with masses of rock, and in many places was utterly destroyed by the periodical torrents, the cloudless sky making the scrambling and climbing most difficult. Near the top the road was good again; but, instead of its leading me into the quarry, I found it was going over the mountain, and could trace it winding down another valley. It was now noon, and I was completely exhausted, so finding shade under a ledge of rock, we took our lunch. I then made a hasty sketch of a most marvellous view over the Red Sea, with Mount Sinai in the distance. Now refreshed, I retraced my steps, and began again to climb. I shortly arrived at a number of workmen's huts, and then at an extensive face of rock in which I expected to find worked veins of porphyry, but could see nothing except "ochre colour." Presently I noticed that the rock and s loose masses were covered with wedge like those in the granite quarries of As I was at a loss to know for what purpo stone had been quarried, or what it reall it looking much like felspar. I knock with the hammer a flake chip, and diately discovered that it was porphy solid rock and everything under my fee the same precious material; the surface was simply an ochre wash from some above. Further examination showed me the Romans had extracted their grandest Not only do these quarries produce th spotted variety, but all the brecciated ki green greys. I noticed one pilaster b large size, partly wedged off by a series in the vertical face of the rock. It wou been almost impossible to expand wedges with water in this position, assert was done. I feel sure they used rather steel tools for dressing the ston cannot see why they should not ha metal wedges. The road I befor tioned as going down in another I think was the road for convey blocks at a later date, as this wou 25 miles between this spot and the M station. In this valley is another to workshops containing unfinished obje altitude of this great quarry I fou

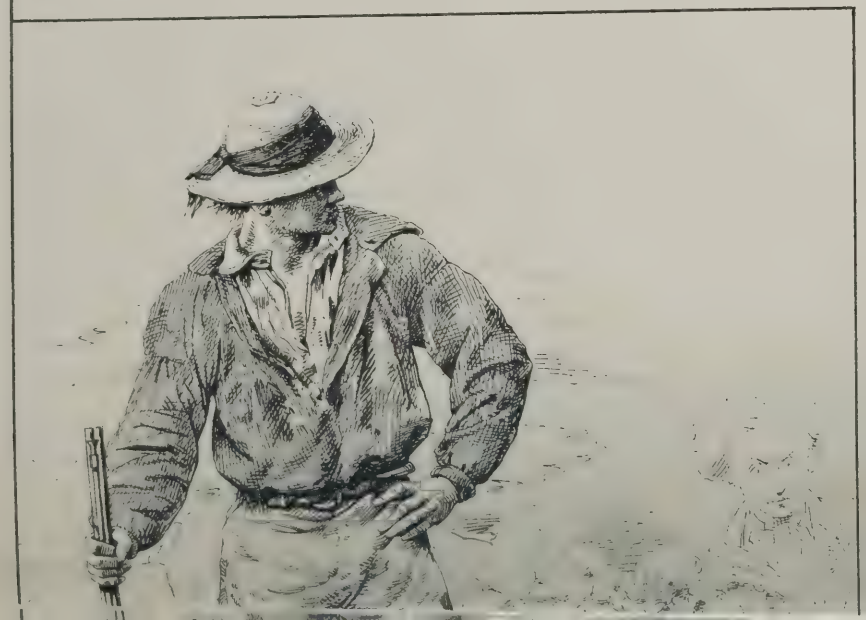




"GRANDFATHER AT THE GRAVE OF LITTLE NELL." HERBERT DICKSEE.



"THE LAND BETWEEN THE LOCHS". ALFRED EAST.









THE HEAD OF THE GANG OF "BUSHRANGERS", WILLIAM STRUTT.



"MORNING", MARCUS STONE, R.A.



"JEALOUSY", MRS H. G. MOBERLY.

SELECTIONS FROM THE ROYAL ACADEMY EXHIBITION, 1887.



"BY FLOWING STREAM THROUGH WOOD & CRAGGY WILD," ALBERT KINSLEY.



"JEALOUSY IS CRUEL AS THE GRAVE", ERNEST NORMAND.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

560ft. I determined to return by a path I ould see leading towards the "Meedinah" (the ld town). This path took me by the side of a umber of small quarries of thin bed but good olour, the porphyry being in a grey-coloured ranite extremely rotten, breaking up like dried rth or decayed Purbeck marble. At one spot observed a bust roughly shaped, and mortars rtly finished. We entered the valley about 30, and found the old town on a slight eleva- on above the reach of the torrents. It was uch larger, but very similar to the stations ong the Desert road. In the plain of the lley there is a cistern with piers around it; ese are plastered, and on them are scratched de drawings of ships with single masts. rther up the valley is a small Roman temple the time of Hadrian; the portico is granite, with a Greek inscription which ns thus:—"For the safety and perpetual ccess of our lord, the Emperor Hadrian, d his whole house. This temple and its ecincts were dedicated to the Sun-god, great rapis, and the gods associated with him, by aphroditus Sigerianus, a slave of the nperor, when Ramnius Martidis was prefect Egypt, Marcus Ulpius Chresinus, procurator the quarries, and Rufus Proculeranus perintendent of the marble works)." In a nilar inscription at Djebel Fahurah, where aphroditus dedicated another temple to rapis, A.D. 118, he is called "lessee the quarries." In this temple is a all altar. The whole is now in ruins. the plaster walls of the cell in large l letters, are W 1823, L 1845, S 1877-78. llowing these bad examples, I added in ligo, "WB 1887, and quarries." The letters an respectively Wilkinson, Lepsius, and weinfurth; according to the latter autho- there is another station down the valley, l a depot with a bank for loading the blocks ich were taken to the Nile, a distance of 96 es. The new route will be by a gentle line to the Red Sea, about 25 miles away. Bedouin found in a ravine some good er, and we now made our way back to the p, arriving at the saddle-pass at 5 o'clock, eing sunset, and was quite dark before we l reached the plain. Whilst proceeding in gle file the Bedouin disappeared into a deep ne, escaping with a cut leg, which he ttered with sand. We arrived at the camp late; the dragoman having posted lan- s on the heigths to guide us. After a day est and sketching we returned to Kenah by same route; arriving safely at the Nile r 13 days in the Desert, and 170 miles of el riding. On our return to Cairo terms a concession to work the quarries were ed upon, which have since been ratified.

THE SOCIETY OF ARCHITECTS.

A SPECIAL general meeting of the society was held on Tuesday night at the ty's new rooms, in St. James's Hall, Picca- , Mr. W. H. Seth-Smith, V.P., in the chair. n nominations having been read, the wing twenty-nine gentlemen were elected nembers:—Robert Samuel Allen, Fern s, Carlton-road, Kentish Town, N.W.; k John Brewer, 2, Upper Hill-street, Rich- l, Surrey; Edward Brown, 21, Liverpool- t, E.C.; Henry Francis Clarke, Briton y, Glamorganshire; Ernest John Vale Col- The Vicarage, Andover; Charles Walter r, Banff; Robert William Coventry Dick, ady Somerset-road, Kentish Town, N.W.; en Henry Drake, Beaufort House, Beau- buildings, Strand, W.C.; Stephen Huntley , 22, Hargrave-road, Upper Holloway, N.; nd Walter Evans, 16, Portland-street, mpton; Thomas Farrall, Sherborne, t; Frederick Gotto, The Terrace, n-road, Leighton Buzzard; Valentine , Grantham; James Harvey, Springfield , Baring-street, Plymouth; George m, Euclid House, Ilkeston; Henry Jeffery, 17, High-street, Ashford, John Leaning, 11, Poultry, E.C.; m Mackenzie, 3, Tulloch-street, Ding- Alexander Wood MacNaughton, 6, -street, Edinburgh; Robert Butcher r, South Beach, Blackpool; Harry Bell res, 53, Cornwall-gardens, S.W.; Charles ick Moxon, Beach Cliff, Westgate-on- John Robert Nichols, 59, Colmore-row, Birmingham; John Henry Phillips, 3, Charles-street, Cardiff; John Price, Local Board Offices, Lark-lane, Toxteth Park, Liverpool; Harry William Roberts, Belvoir Chambers, Leicester; Francis Robson, Cathedral-square, Gibraltar; William Alfred Sanders, 50, Queen-street, Exeter; and Anthony Robert Fletcher Trew, 22, Broad-street, Bristol.

The CHAIRMAN said that owing to some clerical error or inadvertence they had been registered as "Society of Architects," in lieu of, as intended, "The Society of Architects," the title which appeared on the certificate. It was thought that now that new stationery was being printed, in consequence of the removal to the present more central and commodious premises, a fitting opportunity had occurred for correcting this, and re-registering the society with the prefix of the definite article. After some remarks from Messrs. E. C. Allam, Worth, Johns, Walter Emden, F. W. Fryer, C. Stanley Pearce, and Ellis Marsland, it was decided with one dissentient to apply for re-registration, and on the motion of Messrs. Allam and Emden, a new rule, to be numbered as the first, was adopted—viz., "That this Society shall be known as 'The Society of Architects.'" Mr. E. Farman presented, on behalf of the secretary, Mr. G. A. T. Middleton, absent through illness, a folio volume of 18th-century engravings of Italian churches, as the nucleus of the library proposed to be formed by the Society in its new rooms. On the motion of Messrs. Stoner and Farman, the gift was accepted with hearty thanks, the chairman expressing a hope that other members would contribute architectural books for the same purpose, as such a library would prove of great value in the future. The chairman called attention to the proposed visit to York in the first week of October, and mentioned that particulars would be furnished to all members communicating with Mr. Middleton not later than the 30th inst.

UNDERGROUND AIR CHAMBERS.

THERE appears to be some justification for the objection entertained against admitting fresh warm air from basement chambers. The plan is easy, and can be applied without difficulty; but, on the other hand, there are rather strong objections to it. The chamber may become a place of storage or refuse, it may communicate too readily with the drains, and in either of these cases the air becomes contaminated before it enters the rooms above. The fresh air admitted may be perfectly pure; but directly it enters the chamber, which really becomes the reservoir of air supply to the building, every room in that case suffers. When the chamber is heated the gases are drawn into it, and are distributed to the several apartments, so that by a foul drain or the entrance of unwholesome ground air the whole supply is rendered unfit for respiration. Such a state of things cannot occur if every room has its own air supply admitted at the floor level—a system which is preferred by several authorities as more healthful. The chief question is how is it best admitted, and how warmed? One authority says the air should come from the east and west sides passing over tubes of hot water, which can be easily provided for. These tubes can be introduced in the skirting, or be collected in recesses in the form of coils. The backs of windows form admirable places for the coils, and the air in this case can be allowed to enter under each window through a grated opening under control. The vertical tube system of introducing air is probably the simplest method for admitting fresh air into ordinary rooms, and of course, the air can be heated by means of gas or hot-water pipes. The use of a large underground chamber has been largely employed because of its economy in a large building. One apparatus, or heating coil, is sufficient, and the chief expense is the carrying up of the necessary flues to the several rooms. By the separate system of introducing air, each room can be warmed independently of the others, or to a different degree by means of stop-cocks; but what is more important is, the air is pure and drawn directly from the outer air, not through the intervention of a chamber in the basement. Another advantage of the system is that the air can be allowed to enter at the breathing level, and this plan has been carried out, we believe, successfully upon the small-pipe system of J. L. Bacon and Co. in several schools and other buildings. The separate system of introducing air is the most natural. Air of uniform temperature in a room is oppressive unless cooler currents mingle with it which produce a continual movement of the air from below upwards, but without draught. Although it is better, no doubt, to keep the floor of a room warm, and the upper part cool, the object is very seldom attained, the upper part of a room soon getting the warmest, while the feet are in a cold bath of air. Proper ventilating arrangements ought in a decisive manner to diminish this undesirable and uncomfortable state of a room by providing inlets and apparatus that can be warmed, and extracting flues at the ceiling level heated by gas jets, or in connection with ventilators in the roof. But the natural condition of things cannot be altogether reversed without artificial aids. Floors of rooms exposed to doors and windows will always be exposed to the colder air by virtue of the law of gases, the heated and expired air ascending as the cold falls down and takes its place; yet even this is a more healthful condition than that of breathing heated air that may be impure, drawn from underground chambers and through long flues.

CHIPS.

The chain which it is the intention of Mr. Herbert Keeling to present to the town of Hanley, in place of the base metal one given by the late Mr. Ricardo, which has grown too shabby for further use by any right-minded mayor with a proper sense of the dignity of his office, will weigh 35oz., will be 60in. in length, and of 18-carat gold. The pendant of the chain will be heart-shaped, having upon it in enamelled work the borough arms in the centre, the Royal Arms of England on each side, with the date of the incorporation of the borough, 1857, at the top, and the date of the present year at the bottom. There will be 26 shields in all.

The committee for the erection of a Trades-hall in Sydney, N.S.W., have selected the design submitted by Mr. J. Smedley, of George-street in that city, among ten sent in. Two premiums of 50 guineas and 25 guineas respectively were offered for the best designs.

At a meeting of master plumbers of Edinburgh held on Friday night, the principle of registration for plumbers was discussed, and eventually a resolution approving of the proposal, both for masters and men, was unanimously agreed to. A committee of thirteen was appointed to take steps in the matter preparatory to a public meeting to be held in the City Chambers under the presidency of the Lord Provost. Some difference of opinion was manifested as to the desirability of co-operating with the London Company of Plumbers, some members of the craft expressing a wish to maintain independence in the movement for registration.

Sir John Fowler, K.C.M.G., M.Inst.C.E., has been appointed a deputy lieutenant for County Inverness.

New premises to be known as Albert Buildings have just been erected in Great Tower-street, E.C., from plans by Mr. F. J. Chambers, of College-hill. They have a frontage of 90ft. to the street, divided into five shops, and the facing materials of the superstructure, which will be let off as offices, are red brick and stone dressings. Messrs. J. and J. Greenwood were the builders.

The Halifax town council have adopted a report by Mr. G. H. Hill, C.E., of Manchester, as to the improvement of the water supply. Mr. Hill recommended that the powers for constructing a reservoir at Walshaw Dean should be revived, that additional storage reservoirs should be formed in the Castle Carr and Ogden Valleys, and that the waterworks at Dean Head (owned by a private company) should be acquired and extended.

The town council of Burton-on-Trent have raised the salary of Mr. Miller, assistant surveyor, from £150 to £170 a year.

The Civil Service Commissioners announce that at an open competitive examination held in Edinburgh on the 23rd August, 1887 and following days, for the situation of Assistant in the Museum of Science and Art, Edinburgh, the undermentioned candidate obtained the first place—Thomas William Nash.

The will of the late Mr. George Benton, railway contractor, who died on the 10th June last, at his residence, Clyne House, Stretford, has been proved in the Manchester District Registry of the Court of Probate, the net personal estate, including leaseholds, being sworn at £605,670 10s. 10d.

WAYSIDE NOTES.

THE notions of some members of Parliament as to what subjects should be included in the curriculum of technical schools are curious. The list, for instance, suggested by Mr. Hunter the other evening is decidedly comprehensive. The honourable gentleman, at the time when the House was in Committee on the Technical Schools (Scotland) Bill, moved an amendment that the following subjects should be taught in board schools:—"Agriculture, drawing, modelling, working in leather, clay, glass, wood, and metal, weaving, dyeing, designing, printing, bleaching, building, machine construction, naval architecture, navigation, civil and mechanical engineering, mathematics, mechanics, natural philosophy, chemistry, metallurgy, textile fabrics, geology, botany, French, and German."

Rather extensive this. Moreover, it is difficult to see how French and German can be included under the head of technical subjects. And, after all, the most liberal scheme of technical education is not of much good if the operative has not the qualities of patience and perseverance, with a readiness to please, that render him infinitely preferable to his employer than excessive knowledge of his craft. What does the British workman say to the stigma of Mr. Archer, the Vice-Consul at Porte Alegre, in Brazil, a note of which appeared in the *Times* of Saturday last? The notice says that Mr. Archer, "writing of the industries in his district, states that an earthenware factory was started in the neighbourhood, many of the necessary materials having been discovered by two Englishmen who were formerly operatives in a wholesale earthenware house in Porte Alegre, and workmen were got from England. The latter, however, gave so much trouble, and the management was so defective, that the factories proved unsuccessful and had to be stopped."

The above looks bad, and worse when we read what Mr. Archer says about his own experience of British workmen in Brazil:—"They are generally given to drink, and are unsteady, exacting, and overbearing, and are a great contrast to foreigners." Complaint is further made that in British undertakings, such as coal-mines, gasworks, &c., Englishmen are generally discharged and their places filled by foreigners—Germans and Italians and others, who are found more steady and reliable. The experience of British contractors and sea-captains even are stated to be the same.

This won't do, even in Brazil. Making every allowance for the fact that men who go to the Colonies and other quarters of the globe are not, as a rule, the best of their class, for the hot climate, and for other disadvantages under which a person would labour in Brazil, there still remains a grave doubt as to whether even these circumstances are sufficiently extenuating to make such offences pardonable. Nothing, indeed, can well excuse habitual insubordination (even in a hot climate) for acts of which we here rightly straightway order a man off a job. Not being a thorough disbeliever in the British workman, I should like to hear what excuses he can urge for the behaviour of his fellow-craftsmen in Brazil.

It is said that those who live in glass houses must not throw stones, and picking holes in the working man reminds me what a lot of mud has been thrown at architects during the last week or so in connection with theatre planning, and also at the profession generally. Much of it may well stick, and remind us of our weak points, and so help the cause of Registration. No time could be more favourable than the present for impressing upon the public the necessity for somewhere breaking the line of descent, which, from *architect*, passes by way of architect and surveyor, surveyor and auctioneer, auctioneer and house-agent, house-agent and undertaker, till we reach undertaker and sweep, and can thus claim fellowship with the "practical chimney cleaner."

Whether the designer of the Exeter theatre was at fault or not but little affects the question at issue. Things should be so ordered that such a person under such a calamity should be above suspicion. The public should be unable to cast mud and filth at the architect. But whilst the present disbanded condition of the profession remains, such it will do, and such it will be perfectly justified in doing, and the sufferers have but themselves and their co-freres to blame.

Why not have Special Diplomas for special branches of our artful-science? For good or for evil, the age is one of specialists, and it is necessary to recognise the fact and not treat it as a phenomenon that has appeared upon the horizon for a season, only to fade away in due course. The increase in population, with its thousand and one wants, the widely extended knowledge in every branch of science, have rendered the specialist a prominent necessity, and desirable, and he will therefore remain. Recognising this fact, then, why cannot the Royal Institute of British Architects (when it is the R.I.B.A. and not merely the R.I. of a few B.A.) arrange a scheme for granting special diplomas, certifying, in the one case, that Mr. A. has proved himself competent to plan and superintend the erection of a theatre or music-hall, and, in another, that Mr. B. may be safely intrusted with the erection of a town or public hall? Other buildings might be specified, and the public would then know where to find their man, and could not, as at present, be astonished to learn that all a young architect has to do in the way of planning in order to pass the Institute examination is a *parsonage house*. A country parsonage house, forsooth! This was the subject set in the exam. of March, 1886.

Mem.: It would not do for all of us to be specialists, as such persons, unfortunately, often get into grooves, and consequently become narrow-minded. A celebrated engineer, if I remember aright, speaking to students at King's College, a few years back, said that "the all-round man could often beat the specialist on his own ground," and he gave his reasons for saying so.

But there is a difference between a specialist who has become such by brag and bombast, and the man who has given his life-studies to a certain subject. The former are public malefactors, and the latter are public benefactors. To produce the latter class of men should be the object of any special diploma system. My idea may be worthless, but I give it in its crude state, trusting that someone will kindly point out the impractibility of the scheme, and put me right. For my own part, it would certainly seem impracticable till the whole profession is one body, with one voice—a body revered and honoured by the public, because of its worthiness for such reverence, its power, and its integrity.

What is a "flat-coloured" plan? The vicar of Carmarthen advertises for plans (flat-coloured) for a church to accommodate 300 persons. I have heard of "flatting" and "flat-tints," but really do not quite comprehend the meaning of flat-coloured plans, though have a suspicion that the reverend gentleman requires geometrical drawings, and not perspectives, or perhaps no shading to the drawings. But I may be wrong, so leave the competition to those who understand the technical process referred to. There are, apparently, no particulars to be given; but this is altogether a matter of detail, and evidently considered superfluous.

Who can definitely solve the latest Chinese puzzle? Does the Great Wall exist, or does it not? If the eye of the camera is to be believed, and excepting for some slight exaggeration in depth of chiaroscuro we have no reason to doubt its honesty, this ancient architectural construction in the Early Chinese style has certainly a genuine existence. The *Graphic* of last week reproduced two photographs (taken, I believe, by military men), which exhibit extensive remains of this extraordinary enterprise of one of the old Chinese Emperors. The photos show the wall running up hill and down dale, and would seem to prove beyond a doubt the existence of, at any rate, large portions of these curious ramparts, designed to keep out the hordes of Tartar barbarians.

When will the conservative Chinaman make a slight alteration in his style of architecture? He cannot so much as lay claim to having seen the rise and fall of any particular method of building. Yet, although the Joss-house and pagoda remain, this excessive conservatism is evidently giving way in other sciences. Lately, at Spithead, there were stationed four Chinese ironclads, with their attendant machine-guns, torpedo-boats, and steam-pinnaces; and bands of Chinese Jack Tars were to be seen frequenting the streets of Portsmouth and Southsea. Possibly old associations endear the Chinese to their style of building. Great, indeed, is the influence of association on our impressions of the beautiful in nature or art. Quoth John Chinaman, in reply to a question from a party of visitors to one of these ironclads at Spithead, "Englishman very good; Englishman very kind; but Englishman *very ugly*."

GOTH.

EDINGTON CHURCH, WILTS—SHEET OF MOULDINGS.

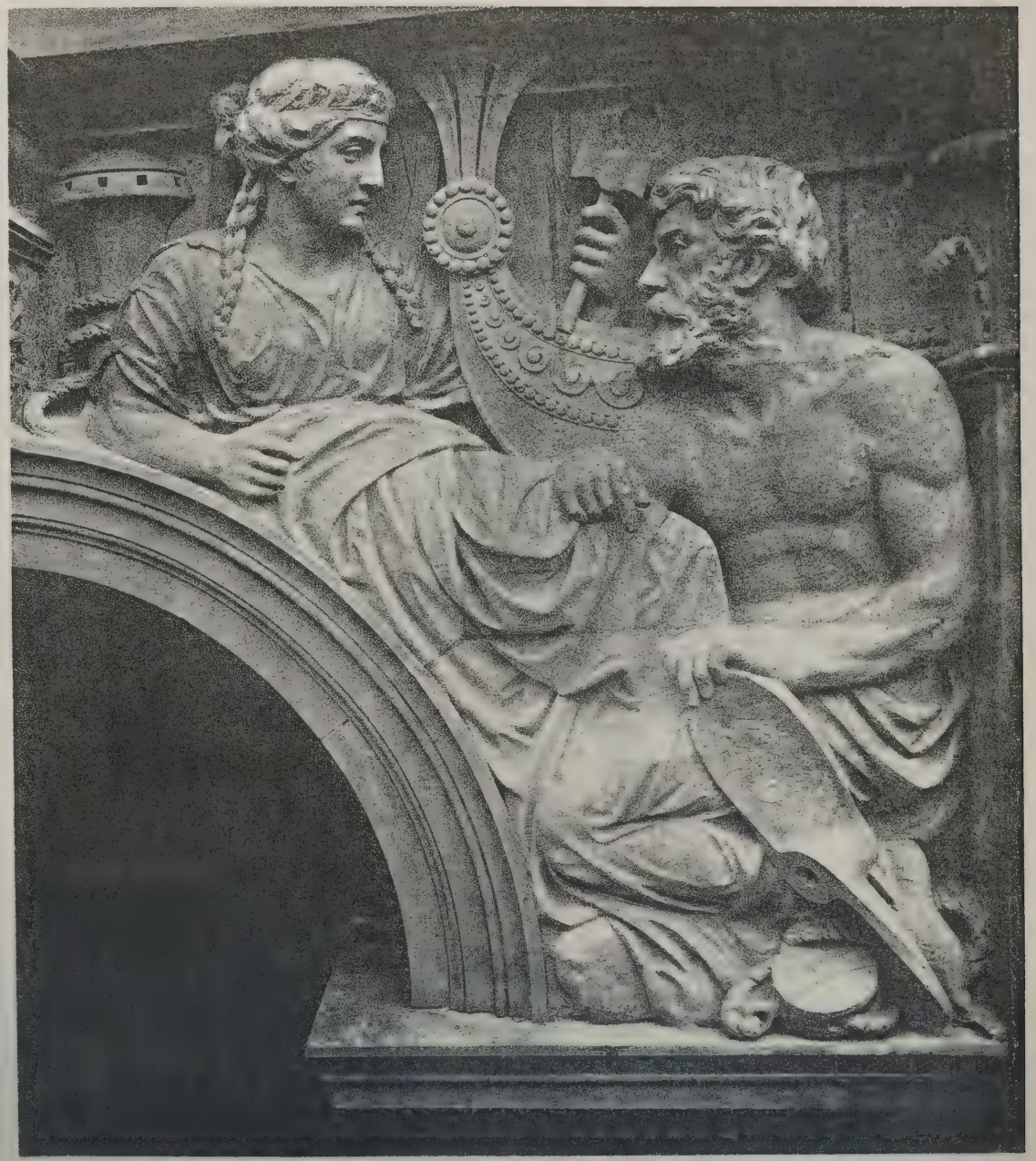
A NOTICEABLE feature in the design of this church is that effect is produced by good proportions and rich mouldings, rather than by carving. The mouldings are very bold and rich throughout, and full of teaching, as indicating (even more than the tracery and general forms) a decided advance in the change of style, whilst retaining many of the characteristics of the Decorated period. Thus the inner doorway of the porch has the Decorated wave-mould, quirked at its inner sinking at A on our sheet of mouldings (whilst the outer sinking remains as in earlier work), and the "casement" slightly flattened. The outer doorway of the porch retains the sunk-chamfer, in conjunction with a very Perpendicular type of label.

The reticulated side windows of the chancel and end windows of the transept have the double O.G. (or brace-mould), with a flat casement and an attenuated form of filleted roll, forming a group of mouldings of decidedly Perpendicular character. The east window has the same members, with the addition of the quirk and sunk-plane, to throw into relief the fillets of the inner order of the tracery, which are observable in Bishop Edington's work both here and at Winchester Cathedral. It also has the somewhat unusual arrangement of two filleted rolls set at right angles, forming the inside edge of the jamb: this also occurs in the west porch doorways at Winchester. A similar quirk to that before mentioned is to be noted in the outside splay of the two narrow windows in the transepts, forming (with the line of the splay and that of the outside face) the peculiar angular outer member of the mullions which is seen in the great west window at Winchester. The casement here is flat, and the outer member of the jamb is the quirked wave-mould, as in the inner doorway. The mouldings of the aisle and clerestory windows, the nave, arcade, and the various copings and cornices all show the same mixture of early and late forms, the latter predominating, but all are rich and beautifully designed.

The leading principle in the construction of the groups of mouldings at Edington is the well-recognised characteristic of Perpendicular work—viz., that all lie on the *splay* or *chamfer-plane*, and the projecting points of the various members all touch the line of the plane. The splays, whether sunk or not, are also parallel to this line, so that the moulding are sunk from the surface represented by it. This applies, not only to jamb and arch mouldings, but also to the cornices and string courses.

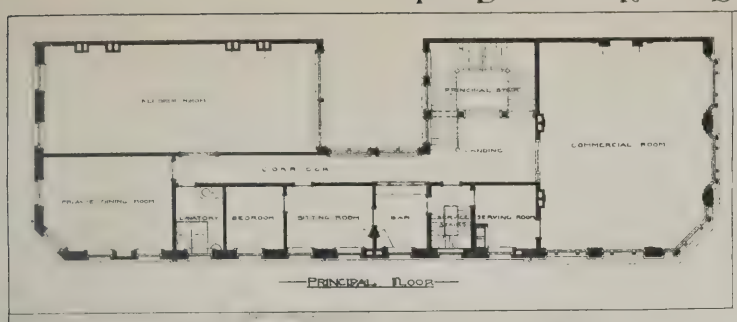
All the mouldings shown on our sheet are reduced from full-size sections measured and plotted by the architect for the restoration of the church—Mr. C. E. Ponting, of Marlborough, who has also lent us some sketches of the beautiful niches in the chancel. At an early date we propose to give photolithographic reproductions of these studies. An elevation of the west end of this church was published in the BUILDING NEWS for August 12 last, when a plan of the building was given with Canon Jackson's paper in description of its history. Two charming drawings of the church by the late Fr. C. Deshon (now in the possession of Mr. J. Gandy) will be found illustrated in the BUILDING NEWS for July 12, 1872.

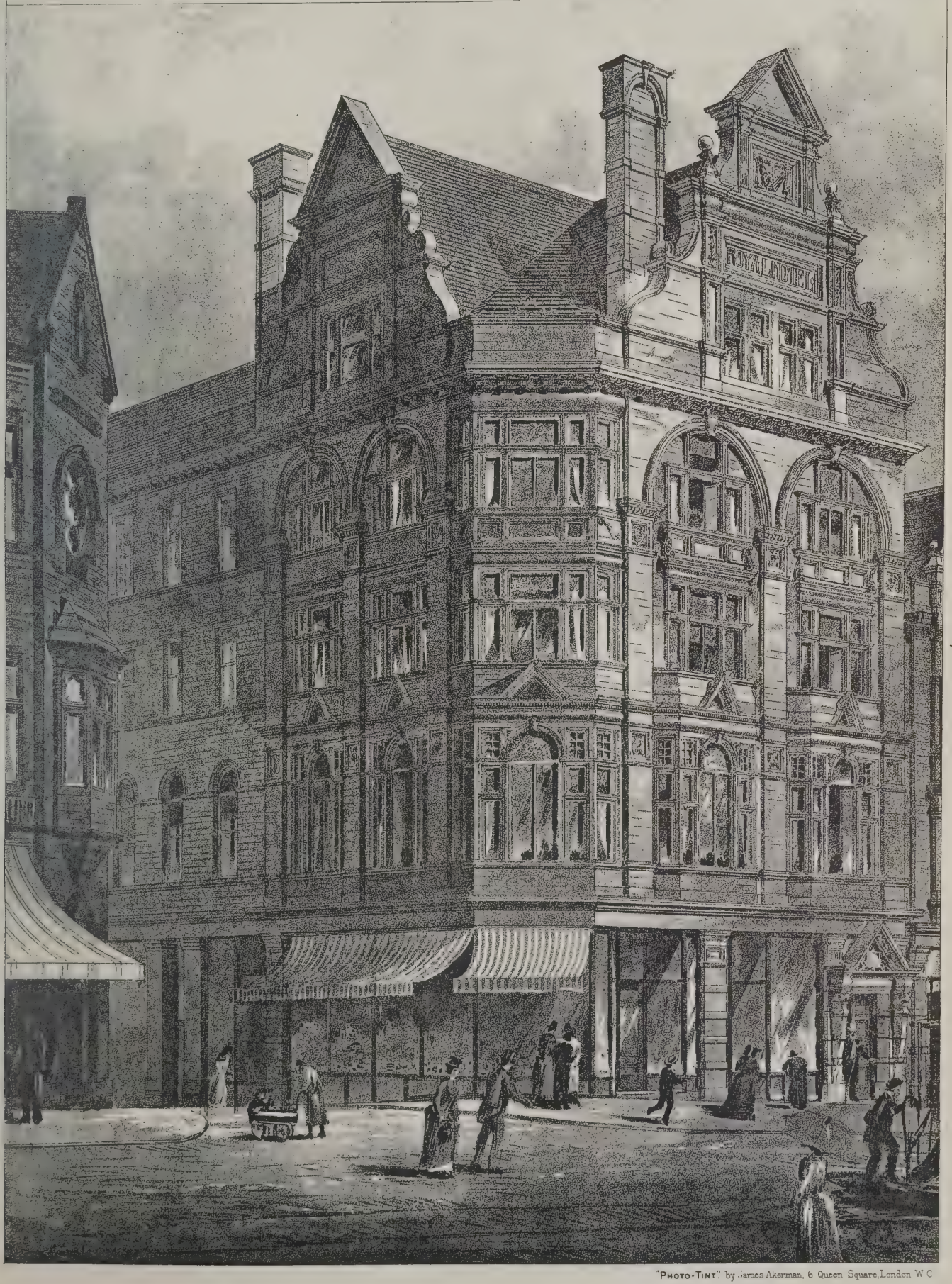




"PHOTO-TINT," by James Akerman, 6 Queen Square, London W.C.

TWO SPANDRILS FROM GLASGOW MUNICIPAL BUILDINGS. WM. YOUNG ARCHITECT.



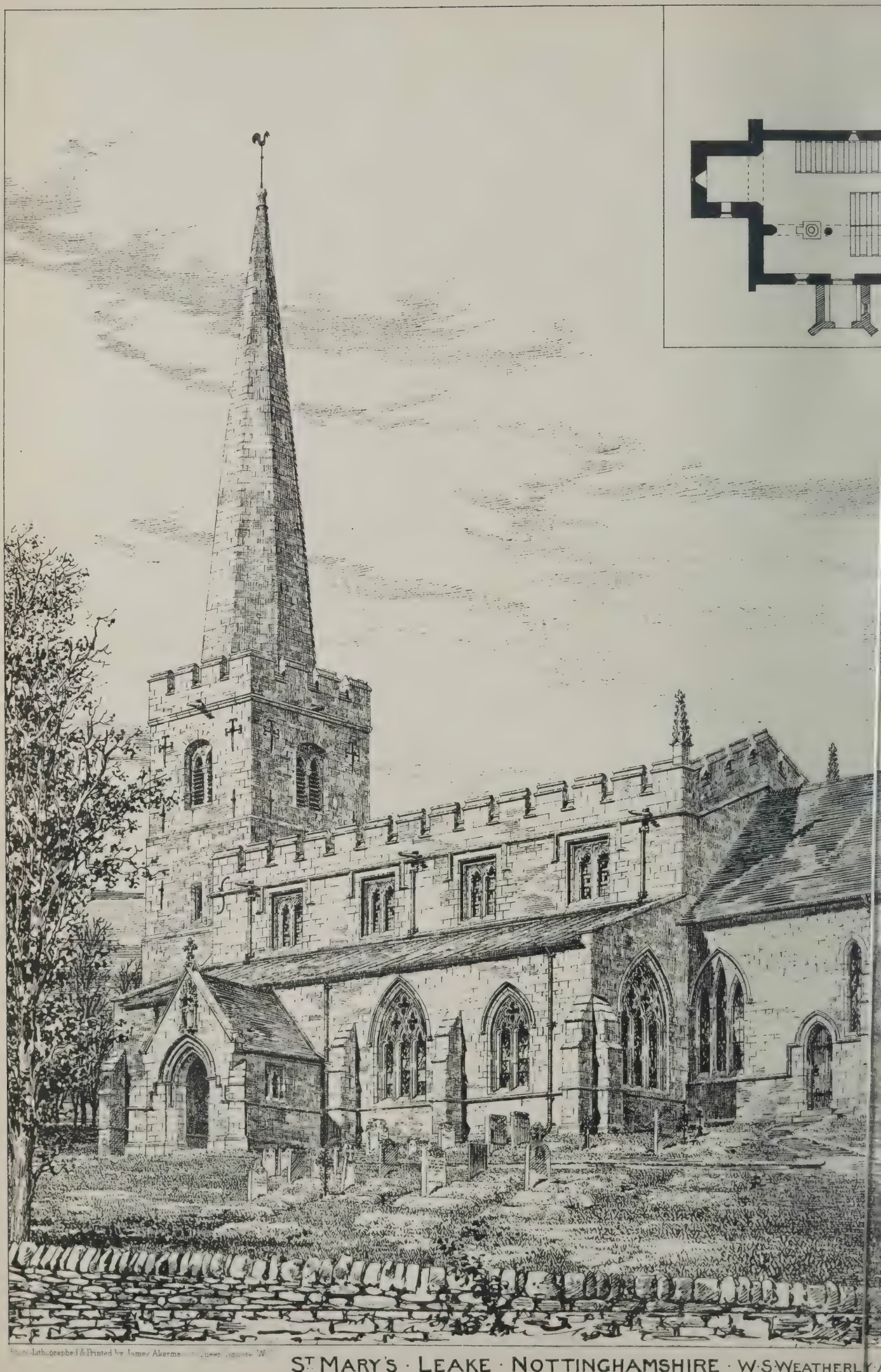


"PHOTO-TINT" by James Akerman, 6 Queen Square, London W.C.

ROYAL · HOTEL · BUILDINGS · BRADFORD

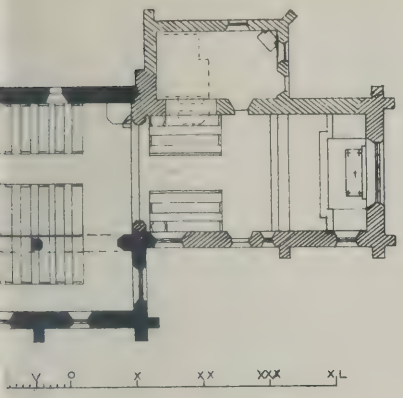
JAMES · LEDINGHAM · ARCHT.

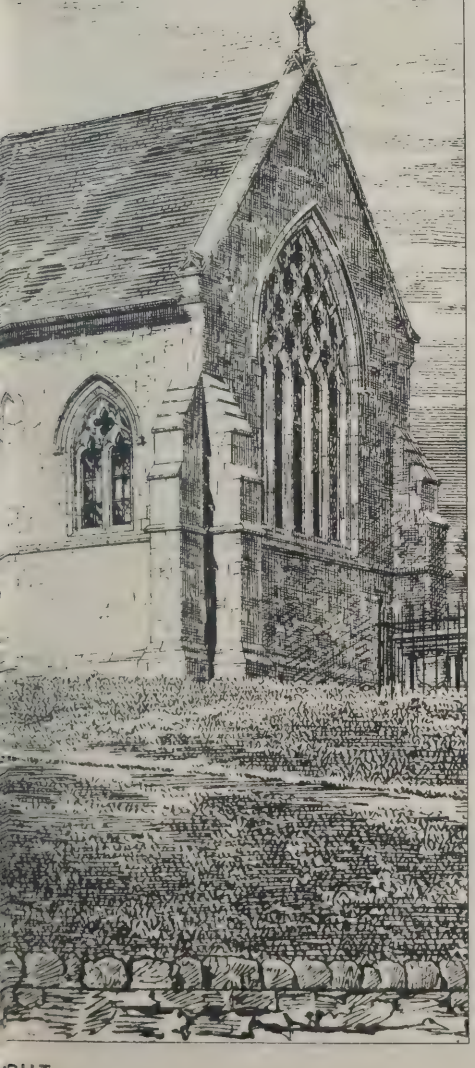

KITCHEN
PANTRY
DINING ROOM
HALL
STUDY
BILLIARD ROOM
DRAWING ROOM
The Residence of
Theophilus Allen Arch.t
Stanyard Hill. Surrey.



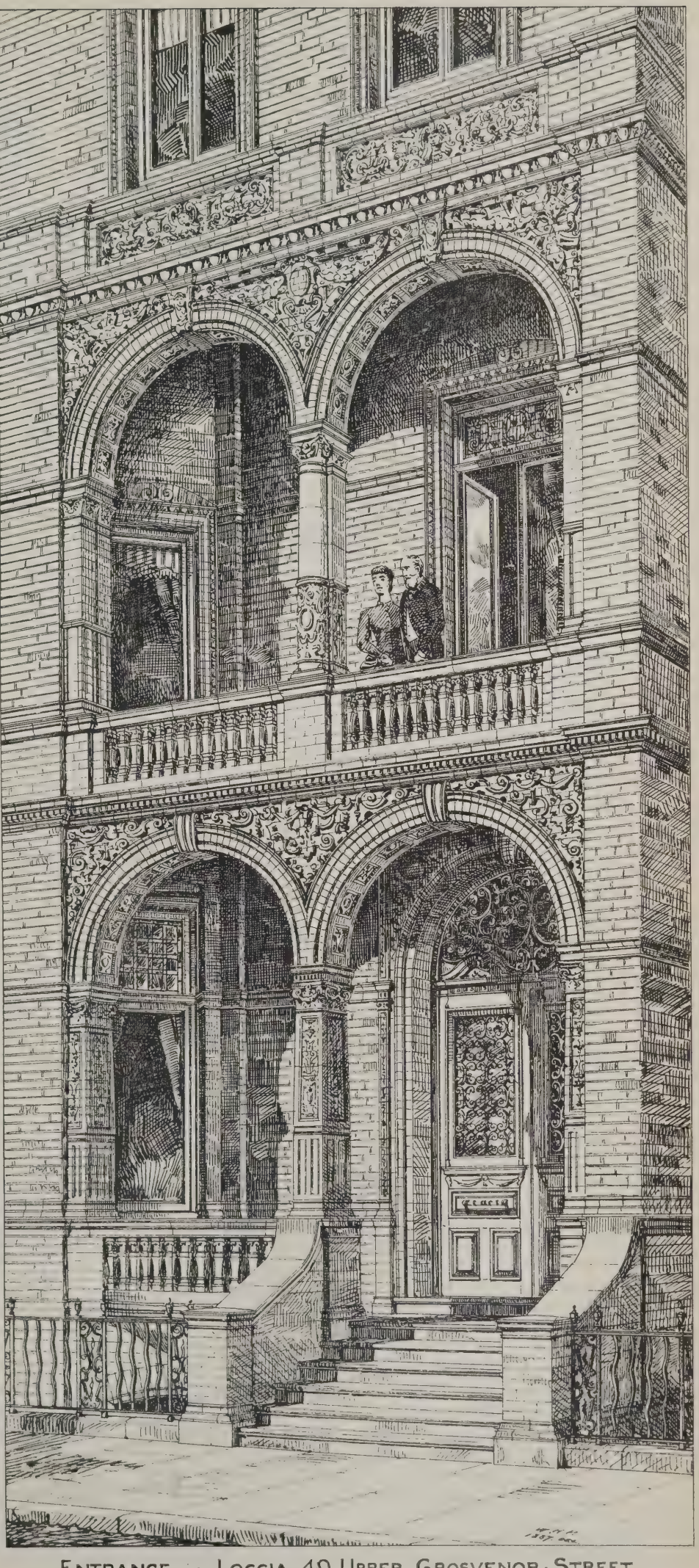
Lithographed & Printed by James Akerma... W

ST MARY'S · LEAKE · NOTTINGHAMSHIRE · W·S WEATHERLY



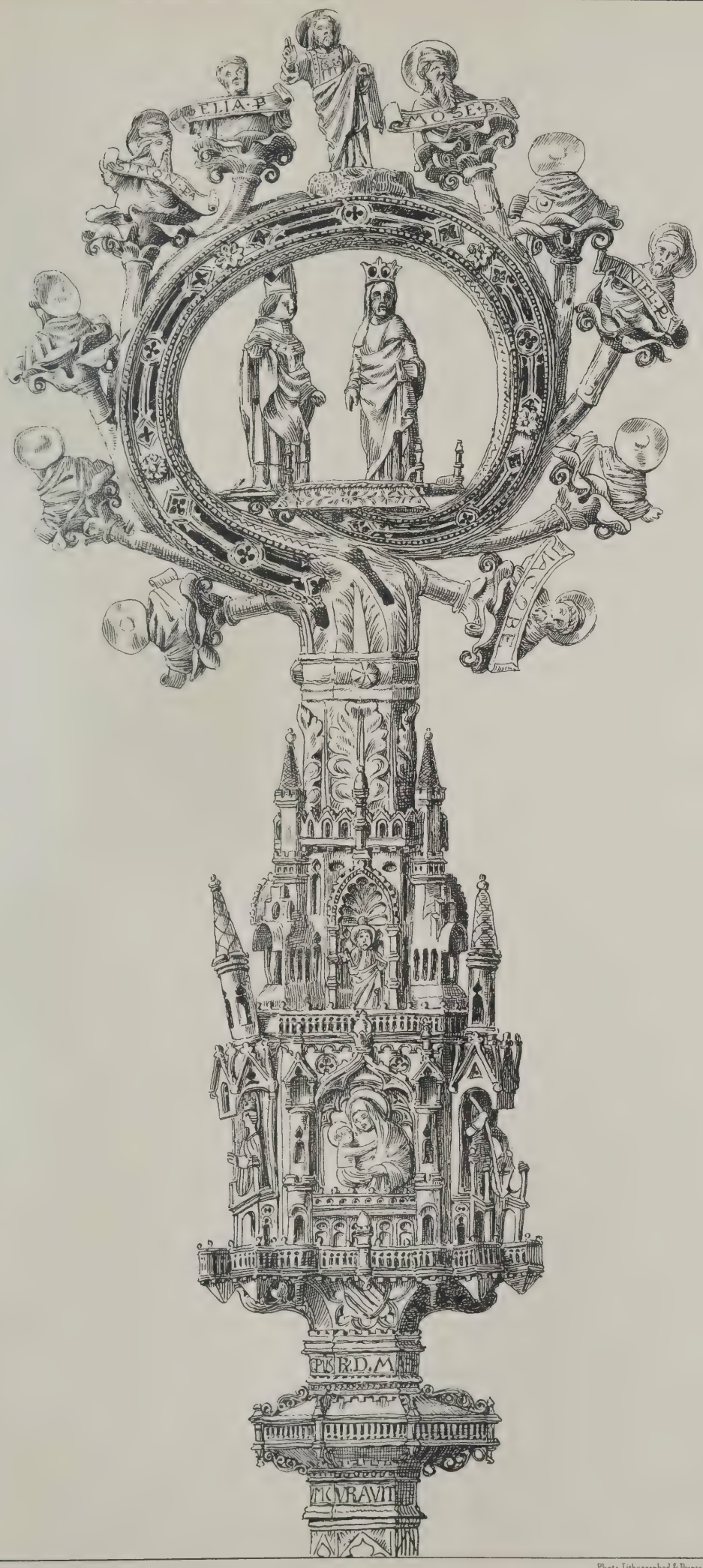


ARCHT.



ENTRANCE AND LOGGIA 49 UPPER · GROSVENOR · STREET

W · H · POWELL · ARCHT



Scale of Centimetres 0 5 10 15 20 25 30 35

Scale of English inches 0 1 2 3 4 5 6 7 8 9 10 11 12

T. G. J.
Sept-10-
1885-

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

PASTORAL OF ARCHBISHOP VALARESSO ZARA, A.D. 1460.

DRAWN BY T. G. JACKSON, M.A.

CONTENTS.

Rebuilding Schemes ... 423
The Cubing of Public Buildings ... 423
Iron Doors for Warehouses ... 424
The Church and Hall of Dinton, Bucks ... 425
Building Materials.—IV. ... 427
Endurance of Metals under Stresses ... 428
The Resistance of Stone to Crushing, as Affected by Bedding ... 429
Mr. E. A. Freeman on Church Restoration ... 429
Egyptian Porphyry ... 429
The Society of Architects ... 431
Underground Air Chambers ... 431
Wayside Notes ... 432
Edlington Church, Wilts—Sheet of Mouldings ... 432
Our Lithographic Illustrations ... 453
Building Intelligence ... 454
Architectural and Archæological Societies ... 455
Engineering Notes ... 455
Competitions ... 456
Correspondence ... 456
Intercommunication ... 457
Statues, Memorials, &c. ... 458
Legal Intelligence ... 458
Parliamentary Notes ... 458
Our Office Table ... 458
Meetings for the Ensuing Week ... 459
Tenders ... 460

ILLUSTRATIONS.

SELECTIONS FROM THE ROYAL ACADEMY EXHIBITION, 1887.—ST. MARY'S CHURCH, LEAKE.—ENTRANCE AND LOGGIA, 49, UPPER GROSVENOR-STREET.—TWO SPANDRELS FROM GLASGOW MUNICIPAL BUILDINGS.—ROYAL HOTEL BUILDINGS, BRADFORD.—PASTORAL OF ARCHBISHOP VALARESSO ZARA.—RESIDENCE OF THEOPHILUS ALLEN.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SELECTIONS FROM THE ROYAL ACADEMY EXHIBITION.

THIS plate forms the last sheet of selections which we have prepared in illustration of the artists' own sketches of their pictures at the Royal Academy Exhibition this year. Pressure of other subjects prevented us from concluding the series earlier, and the painters of the works now represented must excuse the delay mentioned for the simple reasons now given. The central picture, called "Morning," is a single female figure in picturesque pose and gay costume, by Mr. Marcus Stone, R.A. Round this study are arranged subjects of very varied motiff, embodying ideas of an equally diverse character, making thereby the choice, which is thus placed before our readers, all the more interesting. Mr. Herbert Dicksee with much pathos represents "Grandfather at the Grave of Little Nell." This is the incident, as briefly recorded in "The Old Curiosity Shop": "At length, they found that he had risen early, and with his knapsack on his back, his staff in his hand, her own straw hat, and little basket full of such things as she had been used to carry, was gone. As they were making ready to pursue him far and wide, a frightened schoolboy came who had seen him but a moment before sitting in the church—'upon her grave,' he said. They hastened there, and going softly to the door, espied him, in the attitude of one who waited patiently. . . . When it grew quite dark he rose and returned home, and went to bed, murmuring to himself, 'She will come to-morrow.' Upon the morrow he was there again from sunrise until night . . . and thenceforth every day and all day long he waited at her grave for her. . . . The last time was on a genial day in spring. He did not return at his usual hour, and they went to seek him. He was lying dead upon the stone. They laid him by the side of her whom he had loved so well; and in the church where they had often prayed, and mused, and lingered hand in hand, the child and the old man slept together." "Then when the dusk of evening had come on, and not a sound disturbed the sacred stillness of the place, when the bright moon poured in her light on tomb and monument, on pillar, wall, and arch, and most of all (it seemed to them) upon the grave—in that calm time, when outward things and inward thoughts teem with assurances of immortality, and worldly hopes and fears are humbled in the dust before them—then with tranquil and submissive hearts they turned away and left the dead with God." "The Head of the Gang" is a pen-and-ink study by the artist of his picture called "Bush-rangers," and the incident so graphically painted by Mr. William Strutt may be thus described. The scene is on a suburban road at a short distance from Melbourne, where, in the year 1852, a desperate gang of bushrangers formed the plan to waylay and rob all the travellers along the well-frequented thoroughfare from St. Hilda and Brighton to Melbourne. The project has been successfully carried out, and the unfortunate victims, fleeced of all their valuables, are seen tied together in twos sitting on the ground under guard of two desperadoes with loaded rifles. For nearly three hours the unfortunate sufferers were thus kept in mortal terror of the robbers, who, on completing the preliminaries for so good a haul, mounted their horses and made off. Thus left to their own resources, the prisoners at length succeeded in releasing themselves and returned to their homes. A lady and gentleman numbering among the rest, thus pinioned, are shown in the sketch sent us by Mr. Strutt, and during the affray a man of the party was shot dead. This daring feat was accomplished in broad daylight some two or three miles distant from where the artist resided when in Australia. The dresses are contemporary with the incident, most of them being brought by Mr. Strutt from the Colony. The scenery is studied from nature, and the author has reason to congratulate himself on the popularity of his picture throughout the exhibition. The delicate landscape, "By Flowing Stream through Wood and Craggy Wild," by Mr. Albert Kinsley, is marked by a refinement and knowledge of nature which deserves more than a passing comment. The silver birch trees, the overgrown banks of the rambling stream, the distant hills, and the tender foliage of the foreground are all in keeping with the scale adopted in the work. It was painted in late autumn, and represents a scene in Yorkshire. The size of the canvas is 42in. by 72in. In the other landscape which we reproduce, Mr. Alfred East, its painter, carries us up further north to "The Land between the Lochs," in the beautiful neighbourhood of the Trossachs, where, during the months of October and November last year, he finished this work of love and skill in the open air. It represents the country which lies between the Lochs Achray and Vennachar, in the valley of the Black Water, or Teith as it is called, after it leaves the last-named loch. The view is from Duncraggan; the flat lands to the left of the picture are Kendrick Meads, the gathering place of the Macgregors, and the distant hills are those which separate it from the Valley of Aberfoyle and Loch Ard. The artist has most cleverly given the effect of an early winter afternoon clearing up for a frost. This delightful scene is spoken of in the "Lady of the Lake." Turning from these peaceful scenes of nature, we have two renderings of "Jealousy" from quite opposite points of view, which furnish much for many a reflection. In Mr. Ernest Norman's powerful picture, "Jealousy" is represented "cruel as the grave." A Moorish beauty reclining on her sumptuous divan, as Eastern ladies in her position are wont to do, languidly passing away her time by the amusements afforded in the busy street, suddenly discovers her lord and master in the crowd over the way; so, raising herself to watch his movements through the mesherebeyeh of her lattice window, she sees him, unconscious of the espionage, engaged in a stolen embrace with a slave girl, whose attractive form he has intercepted on her way to the harem, to which she was carrying in refreshments. Inflamed by a woman's hate, her mistress, with flashing eye and compressed lips, awaits the coming of her newly-discovered, though, perhaps, for some time suspected, rival, while instinctively her revengeful hand steals towards the weapon lying by her side secreted among the soft cushions of the couch. Nemesis, swift and unrelenting, threatens the luckless Hebe. Of the sentiment more need not be said. All that skill and colour can lend have been realised in the portrayal of this "the home of Love." "Jealousy," as depicted by Mrs. Herbert G. Moberly, if more common-place in idea and less ambitious in design, strikes at a simpler and a purer chord. A fair-haired English girl, in long, flowing drapery of soft colours and everyday costume, sits writing at an old-fashioned bureau, engaged on a very particular letter, in the special wording of which she finds some difficulty, the result possibly of inexperience, coupled with a feeling not easily described. By an instinctiveness which strikes the fair correspondent as equally remarkable, her favourite pet spaniel, who has hitherto monopolised all her attention, exhibits a restlessness which by no means assists the conclusion of the letter, and so exercises a not unnatural feeling of modest jealousy, and gives a title to the picture.

ST. MARY'S CHURCH, EAST LEAKE.

THE works of reparation at the church of St. Mary, East Leake, near Loughborough, consist of the strengthening of the tower and the rebuilding of the spire, which was much shattered by lightning. The nave has been repaired, reseated, and rearranged, the former high seating being adapted and painted a dark green; the chancel and chancel arch rebuilt stone by stone where possible, and a new roof constructed, replacing the low-pitched modern plaster roof, an organ-chamber and vestry being added on the north side. An altar, with altar cloths and dossal, has been provided, and oak clergy and choir seats. Hollington stone is used for the dressings, and stone from a local quarry for the rubble walling. The north wall of nave contains some interesting Norman remains, and the tower arch is of well-proportioned early work; but the church generally is of 15th century with repairs of the 18th century. There are evidences of the chancel-screen and rood, and of the screens inclosing the chapel at the east end of south aisle. The windows here are very beautiful, and almost unique in treatment. The church possesses a curious wrought-iron trumpet for augmenting the voices of the singers; it is 7ft. 6in. long, with bell-mouth 1ft. 9in. across. Three others are known to exist—namely, at Willoughton, Lincolnshire, and at Harrington and Braybrooke, neighbouring villages in Northamptonshire. The one at Thorney, Nottinghamshire, was lost at the rebuilding of the church about 1850. The bass of the chant was hummed through these trumpets, a performance known as "vamping the bass." The architect under whose superintendence the works have been carried out is Mr. W. S. Weatherley, of 20, Cockspur-street, London.

ENTRANCE AND LOGGIA, 49, UPPER GROSVENOR-STREET, W.

THE photo-litho. of this Royal Academy drawing shows part of a block of mansions now building in Grosvenor-square. These houses erecting at the south-west corner of Grosvenor-square are from the designs, and are being built under the superintendence, of Mr. W. H. Powell, architect. The buildings are faced with red pressed bricks, red rubbers being used for the gauged arches, carved frieze, spandrels, &c. The several contractors are Messrs. Patman and Fotheringham for the main structure, and a portion of the finishings will be done by Messrs. Longmire and Burge. Mr. Walter Mitchell is the clerk of works.

SCULPTURE FROM THE MUNICIPAL BUILDINGS, GLASGOW.

THESE illustrations are from the spandrels representing "Shipbuilding" and "Engineering," by Mr. Mossman, sculptor, of Glasgow. They form part of the ornamentation of the new Municipal Buildings at Glasgow, now being erected from the designs of Mr. William Young.

ROYAL HOTEL BUILDINGS, DARLEY-STREET, BRADFORD.

THESE buildings are in course of erection for Mr. James Lazenby upon 514 square yards of land, forming part of the site of Christ Church, which, with adjoining land, was acquired by the Corporation for street improvements, and, after diverting and widening the streets, was sold in plots for business premises. The basement, sub-basement, and ground floors at the rear of the block are constructed for wool warehousing, part of the ground floor and basement in Darley-street is arranged in shop premises, and the remaining portion of the basement, part of the ground floors, and the whole of the upper floors of the building are arranged as an hotel, containing entrance hall, staircase and

lavatory, and extensive stock rooms on ground floor, commercial, private, dining, billiard, serving, and other rooms on the first floor (as shown on plan), and thirty-five bedrooms on second, third, and fourth floors, with all the necessary adjuncts. The culinary department, and washhouse and laundry are situated on the top floor, and the hotel will be fitted with all the latest appliances requisite for a first-class commercial house. The building to the right is being erected on 131 square yards of land for Mr. N. W. Noakes, and is arranged and will be fitted up with all modern improvements for a first-class hair-dressing and perfumery business. At the rear of the latter premises, and facing Piccadilly, a block of wool warehouses, occupying 521 square yards of land, and seven stories in height, is in course of erection for Mr. Joseph Hey. All these buildings are built of stone, those facing into Darley-street and part of Upper Piccadilly being faced with ashlar, and the works are carried out by local contractors. Mr. James Ledingham, A.R.I.B.A., of Bradford, is the architect.

PASTORAL STAFF OF ARCHBISHOP VALARESSO, AT ZARA.

THE most perfect *souvenir* of this magnificent prelate which Zara possesses is the very beautiful and quaint pastoral staff which he gave to the cathedral. It is of silver, parcel gilt, and bears the inscription :—

R+D.+MAFEVS+VALARESSVS+
ARCHIEPVS
HVADRENSIS+FACIENDVM+CURAVIT .
M . CCCCLX+.

From the circumference of the crook radiates 11 little figures. In the centre is the figure of Christ standing on a rock, and on each side of Him are five little half-length figures springing out of flowers, and facing alternately to each side of the staff. Each holds a scroll with his name, ELIA . P——SIMON . PA——AMOS . P. IEROBOAM (whom one is surprised to find in such good company); TVBIA——MOSE . P——IEREMIA . P.——DANIEL . P. ARON . P. IACOBE.* In the centre of the crook are statuettes of a female figure crowned and holding a book, and a bishop with a pallium, who holds out a book with his right hand. These have been variously supposed to be the Virgin Mary and Archbishop Valaresso, the donor, or St. Donato and St. Anastasia, the patron saints of Zara. It may be objected to the latter interpretation that Donato was not an archbishop, and would not have the pallium. The neck below the crook has been modernised, but all the rest of the pastoral is perfect and original. The next stage is a rich piece of tabernacle work, triangular in plan, with a pinnacle at each corner, and two stories high. In the upper stage the three faces are occupied by St. Peter, St. Jerome (?), and a bald saint holding a book; in the lower by a Madonna with the Holy Child, a figure of Our Lord issuing from the tomb, and a saint also apparently stepping out of a tomb. St. George and two female saints occupy niches in the angle pinnacles. The staff is plated with silver, and the total height of the pastoral is 6ft. 6in. The workmanship is very fine, the little figures are cast and engraved with a tool, and the foliage of the flowers out of which the prophets emerge is beautifully finished with file and graver. This is the description which accompanies the illustration of this exquisite example of silversmith's work in Mr. T. G. Jackson's admirable book on Dalmatia and Istria,† and we are indebted to the author for the loan of his original drawing of the pastoral, which we have reproduced to-day to an enlarged scale to show the delicate detail in the finer parts of the staff. Scales are drawn on the sheet for reference. We gave other illustrations from Mr. Jackson's book with our review of the work in the BUILDING NEWS for July 22nd last. The Duomo treasury at Zara is very rich in church plate, and among the more remarkable pieces are a reliquary supported by four dragons with wings; a coffer containing the head of St. Giacomo, a 5th-century martyr; the reliquary of St. Grisogono, with medallions of enamel on the lid; St. Orontius's reliquary; another of St. John the Baptist, professing to contain one of his fingers, and a reliquary in the form of an arm. This last referred to is the best of the numerous arms in the treasury.

* The labels with TVBIA and IACOBE are not original.

† "Dalmatia, the Quarnero and Istra," by T. G. JACKSON, M.A. Oxford; At the Clarendon Press, 1887.

STANYARD HILL, CHOBHAM.

THIS house has been built on high ground near the village of Ottershaw; it has been planned so that the windows of the reception rooms may command the extensive views over the Hogsback, about 15 miles to the south, and the Chobham and Frimley ridges to the west. It is built with the local red bricks, the external walls being 16in. in thickness, with a 2in. cavity. It stands in picturesque and undulating grounds of upwards of 50 acres, which have been laid out with great skill by Mr. H. E. Milner, of Dulwich Wood, Norwood. Mr. Theophilus Allen is the architect, who has built the house for his own occupation; Messrs. T. Knight and Sons, of Chertsey, being the builders.

CHIPS.

The parish church of Clevedon, Somerset, was lit with gas for the first time on Sunday, the work having been carried out by Messrs. Wippell, of Exeter.

From a recent return it appears that there are 2,281 building societies in the United Kingdom. The receipts of 2,000 of them are more than 20 millions—an average of £10,000 a piece. Their liabilities are more than 50 millions. There are only five such societies in Scotland, and only 44 in Ireland; but the English and Welsh societies have a membership of hardly lower than 600,000 men.

A new Baptist chapel is about to be built at Sandy, Beds, at a cost of about £1,800. Messrs. Usher and Anthony, of St. Paul's-square, Bedford, are the architects; and Mr. Wade, of St. Neot's, Hunts, is the contractor.

After some months' trial the system of "building-permit fees" has been abolished in Minneapolis, and a resolution will come up before the council recommending that all fees paid in during the time the system has been in force be refunded.

A new police station is about to be built at Newton Heath, from plans by Mr. W. T. Gunson, of Marsden-street, Manchester.

A board school is being built at Bothwell, N.B., from plans by Messrs. Bruce and Hay. The contract for masonry has been taken by Messrs. Miller and Kenwick, of Bothwell, for £1,436, and that for wrights' work by Mr. G. R. Havrie, of Belshill, for £688.

The Dewsbury school board are about to provide accommodation for 900 children in a building to be called the Jubilee Queen Victoria School. Mr. J. L. Fox, of Central-buildings, Dewsbury, is the architect.

It has been decided to erect, at a cost of between £6,000 and £7,000, a new Congregational church at Higher Audley, Blackburn.

The post-office at Lincoln is being enlarged in order to provide more adequately for the telegraphic work. The work, which is in the hands of Mr. G. Morgan, builder and Government contractor, is expected to be finished two months hence.

The deputy coroner for Central Middlesex held an inquiry on Saturday respecting the death of Henry Kelly, aged 68, a builder, living at No. 2, Caversham-road, Kentish Town. Annie Kelly, the widow, stated that the deceased two years ago had a terrible fall, fracturing his skull, and since then he had been partially paralysed. He had been very unsuccessful in business all his life, and lately more so. On Monday, the 5th inst., he left home, and she saw no more of him, and heard on Wednesday that he had hanged himself. A verdict of "Suicide whilst of Unsound Mind" was returned by the jury.

The Durham and Northumberland Archæological Society had an excursion in South Durham on Friday. The first place visited was Heighington, where the church and other objects of interest were inspected. The Rev. J. F. Hodson and Rev. Canon Greenwell accompanied the party, who then drove to Walworth Castle, where the remains of a Norman chapel were viewed. Thornton Hall was then inspected, and subsequently Croft Church, with its Saxon remains.

The Albert Memorial Church, Queen's-road, Manchester, was reopened on Sunday, after renovation carried out by Mr. Reuben Bennett, of Manchester.

An Oddfellows' hall is being built at Woolston, Southampton, from plans by Mr. John H. Blizard, of Southampton. Mr. John Hinton, of Woolston, is the builder.

Building Intelligence.

BIRMINGHAM.—A Wesleyan Chapel, schools, and Central Hall, which have been erected on a site having frontages to Corporation-street, the Lower Priory-street, and Dalton-street were opened on the 8th inst. The buildings comprise a chapel, a large hall for meetings, Sunday schools, including ragged and infants' schools, class-rooms, and a house for caretaker. The frontage to Corporation-street on the ground floor has been utilised for shops. The buildings are in the Early English style, the materials used being Darley Dale stone for the ground floor, and red brick with stone dressings for the remainder of the elevations. The building is surmounted by a tiled roof. The chapel and hall occupy the whole of the first floor, and are approached by a wide staircase from the centre of the Corportion-street front. The chapel, which will seat 350 persons, has an apsidal end in which the communion table is placed, the pulpit being on the left-hand side adjoining the vestries, and the choir and organ on the right-hand side. There is a gallery at the opposite end. The ceiling is panelled, the walls are plastered, and the dados and dressings to lancet windows are of brick. The Central Hall at the rear of chapel has accomodation for upwards of 1,000 people, and has three entrances. It is lighted on three sides, and has galleries at the sides and ends, with a raised platform and orchestra, the latter furnished with a large organ. The total cost has been about £11,000. The architects are Messrs. Osborn and Reading, of Bennett's Hill, Birmingham, and the builder is Mr. John Bowen, of Balsall Heath.

CARDIFF.—A large malt-house on the East Moors, Cardiff, is approaching completion. It will contain four steeping tanks, four growing floors, and four kiln floors, and will be capable of manfacturing 900 quarters of malt a month. It is five stories in height, besides a malt store in the roof holding more than 2,900 quarters. There is also a malt store in the kilns with a capacity for 1,500 quarters. In the barley loft which occupies the fourth floor, there is room for 1,200 quarters. This loft contains the gas-engine and shafting for driving the elevators, carrying band, and the sack-hoists; and the four iron steeping cisterns are placed here also. The kilns are two in number, and each has an upper and lower drying floor. The upper drying floor is of Hermann's patent wire. The dimensions are as follows :—Length of main building, 113ft.; total length, including kilns, 147ft.; breadth, 53ft.; breadth across kilns 73ft.; height, to ridge of roof, 60ft.; height of kiln, 73ft. The contractors for the building are Messrs. Sheppard and Son, of Cardiff. Messrs. Williams and Son having supplied and fixed the iron stanchions and girders. Messrs. Cross Brothers have carried out the water and gas services; Messrs. Stopes and Co., of London, the tile and wire drying floors; Messrs. Goddard and Massey, of Nottingham, the steeping tanks, and Messrs. Spencer and Co., of Melksham, are fixing the machinery and the gas engine. Mr. John Gillett, of Penarth, has acted as advising engineer. The architect is Mr. F. Baldwin, of Church-street, Cardiff.

CANTERBURY.—New banking premises are now being erected at Canterbury for Messrs. Hammond and Co. The original design was by the late Mr. J. Green Hall, F.R.I.B.A., of Canterbury, in the Early English style; but the design not being in harmony with the surrounding buildings, it was decided to adapt the Early Tudor style to the requirements of a bank. A fresh design was accordingly prepared by Mr. W. J. Jennings (to whom on the death of Mr. Hall the work was intrusted) in that style. The materials of each façade consist of red Suffolk bricks, Ancaster and Stoke Ground-stone dressings. The accommodation comprises large banking room, bank parlour, manager's room, call-over room, two large strong rooms and other offices on the ground floor, and a residence for the senior clerk on the first floor. The fittings throughout the banking room will be of American walnut wood. The builder is Mr. Wilson, of Canterbury, who has undertaken to carry out the works for £6,000 by private tender.

CHESTER-LE-STREET.—The extensive building works commenced by the Chester-le-Stree

Co-operative Society two years ago are now on the point of completion. New shops, &c., for the following departments have been provided —viz., drapery, boots, shoes, and hardware; tailoring, millinery, furnishings, butchering, and groceries, besides cocoa room and restaurant; reading room, library, and lavatories for ladies and gentlemen. Extensive stabling and cart shed accommodation have been provided, together with cattle lairs and slaughter-house. Thirty-one cottages have also been erected containing four and five rooms each, and the adjoining streets paved and sewered. The total cost has been about £14,000, excluding value of land. The work has been divided among various contractors, the principal being Messrs. J. Burnett and Son, of Birtley; Mr. Wm. Thompson, of Chester-le-Street; and Mr. John Yeeles, of Jarrow. The architects from whose plans and under whose superintendence the whole has been carried out are Messrs. S. Oswald and Son, of Newcastle-on-Tyne.

North Witham, Lincolnshire.—The parish church was reopened on Thursday last, after a complete restoration, by the Bishop of Lincoln. The nave and chancel are of Roman work, with a fine tower and spire of late 14th-century work, at which date all the windows and roof were added. The roofs have been reconstructed to old pitch in Dantzic oak, and the lead recast in churchyard and relaid, all the stonework repaired and new buttresses added, the internal plaster removed and walls repointed. The chancel arch being only 6ft. wide, the altar has been brought into middle of chancel, and the choir stalls placed west of same, the remainder of nave being seated with oak benches. The work has been well done by Mr. Ware, builder, of St. Neot's, under the direction and personal supervision of Mr. Withers, architect.

Southport was *en fête* on Wednesday week, when the formal opening of the Marine Park and Lake, which have been constructed on the foreshore, a capital recreation ground situated at the Duke-street end of the promenade, and a new Museum of Science and Art Schools in Lord-street, took place. The Marine Park lies between the Promenade and the Channel, on what was, till recently, a swampy and flat stretch of foreshore. Under the direction of Mr. Halewood, 16 acres has been formed in a boating lake, and the remaining 7½ acres has been laid out with turf and winding walks, and planted with shrubs, the total cost of the transformation being £12,000. Upon the recreation grounds £3,000 have been spent, also under Mr. Halewood's supervision, and they cover about nine acres. They are situated on the Southport and Cheshire Lines Railway, and between the sea and the shore building line. The schools and museum have been erected from plans by Mr. E. W. Johnson, of Southport, and form one block placed between the Cambridge Hall and Art Galleries; an open gallery connects all three buildings on the first floor level. The portion devoted to art classes is on the second floor. There is a large examination or lecture hall, and several smaller rooms. The ground floor contains rooms for chemistry classes. All the floors are paved with wooden blocks. The site was given by the Corporation, the estimated value being £2,000. A further sum of £5,000 was spent by the Corporation on the building, and in addition also £1,000 each was contributed by two donors, and a grant of £1,000 from the Science and Art Department for the fittings, the total expenditure being thus brought up to £9,000.

Walford. — The parish church of St. Leonard, which, with the exception of 15th-century windows inserted in the chancel and Kyrle Chapel, is of the Early English period, has just been restored, from plans by Messrs. Nicholson and Son, of Hereford. The roofs have been reconstructed in oak, sheeted with oak, and covered with stone tiles and stone cut ridges. The building has been strengthened, the plaster daub and colour wash removed from the walls, the gables re-coped and finished with crosses. The floors are laid with solid wood blocks set in mastic upon concrete, and the nave and aisle are re-furnished with oak sittings, pulpit, and eagle lectern. A hot-water apparatus, upon the small-bore pipe system, has been supplied and fitted by Mr. Renton Gibbs, of Liverpool, for the warming of the church. In the early part of the century the spire was struck with lightning, and fell bodily into the churchyard. The building suffers greatly in consequence of the loss of this feature, which has not been replaced in the present works. The squinches upon which it was carried still remain in the angles within the upper stage of the tower. The contractor was Mr. Morgan, of Rockfield, near Monmouth, the amount of the contract being £1,575, which with the extras has been increased to £1,700. Among the special gifts is a new organ, built by Messrs. Holmshaw, of Birmingham, at a cost of £300.

Walton, Liverpool.—The memorial stones of a new Baptist chapel in Rice-lane, Walton, to be built at a cost of £2,200, were laid on Friday. The chapel will be built of grey bricks, having Runcorn stone and red pressed brick dressings, and will be in the 14th-century style. The plan is a parallelogram, 60ft. by 41ft. 6in. inside, and 37ft. to the apex of the ceiling. Sitting room will be provided for 420 persons on the ground floor, and provision is made for the future erection of a west gallery to accommodate 100 persons. In a recess at the east end, divided from the body of the chapel by a moulded arch, will be the pulpit, in front of which will be placed the baptistery. The edifice will have large traceried windows at the side, a rose window over the pulpit, and a four-light traceried window in the west gable. The principal timbers of the roof will be of pitch pine, stained and varnished, and will be supported by wrought and open-framed hammer-beam trusses, with curved and chamfered braces, resting upon moulded and carved stone corbels. Between each principal, upon longitudinal curved brackets springing from the hammer beam, will be formed a clerestory of 24 lights on each side. The pews and other fittings will be of yellow pine. The exterior roof will be covered with Bangor slates, having red ridge tiles. The chapel will be heated by hot water. Provision is made to erect at a future time a schoolroom, two classrooms, and also a tower having a spire rising to a height of 102ft. The building is being erected by Mr. John Millar, Nelson-place, Wavertree-road, Liverpool, from the designs of Mr. Thomas E. Murray, Liverpool.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Sheffield Society of Architects and Surveyors.—The following officers have been elected to serve during the session 1887-8 of this newly-established society:—President, Mr. T. J. Flockton; vice-president, Mr. F. Fowler; treasurer, Mr. J. B. Mitchell-Withers; council, Messrs. C. J. Innocent, C. Hadfield, J. D. Webster, E. M. Gibbs, fellows, and E. Holmes, associate member.

Norwich Castle, which in feudal times figured boldly while held by Roger Bigod, has for many years formed the county prison, and has been re-cased with masonry throughout, and gutted of most of its internal fittings. The Government authorities, having built a new home for felons on Mousehold, a height near the city overlooking the Cavalry Barracks, Norwich Castle was offered to the town council for £10,000. Of this sum the late Mr. John Gurney contributed £5,000; and the building has been formally handed over to the corporation, the purchase being complete.

The water commissioners of Dumfries and Maxwelltown have adopted a detailed report and scheme by Mr. James Wilson, C.E., Greenock, for bringing a new water supply into the towns from the Old Water and the Glen Burn. The scheme involves the construction of a reservoir on the former stream at Cornlee, having a capacity of 250 million gallons, and of an intake dam on the Glen Burn, the water from both sources being led in pipes to the present filtering pipes at Lochfoot. The cost is estimated at £30,180, exclusive of the purchase price of the land and the outlay involved in obtaining Parliamentary powers.

Mr. Havard Thomas, of Fulham, the sculptor of the Bristol statue of Samuel Morley, has been selected as the sculptor of the statue to be erected at Nottingham. The figure for Nottingham will not be a replica of the Bristol statue, but it will be of the same dimensions in a different position.

A group of industrial schools for girls have just been commenced to be built in Dialstone-lane, Offerton, near Stockport. Mr. J. Hunt, of Stockport, is the architect, and Messrs. Froggatt and Briggs, of the same town, are the contractors. The cost will be about £3,000.

Engineering Notes.

Greenock and Gourock Railway.—The works on this railway are in active progress, over a thousand men being employed on the work. A considerable portion of the tunnelling, the erection of stations, and of the quay at the terminus are yet far from being completed; but the cuttings along the whole route are well forward, and the railway will be completed by the end of next year. Messrs. Watt and Wilson, Glasgow, the contractors for the Greenock section, have carried out much of the work in the vicinity of Cathcart-street Station, where the new line for Gourock breaks off. The new station will be 420ft. in length, and 100ft. broad. The height of the walls will be 33ft., and the roof is of 13 girders, extending from wall to wall. Light steel couples and tie-rods will be used, and the glazing will be on Pennycuik's system. The chief work in this section is a tunnel 227 yards long. The second, or Gourock section—for which Messrs. Hugh Kennedy and Sons, Partick, are the contractors—begins at Bruce-street, Greenock, and goes to the terminus at Gourock Quay. The heaviest portion is the boring of a tunnel about a mile in length between Newton-street and Dunn's Farm. On this section five bridges are to be erected, and four of them have already been put up. In front of Gourock the bay has been filled up 20ft. out with material from the tunnel and cuttings. A staff of men are also engaged at the erection of the Gourock quay, which is to be of great length. The piles for a considerable part have been already driven, and a good portion of the concrete wall, which composes the face of the quay, has been laid.

CHIPS.

The Leeds town council have decided to discountenance on sanitary grounds the use of standpipes for domestic purposes. Six months' notice has been given of the intention of the corporation not to allow their employment, and if in the mean time any such pipes become unfit for use, they are not to be repaired, while for the future no stand pipes are to be erected in the borough. There are now 401 standpipes in Leeds, which supply 3,130 houses, occupied by the poorer classes, with water.

Mr. Thomas J. W. Harrower, the engineer of the Danube and Black Sea Railway, now in progress, died on the 29th ult. at Kasterdjil in Roumania, in the 34th year of his age.

It was reported to the Lincoln City Council last week that Mr. J. L. Pearson, R.A., had agreed to accept a fee of fifty guineas and five guineas for travelling and other expenses in connection with the restoration of the Stonebow. The sum was ordered to be paid, members of the council remarking that it was an exceedingly moderate charge.

Mr. William Fraser, of Exchange Station, Liverpool, assistant-engineer and surveyor, and a member of the Sanitary Institute of Great Britain, has been appointed inspector of nuisances and surveyor for the Newmarket rural sanitary district, at a salary of £120 per annum.

A large country mansion is in progress at Gallowhill, near Bolam, for Mr. Charles Perkins, J.P. The contractors are Messrs. Joseph Burnett and Son, of Birtley; and the architects are Messrs. Sept. Oswald and Son, of Newcastle-on-Tyne.

New business premises are in course of erection in Bridge-street, Newcastle, for Alderman G. B. Grey. Mr. James Waterston, mason, and Messrs. G. and C. Haswell, joiners, are the contractors employed. The architects are Messrs. Sept. Oswald and Son, of Newcastle-on-Tyne.

Extensive alterations and additions have recently been made to Freshfield Roman Catholic training college, near Southport, for the Superiors. Mr. Frederick H. Peate, of Liverpool, was the architect, and Mr. Samuel Thomas, builder, of Goreslane, Formby, has carried out the work.

The foundation-stone of the new Priory in connection with St. Dominic's Church, Red Barns, Newcastle-on-Tyne, was laid on Saturday. The new Priory, which will be of Gothic character, has been designed by Messrs. Dunn and Hansom, of Newcastle, and will be built of red brick with terracotta dressings. When completed, the Priory will cost somewhere about £7,000 or £8,000. The section just commenced will cost about £3,300.

New warehouses have just been built in Farringdon-road, to which they have a frontage of 120ft. Mr. F. J. Chambers was the architect, and Messrs. Grove and Son, of New North-road, N., the builders.

COMPETITIONS.

HELSTON PUBLIC ROOMS.—This competition, to which reference was made in our columns, has recently been decided. From the designs submitted, six were set apart by the committee specially appointed to examine and report upon the plans. The committee unanimously advised the adoption of the design bearing the motto, "St. Michael." Upon opening the sealed envelope, the successful competitor proved to be Mr. Charles E. Dyer, of Plymouth, who has been instructed to proceed with the work. The building will occupy a central position in Wendron-street, upon a site a part of which is occupied by the Old Grammar School. This building is a substantial structure, and possesses far more merit as an architectural composition than most buildings of its period. On these grounds, and upon the score of economy, it has been thought advisable to retain and embody in the new building the more important portions of the old one. The buildings will comprise a reading-room and library, business and committee-rooms, billiard and smoking-rooms, rooms for the caretaker, and a large hall with suitable retiring-rooms. In view of the deplorable sacrifice of life at Exeter, which has caused so great a sensation throughout the kingdom, we are glad to note that the architect pointed out in his report to the committee the effectual means he had adopted for escape from the building in case of actual fire or panic. We hope to be able shortly to illustrate the design.

HOPE CHAPEL, WIGAN.—The building committee having recently advertised for designs for a new chapel, to be erected near the Market-square, received about a dozen designs from various architects, and ultimately selected the one submitted by Mr. George Heaton, of Wigan, member of the Society of Architects, and Assoc. Mem.Inst.C.E., as being entitled to the premium offered—viz., fifteen guineas. The cost of the building will be about £3,000.

CHIPS.

St. Andrew's Church, Eccles (erected in 1879 at a cost of some £8,000), is about to be completed by the addition of a tower—designed by Mr. Crowther, of Manchester—the cost of which is borne by contributions from the late Mr. Henry Boddington and his family.

A meeting has been held at the Castle of Chillon for preparing the restoration of the castle and the establishment there of a national historical museum.

During the Marquis of Bute's recent stay at Cardiff Castle workmen were employed under his superintendence in excavating near the ruins of the Black Friars' Priory, in Cathay Park; the remaining walls have of late years been used as a vinery, but this is now to be removed and care taken to preserve the ruins. During Lord Bute's absence from Cardiff orders are given to suspend the excavations by which the ground plan is being ascertained, as he proposes to personally direct the work.

The inhabitants of Milton of Campsie have been presented by Mr. Alexander Macnab with a new public hall. Designed by Mr. William Marshall, Kirkintilloch, the hall is a one-story building, lighted from the roof, with ante-rooms and janitor's house, and is seated for about 400 persons.

Major Tulloch held an enquiry at Middlewich, on Saturday, respecting a loan of £450 for sewerage work. The engineer submitted plans for a siphon sewer, the ends of which were on a dead level, explaining that the local authority had instructed him, but he did not believe it would work. Major Tulloch said it was most amusing that the board should instruct the engineer, and not vice versâ. He condemned the siphon sewer, and approved the rest of the scheme.

The re-opening of the parish church of Billingborough, Lincolnshire, took place on Wednesday week. The work of restoration has been carried out by Mr. Dickinson, of Billingborough. The nave has been re-seated, the passages have been paved, having borders of encaustic tiles, the walls have been re-plastered, and a new door on the north side has been opened out.

A new iron girder bridge erected across the Leven at Balloch, N.B., in place of a suspension bridge, which was condemned, is now open. It is 25ft. wide, giving one footpath and a roadway sufficient for two vehicles to pass. The bridge is in five spans, and has cost about £5,000.

Mr. David Oldfield, late of London, has been elected as surveyor to the newly-formed local board for Felixstowe and Walton, Suffolk.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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RECEIVED.—W. A. G.—L. L. B.—J. P. and Son.—C. B. N.—S. and Co.—J. J. M.—C. and J.—H. M. and Co.—D. S. and O.—T. W.—H. and Co.—B. of N.—J. R. C.

"BUILDING NEWS" DESIGNING CLUB.

E. AYE WILLIAMS, F. W. Chapman, W. Ellison Fenwicke, J. Reade, R. Readhead, F. Carpenter, S. Short, and several others:—The rules for the series of competitions for 1887-8 in connection with the BUILDING NEWS Designing Club will be published in the course of a few weeks, when the awards now pending will be made. Correspondents are requested to note the answers given in last week's issue to other similar inquiries. We cannot undertake to reply by letter to the very large number of communications received from all parts in reference to the club. All subscribers are welcome as members on their written application, giving their age, address, and occupation, as required by our rules.

Correspondence.

ARCHITECT AND BUILDER.

To the Editor of the BUILDING NEWS.

SIR,—The article in last week's number on the relations of the architect and the builder is rather suggestive than conclusive; like building contracts from which the old-fashioned provision that the architect's decision shall be final and conclusive, has been omitted for the new-fangled clause for arbitration, which frequently suggests litigation.

It is not easy to see from what you have said in your opening paragraph, the strong grounds for affirming that the architect in his present capacity (*per se*, or what it is at present supposed to be), between client and contractor holds a threefold relation of artist (which he frequently is not), agent (which he only could be by the express or tacit consent of the client), and arbitrator (which he only could be by a clause in the contract).

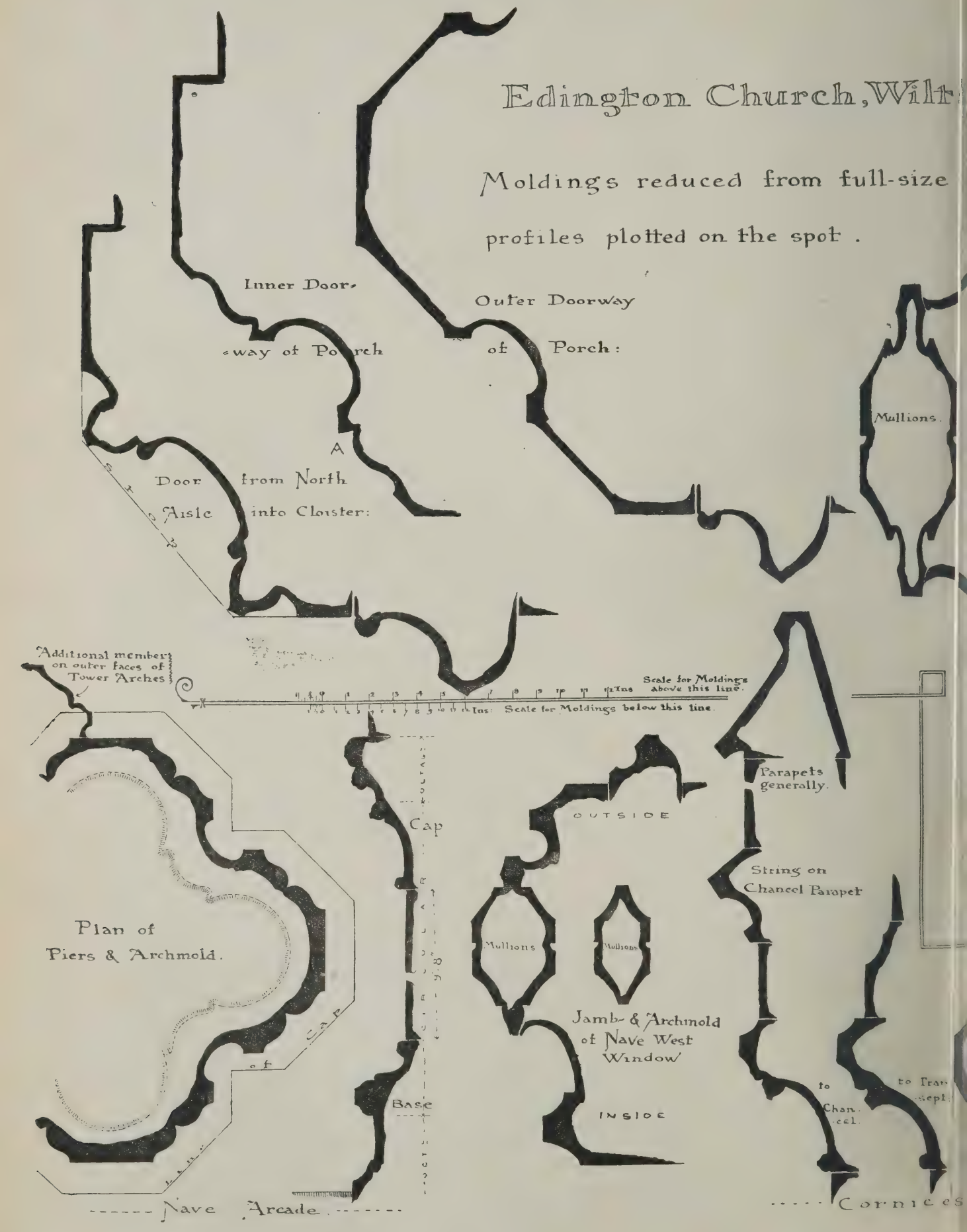
As to the part of the architect's capacity containing the two last you ask the questions, "Can the architect bind the building owner or his principal by any act?" "Are his decisions to be taken as conclusive and final?" Which you do not answer. May I do it for you? First, he cannot bind his client in anything for which the client has not given him authority to do so; of course the authority can be given in many ways, written or oral, or by tacit approval, or by clause in the contract as to ordering works, or giving certificates; but it is absurd to suppose that an architect has an inherent right to bind his client or employer. Then as to his decisions being final and conclusive, it entirely depends on the terms of the contract by which his decisions may be made so, as to the true intent and meaning of the drawings and specification; what are and what are not extra works, and omissions, their value, and the authority for them; the time for executing the works, and any extension of it; the enforcement or waving of penalties and their amount; the necessity for annulling the contract, and for employing other means for completing the works, and the deduction for same; the time and amount of certificates for instalments, and of the final certificate of the completion of the works. As to these, and others, such as the use of proper materials and employing proper workmen, &c., the contract can provide that the architect's decision shall be final and conclusive as to all or any of them; but such a provision is inconsistent with a general clause for arbitration; yet such a clause may also apply to all, or be limited to any of them.

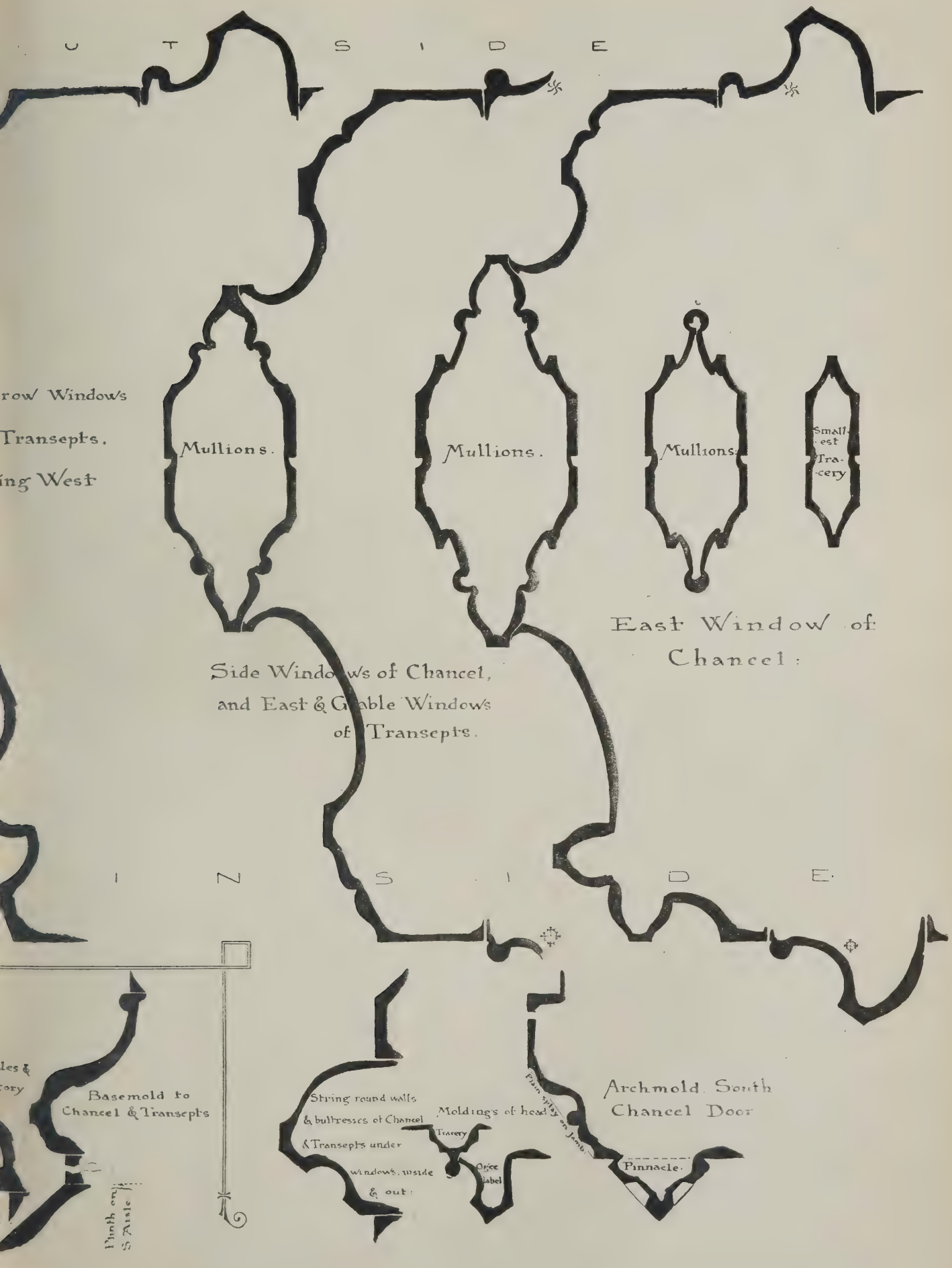
Lord Grimthorpe's clauses were unnecessary, except to prevent misconception of an existing fact, for neither architect nor clerk of works has power to bind his employer unless he has given him the power to do so. No doubt it may be inferred that he has done so by approving of the plans and telling the architect to proceed to carry them out, as regards the usual steps taken in similar cases, which may include ordering quantities, as you say; but even this is doubtful, if the architect has not mentioned, as he should do, to his client the necessity for it, and cost of it. Not doing it may enable a smart young man, or a slow old one, to pin his client to a commission; but candour, as well as honesty, is the best policy in the long run.

As to remedying defects discovered after the final certificate, this is usually provided for by a clause in the contract withholding payment of the drawback or percentage deducted from the instalments paid during the progress of the works for some time after their completion, during which time the contractor would be bound to remedy defective work; but even after this time had expired, and all money had been paid, the contractor would be bound to make good any fraudulent or dishonest work, notwithstanding the final certificate of the architect, who would be otherwise accountable to his client for giving it, if he did not exercise due diligence or skill, or was influenced by collusion or other improper motive.

The clause of exceptional power which you quote as to "extras," beginning with, "In case the architect shall consider it desirable to order additional work," and ending with, "included in the specifications and drawings," would be absurd or monstrously unjust without the usual termination, "except as to the money value of such works according to the schedule of prices, and as shall be certified by the architect," for without this the literal meaning of it as quoted would be that the architect could order any quantity of additions or alterations to the contract without increasing the amount of it; but with the termination of the clauses to which you seem subsequently to refer, it only places the architect in the same position as to extra and contract works, which is certainly right.

The clause in the heads of conditions of the Institute of Architects clashes with Mr. Justice Grove's decision, for it refers to the very matters the Justice says the architect should not decide, as he should not be a judge in his own case; but the true intent and meaning of the drawings and specification, and any discrepancies between them, are just the matters the architect is personally interested in, although all agree that these are matters he should decide, if any. So that Justice Grove was misapplying the principle he enunciated, and your distinction between cases where "the employer, *or the architect* on his behalf," and "simply the employer" are concerned is not very clear; nor is the distinction between the cases in which he has the right to determine and those in which he has not. In fact, he has no right to determine anything *per se* that the


Edington Church, Wilt
Moldings reduced from full-size profiles plotted on the spot.
Inner Door-way of Porch
Outer Doorway of Porch:
Mullions.
A Door from North Aisle into Cloister:
Additional member on outer faces of Tower Arches
Scale for Moldings above this line.
Ins: Scale for Moldings below this line.
Plan of Piers & Archmold.
Cap
Base
Nave Arcade
OUTSIDE
Mullions
Mullions
Jamb & Archmold of Nave West Window
INSIDE
Parapets generally.
String on Chancel Parapet
to Chancel
to Transept
Cornices


U T S I D E
row Windows
Transepts.
ing West
Mullions.
Mullions.
Mullions.
Small-est Tra-cery
East Window of Chancel:
Side Windows of Chancel, and East & Gable Windows of Transepts.
I N S I D E.
les &
tory
Basemold to Chancel & Transepts
String round walls & bultresses of Chancel & Transepts under windows, inside & out:
Moldings of head
Tracery
Ogee label
Archmold South Chancel Door
Pinnacle.

contractor cannot challenge. The right to decide must be conferred on him by the conditions of the contract, and, therefore, these conditions should be well and carefully considered, and the architect should see that they give him the necessary power to have his designs carried out faithfully and honestly; but he should claim no power that could only be used as a cloak for negligence, incompetence, or fraud.

A short time since a question was raised in the BUILDING NEWS as to the right of a client to see the contractor or builder's account, and opinions were expressed that he had no such right. Of course, the architect had no more right to retain the builder's account from his client (who was to pay it) if he demanded it, than he had to take the coat off the client's back, and the only valid reason for withholding it would be to prevent his accuracy or good faith being tested if the client had reason to doubt them, although some flimsy excuse was given as to exposing builders' prices.—I am, &c.,

Sept. 13. M. M.

THE EDINBURGH ANTIQUARIES.

SIR,—The BUILDING NEWS of the 2nd inst. has just reached me here, and I notice that it contains a letter from Mr. J. Romilly Allen which will show your readers what members of the Edinburgh Society think of themselves, and how they can speak of others who have no connection with the clique, but have spent years in the independent study of archæology in sequestered places where prehistoric remains abound. They affect a superiority which they have done nothing to support; and, although I am now classed by Mr. Allen amongst "conceited dabblers," I can produce testimonials as to my qualifications as an antiquarian discoverer even from the society itself, or at least from the official, who is, as we Scotch say, "the tongue of the trump," or in other words, from the manager. In 1877 I wrote a paper on the antiquities of St. Kilda, which the said official informed me he had read to a "large and interested audience," and which was subsequently published in the society's "Proceedings." He was also good enough to say that it was "excellent alike in matter and in manner." In 1882-3 I spent nearly a year in Tiree, where I was assured by the official alluded to I would find nothing that had not been already seen and described by Mr. Muir and Dr. Reeves.

I, however, found innumerable prehistoric remains of the most interesting character, which these gentlemen (whose attention had during their brief visit been confined to ecclesiology) had never observed. I was the first to penetrate into the prehistoric ages there. I have withal resided for four years in Shetland, have opened many prehistoric cairns and graves, and examined and ascertained the purpose of extensive remains of pagan worship—remains which are to be found in every part of the group, which are well known to, although their character had never been suspected by, the natives, and of whose existence the Edinburgh antiquaries are perfectly ignorant. After such a long and dearly-bought experience, you will, perhaps, allow that I ought to be as competent to clear out and examine the contents of the so-called Pictish brochs as any man in Scotland. I have at all events no hesitation in saying that the information regarding these ancient buildings on which members of the Edinburgh Society erect such elaborate theories is utterly unreliable. In Vol. V. of the "Archæologia Scotiæ" a list of brochs is given, which includes some ruins in this district that I know to a certainty are not brochs, and have no resemblance to brochs. In Shetland all ancient structures, and even shapeless heaps of stones, are vulgarly called "brochs," and you can imagine what confusion the relics and information sent to the Edinburgh Society by these indiscriminating people must occasion.

I agree with Mr. Allen in thinking that "it is far better that the Pictish towers of Shetland should remain buried for a century to come, than that they should be explored by persons wholly unfitted for the task"—such, I may add, as the S.S.A. receives its information from. The simple reader may imagine that to choose a lord for a president is a judicious arrangement, as the Society will at least be taught good manners; but the more astute will have noticed that those who come in contact with the nobility without being of it, such as valets, gillies, and gamekeepers, are generally more insolent than those who associate only with their equals.—I am, &c., J. SANDS.

FIRES IN THEATRES.

SIR,—Some years ago, after one of the theatre catastrophes, I wrote to the public journals explaining what I think is the only remedy in case of fire or panic—namely, open to the street stairs formed outside the main building and for each stairs to finish on the street level, and to have no doorway or any part of it connected with the building, because such doorway, if fire was issuing, would prevent the people from coming down.

If this system was carried out, I believe it would be a cure of these sad disasters of death by burning or panic, because fear to a great extent would cease as soon as the people found themselves clear of the building and in the open air. These staircases could be easily designed, for safety with short flights and recesses, for the weak to stand aside in case of panic.

The harrowing details of death in the tortuous staircase leading down from the gallery of Exeter Theatre could not have occurred if formed on the above lines. Staircases formed inside public buildings are suffocating flues when fire occurs. Iron screens and automatic fire extinguishers are very good; but how often do we find that such when most wanted are out of order?

The safety of the people should be the first consideration, and this can be only effectually dealt with by forming all staircases outside of the main walls of public buildings.—I am, &c.,

Crichel, Wimborne. W. T. CHINCHEN.

SIR,—We read Exeter Theatre was a roaring furnace in three minutes, and the flames lit the country for miles; and that it was constructed with all the latest improvements. It does not appear that much was done to make it fireproof, for there seems to have been much wood used in its building to create so much flame and such a terrible disaster. Perhaps an experienced local man will kindly enlighten us as to what materials were the flooring, roof, girders, columns, window frames, dado, doors, ceilings, staircases, &c. As I suppose no such account has appeared, many of your readers will, I think, feel interested and obliged, including myself. —I am, &c.,

Broxbourne, Sept. 13th. JAS. PULHAM.

SIR,—Will you allow me a space in your paper to suggest a possible means of making the exits from galleries of theatres easier than now—i.e., instead of the usual stone steps or stairs, it might be a zig-zag inclined plane, the same as is used for going down a subway under a roadway—the floor to be laid with tiles and joints, giving good foothold. There would not be anything like the risk of falling on this, and people could run along it as fast as they liked. It would, of course, occupy more space: but something must be sacrificed to try to prevent such another fearful loss of life as that which has unfortunately happened at Exeter.

I submit that this plan would have the advantage of being easier for going into the theatre, as well as getting out in time of panic, and obviating the difficulty always existing now on stairs, i.e., treading on ladies' dresses when people are moving in crowds, and which is one of the dangers and annoyances of leaving a theatre at any ordinary time.—I am, &c.,

Sept. 13. C. C.

The managers of St. Mary's School, Windermere, have adopted plans for a new boys' school, prepared by Mr. R. Walker, architect, and have given him instructions to prepare the drawings required by the Education Department as soon as possible.

Messrs. Young and Williams, the sub-contractors for the Inverkeithing tunnel on the Forth Bridge Railway, commenced work on Wednesday.

The Government of New South Wales are inviting designs for the erection of a Centennial State House. The competition is only open to architects in the colony, and two prizes, one of £150 and one of £100, are offered for the two best designs. The cost of the building is not to exceed £150,000, and the style is to be Corinthian.

The tower of Lymm parish church, partially restored in 1885, is about to be strengthened and repaired from plans by Mr. J. S. Crowther, of Manchester, at an estimated cost of £100.

Intercommunication.

QUESTIONS.

[9394.]—**Surveyor's Pupil.**—Will any of your readers be good enough to inform me as to the best course of study and plan of action from the beginning for a quantity surveyor's pupil, and the best and cheapest books? Although I referred back to past numbers of the "B. N.," I can find no such information, excepting that for architectural students, which does not apply. The question may be of interest to others beside me.—E. MASEY.

[9395.]—**Discoloured Parchment.**—I shall be much obliged if some kind correspondent will assist me to restore the colour of a parchment certificate, which has become discoloured by smoke?—TYRONE.

[9396.]—**Heating School.**—I am about to build a school having large room 50×20 and classroom 25×18, with master's room in. I want a simple method of heating by hot-water; the pipes must not run along the floor, nor do I want them sunk in trenches, which form dust-traps, &c. There is a system mentioned in Robson's book on "School Building and Prices." Will someone kindly tell me whether this is likely to suit my purpose?—NORTHERN LIGHT.

[9397.]—**Exam. for Assistant Surveyor, Civil Service.**—Will anyone who has sat for the above give me a specimen of the questions put; or can any of the past exam. papers be had? Also how long the exam. lasts?—A CANDIDATE.

[9398.]—**Building Stones.**—I should like to be informed from what quarries the stone was obtained for Wells Cathedral, as it is in a fair state of preservation exteriorly. The stone is reputed to have come from Doulting (Old Down). It is a shelly limestone, uniform in texture. Glastonbury Abbey is said to be from the same quarry, and if so there is a good guarantee of its durability. Salisbury, I believe, is built with Tisbury stone from Wiltshire.—ENQUIRER.

REPLIES.

[9310.]—**Half-Timbered Work.**—I am much obliged to "G. H. G." for the sketch he gives, and for the lucid explanation; but will he refer to p. 346, and note that I invited a "full illustration" of the mode of framing the timbers and their connection with the inner wall, &c.? And will he explain the nature and use of the projection shown at the back of the stud upon his sketch? Also where he would put the plaster and pebble-dash he recommends; he has omitted to show it.—JAMES THORNELOE.

[9385.]—**Strong Room.**—It is usual to ventilate and light strong rooms, and sometimes by means of gas lamps, which are perfectly safe from fire. "Doubtful" does not give sufficient information to enable any one to advise him, and if he would describe the situation of the room, size and construction of walls and ceilings, and if lined with steel and fireproof, also the class of door and ventilating gate intended to be used, then some advice can be sent to "Doubtful" through your pages by one who has had considerable experience in connection with strong-rooms.—CLERK OF WORKS.

[9387.]—**Civil Engineers.**—It is usual for a young man to be articled, though not absolutely required. There would not be any great difficulty in getting employment as an engineer's assistant without serving an apprenticeship, if the applicant is a fair draughtsman and knows something of the business. Many young men have done so and worked their way up. There is a good deal to learn—a knowledge of mechanics or applied mathematics is absolutely necessary to insure any success, construction in brick and iron, hydraulics, sewering, water supply, and other subjects required under the provisions of the Public Health Act are necessary.—G. H. G.

[9388.]—**Book-Keeping.**—Obtain the books published by Messrs. Hudson and Kearns, Southwark-street, who, I believe, have published a set of such books for architects' use.—G. H. G.

[9389.]—**Height of Shaft.**—If in an exposed situation, I should say a height of three diameters for a shaft of the size you mention would be as high as you could safely go.—G. H. G.

[9390.]—**Perspective.**—Refer to back numbers of the "B. N.," where several replies for setting the centrolinead are given.—DRAUGHTSMAN.

[9391.]—**Architects' Chances at Buenos Ayres.**—According to the interesting lecture of Mr. Frank E. Thicke, of Buenos Ayres, published in the BUILDING NEWS of the 2nd inst., pp. 353-5, an English architect of any ability and go ought to have fair prospects in settling in that city, as the population is increasing very rapidly. Money seems plentiful, and there is a movement in progress for rebuilding on wider lines and with loftier houses the crowded business centre of the city. I should advise "Ignoramus" to write to Mr. Thicke for further information.—E.

[9393.]—**Salisbury.**—I never was above the base of the entirely windowless spire; but from its colour and external state never doubted it to be of the Chilmark stone. The four legs (each nearly concealed by its twenty decorative shafts bearing nothing) are of the same Purbeck shell-marble, but on its bed, as is the middle shaft of the chapter-house. But the six bearing more than half the Lady-chapel vaulting, four single and two clustered, have the bed upright. Price observed, in 1774: The difference of sinking between the N.E. tower-leg and the S.W. does not account for a fourth of the decline, this being mainly in the upper parts of the spire, which settled in a curve and might doubtless be straightened (as Manchester chimneys have been) by drilling holes round half of some of the beds of mortar.—E. L. G.

The burghs of Falkirk, Denny, and Dunipace are about to carry out a combination scheme for a supply of water from Faughland Burn. The estimated cost is £50,000.

STATUES, MEMORIALS, &c.

ASHTON-UNDER-LYNE. — A bronze statue, which has been erected by public subscription to the memory of the late Mr. Hugh Mason, M.P. for Ashton-under-Lyne from 1880 to 1885, was on Saturday publicly unveiled at Ashton. The sculptor is Mr. J. W. Swynnerton. The figure is 8ft. high, and represents Mr. Mason in the attitude of addressing a meeting, with arms folded, the right foot a little advanced and the face slightly turned to the right. The statue stands upon a grey granite pedestal 11ft. 6in. high, surrounded by a railing. Its position in Chester-square, looking up the long straight line of the principal street, is commanding.

FROME.—As a memorial to the late vicar of Frome, the Rev. W. J. E. Bennett, it was decided to restore and beautify the cross erected by him in the churchyard, and which had fallen into a very bad state of repair. Mr. W. V. Gough, of Bristol, has prepared plans, which have been approved by the committee, at an estimated cost of about £450. The scheme provides for the re-erection of the present cross on a base of five octagonal steps, with new steps leading from the entrance to the upper path of the churchyard, all of these to be of red Mansfield stone. Round the cross and bounding the steps on each side will be a traceried balustrade of Doulting stone with carved angels on the newels. The whole of the space within the balustrade will be laid with Roman mosaic in ornamental patterns, having Mr. Bennett's monogram introduced into the design. The carving will be executed by Mr. H. T. Margetson, of London. The estimate of Mr. F. P. Brown, of Pilly-vale, Frome, has been accepted, and the work will be proceeded with at once.

CHIPS.

At Guy's Hospital on Wednesday, an inquest was held on Robert Hicks, 31, of Ladd's-court, Bankside, a scaffold builder. William Shepherd, the son of the builder, Mr. W. Shepherd, of Bermondsey New-road, said he saw the deceased, who was taking down scaffolding, jump from the parapet on to some planks 3ft. 6in. below. The deceased fell through one of the boards, which snapped in several pieces and fell with the deceased. The board was quite strong enough for the ordinary work done upon it. The cause of the plank snapping was the deceased jumping upon it. The plank, broken in several pieces, was produced, and the witness admitted it was defective. A juryman, a builder, declared the wood was rotten, and ought to have been cut up for firewood. Another juryman said it was shameful to have allowed such a board to be in use at the top of a building. A scaffolder named Walker said he was bound to admit the plank was a very bad one, and such as no scaffold-maker ought to put in. The jury returned a verdict of "Accidental death," with a rider that there was negligence, not amounting to criminal negligence, on the part of the builder, in allowing such a board to be used, and which had contributed to the death of the deceased.

The autumn meeting of the Iron and Steel Institute was commenced at Manchester on Wednesday, under the presidency of Mr. Daniel Adamson, who in his address pointed out the necessity of a considerable improvement in trade before it could become reasonably remunerative to capitalists and to owners of works.

The corner stone of the Roman Catholic Church of St. Etheldred, at Leominster, was blessed on Tuesday week. The church will cost about £1,300. The contractors are Messrs. J. Jones and Son, Sedgley, and the architects Messrs. Pugin and Pugin, of London; the clerk of the works is Mr. J. Patchett. The church is in the Late Decorated style, and consists of nave and chancel, with a chantry chapel, sacristy, and confessional. The building is divided into seven bays. The total length is 70ft., and the width 26ft. The materials are local bricks, with facings and dressings of Bromsgrove stone.

Mr. William Nelson, head of the publishing firm of Thos. Nelson and Son, died at his residence in Edinburgh on Saturday, aged 71. He had recently restored St. Margaret's Chapel and the Argyle Tower, in Edinburgh Castle, while at his expense workmen are now engaged in restoring Old Parliament Hall, from plans by and under the superintendence of Mr. Hippolyte J. Blanc, of that city.

The town council of Halifax were presented on Wednesday week by Mr. Joseph Pickard, a local manufacturer, with a collection of oil paintings by Rembrandt, Raphael, Le Brun, Correggio, Bassano, and others; also a quantity of old prints after the Dutch masters, and a number of chromos and water-colours, all in frames. The donor expressed a wish that the collection, numbering 150 to 200, should be hung in the Bank Field Mansion, Akroyd Park. The gift was cordially accepted on the condition named.

LEGAL INTELLIGENCE.

SMOKE PREVENTION. — At Lambeth Police-court on Friday Sir Henry Doulton appeared in answer to an adjourned summons, in which he was alleged to have infringed the Smoke Nuisance Act in having negligently used a certain furnace upon his premises so that the smoke arising therefrom was not effectually consumed. Mr. Poland again appeared for the prosecution, and Sir Henry Doulton conducted his own case. Mr. Poland now said that the chimney-shaft at the defendant's premises had been watched by the police, and upon only one occasion was smoke noticed issuing for 10 minutes. He now suggested that the matter should stand over *sine die*, and if there was no further nuisance the case would be allowed to drop. If there were, fresh summonses would be taken out. Mr. Biron said he had no doubt the defendant had used every effort to prevent the nuisance; but it must be prevented, for what a great man might do a little one might follow. Mr. Poland had said the defendant had done all he could in trying to remedy this evil, and he fully believed it was so. The defendant said for 35 years he had constantly paid attention to the subject, and brought about at large expense many great improvements. He had still great anxiety in the matter, and should do his utmost to bring forward every possible improvement. Mr. Biron thought the assurance given by Sir Henry was quite sufficient, and it was agreed that the summons should be adjourned *sine die*.

IN RE STEWART BROTHERS.—Court of Bankruptcy, Sept. 7th (before the Official Receiver).—Mr. C. F. Kemp, the trustee under the bankruptcy of Messrs. Stewart Bros., of Fen-court, City, and New Brunswick, Canada, presided at a meeting of creditors convened to consider a scheme of arrangement proposed by the bankrupts. The failure occurred some months since, and the accounts as amended showed joint liabilties expected to rank £158,102, and assets £19,977. The scheme provided for the vesting of the estate, with the exception of the debtors' interest in the Ottawa property, Canada, in the trustee, to be administered for the benefit of the creditors; the debtors to tranfer their interest in the Ottawa property, subject to claims, with a view to the payment of £70,000 in six years to the trustee out of the balance of net profits, for administration under the scheme. The scheme was not favourably received, and Mr. Hawes, in deference to the feelings of the creditors, withdrew it.

PARLIAMENTARY NOTES.

THE TOWER GARDENS.—Mr. E. Stanhope informed Mr. Fisher on Tuesday that her Majesty had approved of the opening, as an experiment, of the gardens and the covered way of the Tower of London, under rules now being framed.

THE LONDON THEATRES.—The Home Secretary, in reply to Major Rasch, has stated that the report of Captain Shaw on the London Theatres was confidential. He would consult with the Lord Chamberlain and the Metropolitan Board of Works as to whether it could be published to the public advantage.

The Directors of the Small Farm and Labourers Land Company, of which Lord Wantage is chairman, have decided to build several cottages on the Cottenham and Histon estate in Cambridgeshire, in consequence of a demand for the same among labourers and others. The company's surveyors, Messrs. Bidwell, of Ely, are at present engaged in preparing plans and obtaining tenders for the erection of suitable cottage dwellings, to which plots of two or three acres will be attached.

A new Roman Catholic School chapel at Tilbury was opened on Thursday, the 9th inst. The site is two acres in extent, and on it, in addition to the present building, it is intended to erect a girls' school, a church, and a presbytery. The structure now raised provides accommodation for the education of 250 children, the large school room being utilised as a school-chapel. The work has cost £1,300.

Mr. Henry Patteson, of Manchester, senior partner in the firm of J. and H. Patteson, marble masons, of Oxford-street in that city, died at the age of 52 on Wednesday week at his residence at Rusholme. He was a magistrate and alderman of that borough, served as Mayor in 1879-80, and was one of the chief promoters and supporters of the Thirlmere water supply scheme now in course of execution.

One of our engineering contemporaries mentions that for some time past specially prepared slag has been used in Germany for the metalling of roads, principally in the neighbourhood of Hanover. Some of the furnaces in the Hanover district make a speciality of a metalling material called slag stone which is hard and crystalline in character, and is considered very suitable for paving purposes.

Our Office Table.

THE syllabus of lectures of the City of London College, White-street, Finsbury, of which the fortieth session will commence on Monday, October 3rd, has just been issued. The lectures in the engineering department, which is conducted by Professor Henry Adams, M.Inst.C.E., M.S.A., assisted by Messrs. R. J. Hatton and S. F. Howlett, treat upon the subjects of technical drawing, building construction, machine construction, and drawing office practice; the classes are all in connection with the Science and Art Department, and the fees are very low so as to enable artisans to avail themselves of the privileges afforded by the college. Numerous studentships, scholarships, and prizes are offered to students. The valuable textbooks on constructional subjects written by Mr. Adams afford evidence that the instruction given in these classes is practical and thorough, and further proof is given in the fact that during the past twelve years the students under Mr. Adams have taken at the May Science Examinations two Whitworth Scholarships, £100 per annum; one Queen's silver medal, one bronze medal, 25 places in honours, 149 Queen's prizes, 225 first-class certificates, and 286 second-class certificates. They have also obtained in the Examination of Drawings:—National Competition, one bronze medal; 38 third grade prizes, 64 second grade prizes, and 214 awards equivalent to honourable mention. They have gained in addition, a large number of college and special prizes and certificates.

MR. J. E. WAKEFIELD, the clerk to the Metropolitan Board of Works, has written to the daily press to explain that the recent action of the Metropolitan Board of Works in reference to St. Mary-le-Strand was not taken with a view to the removal of the church, but simply to the prevention of danger to the public from any insecure portions of the structure, under the provisions of the Metropolitan Building Acts, 1855 and 1869. It was represented to the Board by the district surveyor that part of the church was in a dangerous state, some of the cornice having fallen, and the necessary notice was thereupon given to the rector and churchwardens. The matter is, therefore, he explains, entirely in the hands of those authorities, and the Board will be quite satisfied if the fabric is made secure in any way that the responsible owners of it may think best. As Mr. A. de Tatton Egerton explained in the House of Commons on Monday night, the removal of the church has only been considered in a general manner by the Board in connection with various schemes for widening the Strand and forming a new communication with Holborn. Mr. William Butterfield complains that under a general and easy-going notice from the Metropolitan Board, the whole upper part which forms the outline of the church, has been wrecked for want of careful and thoughtful intelligence, adding, "Much less money than has been ridiculously spent by the parishioners, since they were served with the notice by the Metropolitan Board of Works, would have repaired everything and left the church a beautiful object."

SOME correspondence has appeared in recent issues of the *West Briton* between subscribers to the new cathedral at Truro and Mr. Robert Swain, the clerk of works, as to the rate of progress and cost of the undertaking. "A Subscriber" asserts that the original estimate of Mr. J. L. Pearson, R.A., for completing his design as accepted in the competition was £95,000, exclusive of outlay on site, western towers, upper part of central tower and baptistery, for which another £25,000 was allowed in the architect's report. Of this sum £35,000 was allowed for the choir and its aisles, and £20,000 for the transepts and crossing up to the level of the ridge. At the date of the last report, presented on Oct. 9th, 1886, £94,016 had already been expended. No figures are, he says, available for the present year; but the writer declares that as only the choir and transepts, or one-third the whole edifice, have been built, the architect's estimate must be doubled if the cathedral is to be finished at a *pro rata* cost to that already incurred. Mr. Swain has replied, pointing out that, instead of one-third, more nearly one-half the scheme has been carried out; to

which "A Subscriber" rejoins that of the nave, which is to be 40ft. longer than the choir, only one stone—a memorial one—has yet been laid; that the upper stages of the central tower and its spire are not yet built, nor are the western towers, chapter house, and cloisters commenced, while much carving remains to be done in the section already erected. A sore point with "A Subscriber," on which he chafes again and again, is that, as he alleges, the contract was let by Mr. Pearson without competition on a schedule of prices for various works, and he challenges the committee to publish the official schedule of prices, that it may be seen whether it is, as had been rumoured, considerably above the market rates. To this Mr. Swain replies that if there exist two builders who would, as "A Subscriber" asserts, have taken the contract at prices from 25 to 100 per cent. below those of the present contractor, they may congratulate themselves, as they would in that case have been in the Bankruptcy Court. Further, as he remarks, such a work necessitates the use of special plant, machinery and plant which a local builder would be hardly likely to possess. Another correspondent raises the issue of the commission paid to the architect upon the outlay, remarking:—"I do not think the payment of 6½ per cent. can be professionally defended; 5 per cent. surely would pay him handsomely, and I have always understood *that* to be the maximum charge."

Two months ago a movement originating with Mr. E. Renard, Art Master of the Salt Schools, Shipley, was started for holding a competition open to all students of art schools and amateurs in Yorkshire, on similar lines to the Gilbert Competition in London. The executive decided to offer four equal first prizes and four equal second prizes for landscape in oil; landscape in water-colour; figure subject and black and white (and subject). The scheme was well supported, and competitors were asked to choose the mode in which the prizes should be adjudged, with the result that the scheme of suffrage adjudication was carried by six votes. The works for the art contest, 114 in number, have now been received, and are hung in the black and white room of the art section at the Saltaire Exhibition. Of the four sections exhibited, water-colour work ranks the highest. In the awarding of the prizes, competitors are supplied with voting papers, returnable on Sept. 30th; the competitor receiving the greatest number of votes being entitled to the first prize. The works are not signed, but are marked with a number by which the competitor may afterwards be identified. In connection with the scheme an Art Conference is to be held on Thursday, October the 6th, to discuss the extension of the scheme and the advisability of creating a professional and advanced section, the modification or development of the present rules, together with other matters of interest in relation to art in Yorkshire. The result of the experiment fully justifies the anticipations of the promoters, and it is believed that an annual exhibition may be made a factor for the development of art in Yorkshire, and bring to the surface many young artists of promise who might otherwise remain unknown and neglected.

A NOVELTY in builders' machinery is, according to the *Scotsman*, to be seen at work on buildings in course of erection at South Bruntsfield-place, Edinburgh. It consists of a derrick crane and a mortar mill, worked simultaneously by a single engine. The crane is elevated in the usual fashion upon timber scaffolding, at a considerable height above the engine, this being attached to an iron bogie waggon standing upon the ground. To lessen the liability of snapping, a wire rope is employed instead of the common link chain. This is led up from the winding barrel through a hole in the base of the crane, and thence over the top, across pulleys, for the purpose of hoisting the "jib." The turning or "slewing" gear consists of a perpendicular shaft, with cog-wheels horizontally attached, and made to work between the crane above and the engine below into similar wheels. The mortar-mill stands some distance from the engine, and is of the ordinary type, driven by a belt attached to a special barrel on the engine. Mr. John Oliver, builder, who is the originator of this duplex action, claims credit for having overcome the necessity for the employment of two engines, and in providing for the work to be done by one, he has reduced the cost of labour and fuel to a minimum, besides lessening the risk of accidents. Messrs. Carrick and Ritchie, engineers, are the makers.

IN a second letter to the *Times* on lightning conductors, Dr. Tyndall points out that the sums set apart by architects and builders for the erection of conductors are often totally inadequate to cover the cost of them. He suggests that the scant provision made may be one reason why the absolutely necessary terminal plates are frequently omitted, and the consequent failure to provide a safe earth connection.

ON Tuesday evening, the 6th inst., the artisans and others engaged on the work of extension and completion of the R.C. Church of the Sacred Heart, Norton-road, Hove, were, through the liberality of the Rev. S. A. Donnelly, entertained at a dinner at Mr. Lower's, Cliftonville Hotel, West Brighton Station. Sixty-five workmen put in their appearance, the chair being occupied by Mr. J. W. Randle, clerk of works; the vice-chairs being filled by Mr. C. Cole, builders' foreman, and Mr. L. D. Boulton, sculptor, of Cheltenham. The architect of the above works, which are near completion, is Mr. J. S. Hansom, F.R.I.B.A., Kensington, W.; and the contractors are Messrs. R. and E. Evans, Peckham, S.E. Mr. R. L. Boulton, of Cheltenham, is executing the sculpture and carving.

THE *Building Budget* of Chicago complains in an editorial note that in that city everything is sacrificed to utilitarianism, and that the lines of buildings are unbroken by towers and spires. The cheap and flimsy character of the churches is specially adverted to, the writer observing that many of the Chicago churches are no more imposing than seaside cottages, and have a plenitude of roof, giving the appearance of having been blown over sideways. It may be said, to the discredit of the city, that Chicago has the longest thoroughfare in the world that has no church throughout its whole length. This triumph of utilitarianism is West Madison-street, which has passenger cars running for nearly six miles, but has not a public building or square along the whole route.

An inquest was held at St. Alban's on the 8th inst. on Thomas Curtis, aged 36, foreman scaffolder at the cathedral, who was killed the previous day by a fall from a scaffold which was being struck outside the south transept. Mr. Brown, general foreman at the Abbey, said that deceased was one of the best scaffolders he had ever had. He had never had a steadier one, and would never wish for a better; he was now extremely sorry to lose him. He had been engaged at the Abbey in this particular branch of work for about ten years, and they had not had a mishap through faulty construction up to the present moment. He built the scaffold from which he fell, up from the ground, with assistants. He had had really entire charge of the scaffold building during the ten years he had been there, and witness would unhesitatingly say that he had never seen a better scaffold builder in his life. A verdict of "Accidental death" was returned.

The Government is believed to be about to remove the Platters Rock in the centre of Holyhead new harbour. This enormous rock, which is really a small island, stands directly in the path of outgoing and incoming vessels. In storms it is a constant source of danger to mariners who run for shelter into Holyhead harbour. The local board at Holyhead have taken the initiative in the movement to get the rock removed, and Baron de Worms writes that the Board of Trade have the question now under their consideration.

The Wallace Monument on the Abbey Craig, Stirling, has been enriched by the addition of three busts of illustrious Scotsmen — George Buchanan, John Knox, and Sir Walter Scott. The sculptor is Mr. D. W. Stevenson, R.S.A., whose art has already largely contributed to the embellishment of the monument. His colossal statue of Wallace was only unveiled the other month, and more recently busts of Bruce and Burns from his studio were placed in the museum, which gives promise of becoming, on a small scale, a patriotic Walhalla.

A branch line of railway 1½ miles in length is being made from Drumshoreland Station to Broxham Oilworks. Messrs. Thomas Pate and Son, of Airdrie, are the contractors, and subcontracts have been let for the three sections of the work to the local firms.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Architectural Association. Visit to Minley Manor (Messrs. Davey and Williams, architects), and Bramshall, one of John Thorpe's houses. Trains from Waterloo, 11.45 a.m.

TUESDAY.—Sanitary Congress at Bolton. Opening address by Lord Basing. 8 p.m.
Glasgow Architectural Association. "An Architectural Chat," by F. H. Newberry, head master Glasgow School of Art.

WEDNESDAY.—Sanitary Congress at Bolton. Address to Section I., "Sanitary Science and Preventive Medicine," by Prof. J. R. Reynolds, to be followed by papers and discussions. 10.30 a.m.

THURSDAY.—Sanitary Congress at Bolton. Address to Section II., "Engineering and Architecture," by Prof. T. Hayter Lewis, F.S.A., to be followed by papers and discussions. 10.30 a.m.

FRIDAY.—Sanitary Congress at Bolton. Address to Section III., "Chemistry, Meteorology, and Geology," by Dr. A. Dupré, to be followed by papers and discussions. 10 30 a.m.

ARCHITECTURAL ASSOCIATION,

9, CONDUIT STREET, W.

A Visit will be paid on SATURDAY, September 24th, to a Mansion in Cadogan-square, S.W., Messrs. Ernest George and Peto, Architects. Assemble at 2.30 p.m.

THOS. EDWARD PRYCE } Hon. Secs.
FREDERIC R. FARROW }

CHIPS.

A branch of the Birmingham and Dudley Bank is being erected at Hay, Brecknockshire, from plans by Mr. R. F. Kempson, of Hereford.

On Monday week the foundation stone was laid of a new mission church at Talke-o'-th'-Hill, to be known as St. Martin's Mission Church. The new structure will cost £400, and will consist of a mission church and recreation ground, the former being 54ft. by 24ft., accommodation being provided for 202 persons. The architect is Mr. J. Beardmore, of Bucknall, and the builder Mr. S. Booth, of Kidsgrove.

Mr. J. T. Harrison, one of the local Government Board inspectors, held an inquiry at Horsforth on Friday into an application made by the Horsforth Local Board for sanction to borrow £1,500 for the purpose of completing a new road through Hawksworth Wood. The plans were produced by Mr. W. H. Parkin, surveyor to the board, who said the total cost of the road would be £2,150. There was no opposition to the proposal, of which the inspector expressed his approval.

Boxford parish church, Suffolk, was reopened on Tuesday after restoration, including the substitution of oak seats for high pews in the nave, and of a carved waggon roof for a flat plaster ceiling over chancel, the construction of new floors throughout, and other works. The outlay was over £1,000.

The free library and Fielder promenade at Fleetwood were opened on Saturday. The free library occupies the buildings of the institute erected by Mr. B. Whitworth, and now acquired and presented to the town by Mr. Samuel Fielder. The promenade is being carried out in three sections, the first and second of which were opened on Saturday. They consist of an esplanade 21ft. in width, and a carriageway 35ft. wide, formed of asphalte macadam.

New schools are about to be built at Laverstock, Wilts, from plans by Mr. Fred. Bath, of Salisbury.

A new theatre is in course of erection at Kimberley, in the Diamond Fields district, South Africa. Mr. Sydney Stent, F.R.I.B.A., is the architect, and Mr. C. T. Jones the contractor.

A large three-light stained-glass window has been recently placed in the south transept of St. John's Church, Brooklands, Manchester, in memory of the late Mrs. Lloyd. The window contains scenes illustrating the raising of Lazarus. In the circular light at the top is a full-length figure of St. John. The work has been carried out by Messrs. Lavers, Westlake, and Co., London.

The death is announced of Mr. John Duncanson, a native of Airth, and a builder in Glasgow, in his fifty-fourth year. Mr. Duncanson erected the Grand Hotel, Charing Cross; the Stirling District Asylum, Larbert; Sandringham Terrace, and many streets in Hillhead and other districts.

One of the great architectural features of Sydney is St. Mary's Roman Catholic Cathedral, the northern portion of which, as far as the central tower, it is proposed to complete as a memorial of the centenary of New South Wales. Mr. W. W. Wardell, F.R.I.B.A., of George-street, Sydney, is the architect, and the total outlay on fabric and fittings up to the present time since the foundations were laid in 1866 has been £113,666. The last contract, that for the north transept and Archbishop Vaughan Memorial Window, has been carried out by Mr. John Young.

CHIPS.

The tender of Mr. W. M. Blackburn, of Newport, Mon., has been accepted at £2,700 for the erection of a new theatre in that town. Mr. W. Gardner, of Newport, is the architect.

At Glasgow Northern Police-court on Monday, a plumber, Robert Lyall, was sentenced to seven days' imprisonment on a charge of fraud. Lyall had been engaged by a grocer in North Woodside-road to repair the roof of his shop, and obtained 3s. 9d. from the grocer on the representation that he had paid that sum for solder. Subsequently, during a heavy rain, the roof again leaked, and on examination it was found that Lyall, instead of using solder for the repairs, had put on a quantity of putty.

The new Middle Class Schools erected for the Skinners' Company at Tunbridge, were opened without ceremony on Wednesday. The building is Gothic in character, built of red bricks, and the chief schoolroom, measuring 70ft. by 30ft., is covered in by an open roof. Mr. A. Burnell Burnell is the architect, and Messrs. Oakley and Drake were the builders. The late Mr. Cooper Fagg was clerk of Works until his death, just before the building was completed, cut short a promising career.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BEDMINSTER.—For the erection of a new school at Knowle, for the School Board for Bedminster, near Bristol:—

Broad, T.	£1,978 9 0
Wilkins, J., and Son	1,940 0 0
Stephens and Bastow	1,923 0 0
Forse, H. A.	1,880 10 0
Turner, S.	1,855 0 0
Wilkins, R., and Son	1,854 0 0
Eastabrook and Sons	1,824 0 0
Cowlin, W., and Son	1,800 0 0
Bastow, J.	1,792 0 0
Beaven, A. J.	1,773 0 0
Church, W.	1,723 0 0
Perrott, J.	1,658 12 0
Hayes, C. A. (accepted)	1,657 0 0

BOURNEMOUTH.—For carrying out the sea-water watering scheme, for the commissioners. Mr. G. R. Andrews, surveyor:—
Sanders, H. I. J. (accepted) ... £7,883 8s. 0d.
(In lieu of that from Messrs. W. H. Hill and Co. recently accepted at £6,768, but withdrawn on account of error of £1,000.)

BRIDGNORTH.—For repairs to the Grammar School, for the town council:—
Head, R. (accepted)).

BRIDLINGTON.—For the erection of a sea wall and promenade in front of the Beaconsfield estate, for the local board:—
Clarke, Sheffield (accepted) about £9,000 0 0

BURTON-ON-TRENT.—For the erection of the Broadway schools in Branstone-road, accommodating 525 children, for the Burton School Board:—
For the main buildings:—
Hodges (accepted) ... £4,640 0 0
For asphalting, &c.:—
Mellors, H. C. (accepted) ... 815 0 0
(Nine tenders received; cost per head £8 11s. 9½d.)

GLOUCESTER.—For the erection of Salvation Army barracks, at Gloucester, for General Booth. Mr. E. J. Sherwood, 101, Queen Victoria-street, London, E.C., architect. Quantities by the architect:—

Gardner, G.	£1,156 17 0
Munday, J., Wimbledon	1,110 0 0
Lane, D.	1,010 0 0
Williams, W.	990 0 0
Jones, W.	984 0 0
Coxhead, F. J., Leytonstone	960 0 0
Jones, D. C. and Co.	948 0 0

Rest of Gloucester.

To Municipal Authorities, Engineers, and Surveyors.

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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1707.
FRIDAY, SEPTEMBER 23, 1887.

THE EXETER THEATRE DISASTER.

THE verdict of the jury in the case of the Exeter Theatre calamity will be received with considerable interest, though not without serious alarm at the large amount of risk evidently entailed on the playgoing public. As regards the efforts of the manager and his assistants to extinguish the fire, the Coroner thought all that could be done had been tried, although the fire-extinguishing apparatus had not been so complete as might have been provided. Referring to the cause of the fatal calamity, the gallery exit and staircase might have been *per se* perfect as a piece of construction; but their arrangement was faulty as a means of providing safe exit for four hundred people from the gallery. These points have been made the subject of a few very strong comments, appended to the jury's verdict of Accidental Death. In the first place, the licensing magistrates are censured for granting a license before the theatre was properly completed and inspected; they not having completed the inspection of the theatre, and satisfied themselves that all their suggestions had been carried out, especially as regards the second exit from the gallery; and that they allowed themselves to be misled by the architect in the matter of the exit from the gallery to the second circle. The magistrates apparently had never noticed the fatal post and pay-office which obstructed the gallery stairs, and which were not put up till after their visit of inspection. The riders of the jury are to the following effect:

1. We consider the magistrates are much to blame, and deserve censure for not having completed their inspection of the theatre and satisfied themselves that all the suggestions made by them had been carried out, especially the second exit from the gallery, and that they allowed themselves to be misled by the architect in the matter of the exit from the gallery to the second circle. We consider also that it was unwise to grant a license for a building in such an unfinished state. We regret the action of the magistrates in declining as a body to recognise the authority of the Coroner's Court, and their lack of courtesy to the Government Commissioner attending it.

2. The jury regret that the Town Council's by-laws do not allow of their efficient control over public buildings, especially as regards means of ingress and egress, and that their surveyor was not more fully instructed. We recommend a radical revision of such by-laws without delay.

3. We deeply deplore that the architect, having been engaged by the directors as a specialist, should have produced a building with so many structural defects, especially in the place where so many of our fellow-creatures fell, at the second landing outside the pay office. We find that many persons lost their lives owing to the post erected there, and consider this post, the gateway below, and the pay-office just above, with the door opening outwards, a very bad arrangement.

4. The jury further think the architect failed in his duty in not providing a second exit for the gallery. They do not consider the way over the rail from the gallery to the second circle a legitimate exit in any case, and are surprised that Mr. Phipps, as a business man as well as an expert in theatre designing, should have suggested it in his evidence. That the gallery staircase *per se* was not a ready exit from the theatre, and that when the presence of the post is considered, which Mr. Phipps admits was there on the opening night, we regard it as doubly dangerous. That Mr. Phipps's explanation of the presence of the hydrant in the flies on the plan, and not in fact, was most unsatisfactory. That the jury do not consider Mr. Phipps qualified to ignore the rules of the Metropolitan Board of Works as regards the erection of theatres, and they think that had he followed these rules, as he alleged they would be, he would have acted wisely. That had the architect raised the roof of the auditorium several feet higher, it would have carried up the smoke, and have allowed the gallery audience more time to escape.

5. We consider that legislation bearing upon the inspection and remodelling of means of exit, and the stage working arrangements of all theatres, and the prevention of fires therein should receive the earliest attention of Parliament.

6. The jury suggest that some effectual plan of excluding fire and smoke from the stage and other portions of the building be adopted by the fixing of a water screen or other apparatus.

7. We consider that the Chief Constable should be empowered to make inspections at all times of all parts of the building, without notice to the directors or to managers. That he make such inspection at least once every month when the theatre is open, and thereupon transmit a report of his inspection to the town council, and state whether all fire-hydrants, ventilating apparatus, &c., are in perfect working order.

8. We suggest that before a magistrates' license is granted for any public building, such building shall be thrown open, with all its approaches, entrances, and exits, to the inspection, under police supervision, of all householders in the borough for a week after its final completion.

There is surely something radically wrong in a system of administrative law which could have made it possible that these defects could have been permitted to pass. Where are the by-laws of the Corporation? But even these are, it appears, inoperative, through want of efficient control on the part of the officials. The rules laid down by the Metropolitan Board of Works as regards the erection of theatres are explicit enough, and though not binding in the provinces, we cannot see how they came to be so completely set aside even by an expert of Mr. Phipps's standing. A second exit from the gallery which held so many should, at all hazards, have been provided, and we consider that every successive tier in height should be provided with additional, instead of fewer, exits. Some architects think that a gallery entrance may be small and inferior compared with those leading to the lower portion of a building, like the stalls or dress circle, and this mistaken view is generally acted upon, to the risk and danger of those who frequent galleries. The gallery staircase formed in the Exeter theatre a rather tortuous and awkward means of escape. The half-landings and separate flights, it is true, were there to check a precipitous rush in case of a panic: but these being provided, it was the duty of the magistrates or their officials to see that the staircase was absolutely free to its full width of 5ft., and that nothing should impede the descent of a crowd in case of fire. Then another mistake was to open a doorway from the upper circle on to the gallery stairs, making it do double duty. Here, again, is seen the error of making the single gallery entrance serve two divisions of the house instead of being confined to its chief intention. A further point to notice is the censure of the jury as regards the neglect of providing a hydrant in the "flies." Though shown on the plan, it was not fixed. How could so important a fitting have been overlooked? There is a further matter made the subject of comment by the coroner, and also by the jury—we mean the provision for carrying off smoke in case of a fire. The auditorium ceiling was too low, and a few feet of additional height would have made it possible for the hapless occupants near the ceiling to have breathed a little longer. The use of a water screen or some other apparatus is suggested as a means of excluding fire and smoke from the stage and other parts of the theatre. Certainly we are a long way behind in not having introduced a mode of getting rid of smoke. Nothing, we see, is said about the provision of an iron curtain to shut off the stage from the auditorium, though its advantages are not to be pooh-poohed by stage managers who find it expensive and troublesome. The double screens of plate iron with a 6in. air space, made by Messrs. Clark, Bunnett, and Co., would at any rate have done something at an early stage of the fire to have cut off the flames and smoke, which instead were wafted inwards towards the audience. Then, might not automatic sprinklers have been provided over and round the stage, like those fixed in Mr. Terry's new theatre in the Strand? But this, unfortunately, is not the time to speculate on what might have been done. Future legislation is demanded; and not only legislation, but administrative power and vigilance as well. At Exeter, unfortunately, the Metropolitan regulations had no legal binding force, although if they had, it seems doubtful whether they would have been carried into effect. The need of compulsory legislation is urgent, and competent officials should be empowered to inspect all theatres throughout the country, so as to supersede the services of licensing magistrates. But beyond all this, it is really the duty of architects of theatres, as of all other buildings, to take all reasonable precautions. We write with reserve; but at present we cannot but think the censures of the jury on Mr. Phipps are fully warranted by the facts. We should be glad to find any reasonable ground for a different conclusion. A fortnight since Mr. Phipps wrote to us that he was "being abused by all the Press with no real knowledge of the matter," and that "when the proper time comes" he would supply us with plans of the structure at Exeter. The "proper time" has certainly come for any such justification as Mr. Phipps may feel inclined to offer, but at present we certainly do not see how the two damaging points dwelt on by the jury—the insufficient exits to the gallery and the absence of the hydrant in the flies—are to be explained.

SANITARY SITES AND ARRANGEMENTS.

THE rather serious outbreak of fever of different forms in various parts of the Metropolis and provinces has awakened many sanitary authorities to their duties as guardians of the public health. In many districts of London, householders have received printed instructions cautioning them to attend to the weekly removal of their refuse and the contents of ashbins, to the periodical cleansing of cisterns, and to the examination and disinfection of all drains that may be out of order. These instructions and gratuitous leaflets on the desirability of disinfection have doubtless stirred many apathetic householders to the sense of their duties to themselves and neighbours; but they are of very little avail to stay the dissemination of a disease when the evil is already at our doors. At best they come then only as remedial measures. For example, it is of little value to a householder to be told that he must cleanse, reconstruct, or disinfect when he resides in a house faulty in construction and full of sanitary defects. Only palliative measures can be taken, while the actual evil remains in the house and its system of drainage. Indeed, it is remarkable that the inmates of some houses should escape an epidemic when everything favourable to its existence should remain in the house, its site, and its fittings. They must do so simply from the natural power of their constitutions to throw off the poison, whereas another tenant would be stricken down.

There are two noticeable classes of buildings which come under the designation of unsanitary dwellings. The first are those which have been built upon unsanitary sites; the second, those in which the arrangements are imperfect. A great many of the smaller houses in London are built on soils which are notoriously of unhealthy character. In many cases the foundations have been excavated in made ground, formerly heaps of vegetable and animal refuse which have never been drained. These sites are numerous. At Battersea, Wandsworth, Camberwell, and many of the localities traversed by railways,

we find large excavations that have been refilled by scavenging contractors. These were formerly levelled, and let as building ground; but since the by-laws were framed for the foundations and sites of buildings in the Metropolis, under the Metropolis Management and Building Acts Amendment Act, 1878, the sites of houses are now looked upon as of some importance. Before that date, although sanitarians were fully aware of the danger of building on sites filled up with refuse, thousands of our suburban houses were erected on them, and there is little doubt that the ailments which occasionally afflict members of families who reside in these houses, the drainage of which is supposed to be good, are due to the gases which are emitted through a depth of made soil composed of animal and vegetable matter. Doctors and sanitary experts may have been called in to advise and report; the drainage has been probably laid down upon the approved system disconnected from the sewer, and ventilators introduced; but the secret of the ill health of the inmates has eluded their grasp, and there is slight suspicion that beneath the living-rooms is a mass of pestilential matter giving out in certain conditions of the atmosphere exhalations of the most deleterious kind. What wonder is it that certain of the inmates never enjoy good health! The existence of cesspools beneath floors is even now of common occurrence in country places; but the emanations from made soil are almost equally bad. The danger of living over sites of this kind was in time perceived, but, unfortunately, not till half our suburbs had been built upon. Now no house or other building can be erected on any site which has been filled up with "any material impregnated or mixed with any fæcal, animal, or vegetable matter," or with dust or slop, unless such matter or refuse shall be removed by excavation, and any holes are to be filled in with "hard brick or dry rubbish. The site, moreover, of every house is to be covered with a layer of good concrete 6in. thick," unless the site be of "gravel, sand, or natural virgin soil." So far so good. We cannot question the wisdom of these rules.

There are circumstances which have not been dealt with by legislation as regards to site, and we may here say a few words upon conditions which even these rules scarcely touch. In our mind we have a row of houses of modern construction built along the foot of a natural slope or hill, in a southern suburb of the metropolis, the soil being clay, and the basement floor some feet below the ground at the back, though the fall of the ground has given the houses in front an appearance of elevation above the road level. All the drainage of the high ground at the back naturally finds its way over the stratum of clay and into the basement. The houses are generally musty and damp. There can be no question of the pernicious influence of such a site, pleasant otherwise as it is. The concrete layer would not mend matters. What is wanted is an intercepting drain to carry off the drainage of the hills and rainfall along their foot, or a dry area all around the houses. The question of drainage of soil and interception of ground air, apart from house drainage, is one that does not trouble the heads of building legislators. House drainage may be perfect, and yet the house is not healthful—it is built on water-logged soil, or upon a flat clay stratum always damp. We remember a sound maxim given by Mr. Edwin Chadwick, the veteran sanitary reformer, to the effect that the subsoil water of the site of a house should be lowered by drainage to not less than 3ft. from the surface.

Applying this test, we should like to know how many sites, in the South of London, for example, would pass? The sewerage works of the Metropolis have considerably improved this aspect of the question, yet we are sure that defective drainage of the soil has favoured the spread of epidemics in all the low districts. A sound sanitary specification ought to make the matter of subsoil drainage a primary one; instead of which, it is shelved. A dry subsoil would rob an inferior superstratum of its dangerous properties. Let us turn to the second condition. We have a variety of dicta on the subject of sanitary fittings, and these are so well understood that it would be presuming on the ignorance of the professional reader to repeat them. These rules have emanated chiefly from sanitarians, engineers, and plumbers. Champions of traps and ventilators have essayed to descant on the merits of systems of drainage; but they have left out of view principles of house arrangement, which have been regarded with indifference or taken as unalterable. Many of the modern houses in and near London are very defective in their sanitary arrangements. Such things as closets under pantries or larders, or sitting-rooms, or placed between two bedrooms without external ventilation, and lighted by a borrowed light through one bedroom, are simply abominations, and not uncommon; but if the drainage is good, they would be passed. Tenants have to submit to these arrangements, as they cannot appeal to any authority to rectify structural abuses. They are matters in the hands of the builders; in some towns the by-laws under the provisions of the Public Health Act require that every closet within a building shall have one side an external wall; but how few of the older houses are planned upon this principle? The general distribution of the fixtures are often imperfect. In good houses we find lavatories in bedrooms or next them, so that the drainage system is in communication with the sleeping apartments. This is a generally condemned plan, but is still found in superior houses. Another very common arrangement is to find two closets in different parts of the house. In all these instances simplification and easier sanitary control might have been insured by grouping together the conveniences so as to economise piping and ventilating arrangements. Plumbers' fixtures are so well understood that it is almost superfluous to give advice upon them. What we more especially desire to say is that sanitation, to be effectual, ought to be arranged during the planning of the building—in fact, before the house is erected on the site. Before we lay a brick the drainage of the soil should be attended to. A damp or doubtful soil should be cut off from the building by a ventilated space below the ground-floor level, or if a basement must be provided, then by a lining of asphalte. Effectually to accomplish the purpose requires a careful study of the site, its levels and drainage. We must attribute the prevalence of a large class of diseases and epidemics to damp and unhealthy substrata, from which vapours and gases are constantly being evolved partly by the warmth of the house. While attaching much importance to the sanitary work of the last twenty years, we ought not to lose sight of the fact that it has been of a spasmodic nature, and that its rules have been applied only to a small percentage of the houses in our great towns.

SANITARY DRAINAGE OF BUILDINGS.*

A CONCISE little handbook has been published by Mr. Paul Gerhard, C.E., of New York City, embodying notes on recent practice in sanitary drainage. It is issued in Van Nostrand's Science Series. The author, who is an authority on sanitary matters, and whose works on the subject of house drainage and plumbing we have before noticed, ha condensed a great deal of information in thi little guide for architects, engineers, and others With the help of it one may easily prepar a plumbing or drainage specification. The lead ing requirements of plumbing work will b found briefly mentioned, and the second part "Maxims of Plumbing and House Drainage, embody in terse sentences the rules to be ob served on planning. We commend the follow ing rules to all architects: "Avoid a useles multiplication of plumbing fixtures. Let th amount of plumbing work in a house b reduced as much as possible. Above al avoid locating fixtures in unoccupied o spare rooms. Do not place plumbing fi tures of any kind in sleeping rooms, no even in unventilated closets adjoining them Always arrange fixtures so as to be concentrate as much as is consistent with convenience i use, in compact groups. Have as few vertic lines of pipe as possible; avoid long horizont runs of pipe. In small cottages place th bath-room as nearly as possible over th kitchen, in order to reduce the amount piping and to simplify the whole work. small houses it is preferable to separate th water closet from the bath room, and to gi to each of them a well-lighted and ventilat apartment. In toilet and dressing-rooms adjoi ing bedrooms, the w.c., lavatory, and bath m be, however, arranged together. . . . Place soil, waste, and supply pipes outside of walls partitions. Let pipes pass in sight throu closets, and have them fully exposed in bat rooms." After a list of such rules the auth describes the construction, and lays do general conditions to be observed by plumber, the materials to be used, and weight of lead pipes for different pr sures. Referring to wrought-iron pipes, following specification is given for soil, wa and vent pipes. "To be of standard wrought-i pipe, having a uniform thickness of not than one-quarter of an inch, the pipes to lap-welded and proved at the iron mills to 53 per square inch by hydraulic pressure, t coated after being heated with a preparatio coal tar and asphalte (or to be treated with Bower-Barff or other rustless process); fitti for soil and waste-pipes to be protec against rust by the same process as app to the pipes, to be tapped truly strai and to have a strong shoulder." Mr. Gerh furnishes concise descriptions of traps, sup pipes, stop cocks, valves, solder, pig and s lead, fixtures, cement, putty, sand, and mor The workmanship is next described, such pipe joints, &c. Test of the work during struction and after completion, and suggest for a sanitary code are included in this c pendious little book, which will be a us *aide memeire* to the professional man. memoranda of cost will be of service to American architect and builder.

* Notes Embodying Recent Practice in the Sanitary Drainage of Buildings, &c. By W. PAUL GERHARD, C.E. New York: D. Van Nostrand.

Six memorial stones of a new Wesleyan scho Hipperholme, near Halifax, were laid on Satu The new school, which is to cost £1,200, adjoin the present chapel, and will accomm 340 children, having ten classrooms, be assembly room. Mr. G. H. Elliot, of Hipperh is the architect.

A new central post-office for Douglas, Is Man, was opened for business on Monday. situated in Regent-street, off the Promenade. building has been planned and built unde superintendence of Mr. H. Tanner, Survey Works, London. The clerk of the works wa G. H. Patterson, of London, while the contra been carried out by the executors of W Gradwell, of Barrow-in-Furness, their forem the work being Mr. Joseph Allison.

The City Commissioners of Sewers ha structed their Street Committee to co whether any, and, if any, what, better m could be adopted for cleansing the cat gullies, and drains in the City and for imp the construction of the drain-pipes leading main sewers.

The memorial stone of new schools n course of erection in connection with All Church, Hoole, Cheshire, has been laid Countess Grosvenor. Mr. Davies Colley, of street, Manchester, is the architect, and Browne, Tower Works, Chester, the cont The cost will be £1,300, the style Gothic, facing materials local brick, with Ruabon cotta dressings.

SANITARY CONGRESS AT BOLTON.

THE tenth annual Congress of the Sanitary Institute was opened at Bolton on Tuesday by a formal reception by the Mayor at the Town Hall, after which an exhibition of sanitary apparatus and appliances arranged in the Drill Hall was inaugurated. The Exhibition is divided into the following classes :—Building materials, construction, and machinery ; water supply and sewerage ; heating, lighting, and ventilating ; personal hygiene, foods, filters, and disinfectants ; articles of sanitary interest not included in the above classes. To the drill-shed, which is admirably fitted for the purpose to which it is temporarily devoted, an annexe has been added, the whole being filled with exhibits. The first general meeting was held in the evening, when the president, Lord Basing, better known as Mr. Sclater-Booth, delivered an address, on

SANITARY LEGISLATION, PAST AND FUTURE.

His lordship referred to the advance in sanitary science during recent years, originating with the Royal Sanitary Commission, and carried out under the Public Health Act of 1875. This measure, he considered, contained the most complete sanitary code to be found in any country, and it had greatly tended to diminish the death-rate. Still there was no finality in sanitary legislation, and while the Act had been amended in some details, many other modifications had been suggested. Powers should be given to enable local authorities to provide a dual system of sewerage and surface-water drainage, to protect sewers from noxious vapours from chemical and other works, to make the connections between the house drains and sewers, and to regulate the trapping and arrangement of such house drains, to prohibit the use of "lock-up" shops as dwellings, and the occupation of back-to-back houses. Greater powers were also needed with regard to checking the spread of, and dealing with, infectious diseases.

On Wednesday the section devoted to sanitary science and preventive medicine was opened by an address from Professor J. Russell Reynolds, F.R.S.

THE PLANNING AND ARRANGEMENTS OF SUBURBS.

Section II.—"Engineering and Architecture"—was inaugurated yesterday (Thursday) by an address by the president of the section, Professor T. Hayter Lewis, F.S.A., F.R.I.B.A. It was illustrated by many diagrams, maps, and plans, to large scale. Professor Lewis remarked that while in classic times the creation of a new city almost emphasised the foundations of a new colony, while in mediæval days towns arose round monasteries and the seats of bishops, or round a castle, of late years numerous towns, such as Fleetwood, Crewe, and Southport, had suddenly sprung into being ; whilst, from each of our large cities, extensive suburbs were being pushed out, forming, in fact, new towns. These extensions, to which he would confine attention, had almost invariably been carried out by speculators without any general definite guiding plan, with little or no forethought for future extension, and with slight provision for supplying the inevitable future wants of the inhabitants. Thus, in course of time, spaces had to be cleared out for churches, schools, institutes, baths, and such edifices, and clearances had to be made to allow for free breathing. But if this were the time of activity in building new towns and extending old ones, it was also pre-eminently the time of activity and power in corporate bodies. New and extensive powers were being acquired and exercised by corporations for the sewage, the supply of water and of gas, for providing open spaces, regulating the width of streets, and even the height of rooms and size of windows. He wished simply to extend these powers. He wished that when it might appear evident to a corporation that any district would require before long a large accession of houses for a population which was clearly increasing to an overflow, such corporation should have the powers (and he thought that public opinion would require it to exercise them) to acquire control over the requisite land—to formulate a general plan, giving the width and direction of the streets—to provide spaces for such public buildings as were certain to be required in a well-regulated community, and for such open spaces as were required for its healthy enjoyment. His scheme was not a very grand one in any respect ; he simply wanted to provide at first for those requirements which must eventually be provided, which could only be fulfilled at a great cost, and even then imperfectly, if not so provided at first. He did not even suggest that the corporation should build, but that it should give general guiding directions, leaving the working out to private persons, or to such companies as had of late done so much good in building dwellings of various classes, from the highest to the lowest. The president alluded to the earnest attempt made, some thirty-five years ago, by the late Professor Cockerell, R.A., to obtain a public control over the proposed buildings at Hampstead, a suburb now covered with houses. Mr. Cockerell drew out a design by which the whole of that suburb might have been built over on one definite plan, utilising the various hills and valleys, so as to take every advantage of its picturesque beauties. Public opinion was not ripe for such a course then, and this grand opportunity was lost. Professor Lewis proceeded to remark that he had taken as his text a smaller district near London, actually built over within his own memory, explaining his points by an enlarged plan of the district from the Ordnance map. He would point out, first, its defective arrangement, and, secondly, the way in which, by a little foresight, the defects might have been avoided. The houses in this district were of various classes. Some of them were good private dwellings, with forecourts and trees. Many others were tenanted by a superior class of artisans ; whilst other portions of the district realised the description given by Mr. Walter Besant, as being composed "of small houses almost all of one pattern—with no green thing to be seen—where no one plants trees. No flowers are in the windows—nothing to gladden the eye." And portions even realised the darker picture drawn by Mr. Froude, who described the dwellers in such a district as having "no sight of green fields, no knowledge of flowers, and with no entertainment but the music-hall." The district he referred to was still growing rapidly under the auspices of the speculator, who was building acre upon acre of houses with just so much care and attention as would allow him to obtain the highest rent at the least cost. It was bounded on the west and south sides by a railway, by the side of which ran the main road, about 30ft. broad, not wide enough for a footway on each side ; its one narrow path next the houses being crowded with foot passengers, and the road itself made narrower by costermongers' carts and stalls. On the north-west side the boundary was a really good road nearly 60ft. wide, and at the north-west angle where these two roads met was a railway-station, receiving and discharging thousands of passengers every day, and to the south was another station. To the east were spaces as yet unbuilt upon. This district had been filled up in a haphazard way. The builders had acquired one field after another and followed its irregular forms, or those of the country cross-roads or ditches, in laying out their new streets, and the result was about as bad a plan as it was possible to imagine—not in the slightest degree picturesque, simply puzzling and exasperating. One of the chief features in the district, the railway-station to the south, was altogether ignored, as it opened merely on to the narrow road, with no street opposite any part of it ; and a large number of the streets had dead ends to them, completely closing them against through ventilation, and very many more were not thoroughfares. The reason was that the builder who took the first area covered built the streets to the extremity of his odd-shaped fields, and used every inch of his ground, not leaving a vacant space for any opening eastward. So when the second builder came he was obliged to run new streets with dead ends, there being for more than a quarter of a mile not a single opening to the west. The further and important result was that the whole of the district eastward had been shut off from the main station to north-west, to which the slightest foresight would have given it an easy access. Such a suburb suggested how, by a very little forethought, a corporate body could so arrange the site as to have the same number of people at the same cost and on the same space of ground as was now covered, making such provision as would make it healthy and cheerful, and providing, at the outset, for such public buildings as must be eventually required. The necessity for some such provision had been repeatedly recognised, and in the appendix to the report of the Poor Law Commissioners, 1842, signed by the well-known name of Edwin Chadwick, was a suggested plan by Capt. Vetch, R.E., for laying out the suburbs of Birmingham, very much on the same principle as was now advocated. In these proposals the president said he had no Utopian schemes in view. He simply took the conditions of life as he found them, and did not suggest any provision for streets or buildings, public or private, not founded upon some actually existing. On a second map he showed the London suburb already described, with the streets, &c., rearranged as he would suggest them to have been laid out from the first. He held that it was drawn on the strictest utilitarian principles ; he had resisted all attempts at crescents or other curved lines, which would produce, no doubt, a much more pleasing effect than he had done, and there was not one single frontage which was not straight. All that had been done was to insure a ready access from any one part to another, and to provide that each street should have its ending in a wide, well-ventilated thoroughfare. Each district, too, would probably have some local peculiarity or object of interest, suggesting a varied plan, such—e.g., as the great Church of St. Paul, the Exchange, the Tower, the river, which formed the key-notes of Wren's design, and as the prominent hills furnished the leading lines in Professor Cockerell's ; or it might be some old ruin, something to make one think and to conjure up memories of bygone times, sermons or histories in stone, and so be religiously preserved. But, unhappily, the district described had no hill, no view, no river, and they had to think only of stations and tramcars. Having taken the two boundary roads as following the existing lines, they had to determine the direction of the main intermediate streets, the first consideration being the probable direct lines of traffic. The chief of these would be a wide avenue bearing direct to the railway station, and another bisecting it, each 60ft. wide, these lines to be followed by other thoroughfares of 40ft. wide, and all to be planted with trees. Professor Lewis proceeded to deal in some detail with the public works and buildings for which provision should be made, assuming that, as a matter of course, the sewers, water, and gas supplied would be provided in the usual way. In the first place, he would set aside a strip of land outside the whole for a park. Its distance from the furthest point would be about that suggested by Mr. Besant—viz , half to three-quarters of a mile. Neither in this case nor in that of public buildings did he propose the work to be undertaken at the first, but only so to arrange, at the first, that the sites should be so reserved as to be available when required, these buildings to include offices for the local authorities, and the library, reading-room, and science and art schools. The park would be about the size of the Hesketh Park at Southport, and in the arrangement of these public buildings it would be difficult, he thought, to take a better example than that of Southport, whose Lord-street and Albert-road formed one of the prettiest vistas that he knew, the chief public buildings being located behind a group of trees. Outside the park he would place the infirmary and convalescent home, a position in which they would have free light and air. If any one suggested that such a position would be too public and lessen the enjoyment of the park, he would refer him to the infirmary and children's hospital in that town of Bolton, and ask him whether, as a simple matter of landscape effect, to say nothing of the value of such an outlook to the patients, he would wish this picturesque building, designed by one of their able townsmen, Mr. Knill Freeman, to be removed. Or again, think of the charming way, and without the slightest feeling of sadness, in which the promenade at Southport ended with such a building, whilst at two such different places as Manchester and Hastings the infirmary formed one of their most prominent buildings. The market might be open at the sides ; but covered as at Preston and Blackpool, or be inclosed as at Bolton, Southport, or St. John's at Blackpool. He knew that many towns of importance (Norwich and Cambridge

amongst them) had still little more than open and uncovered market-places, healthy looking and pretty, with fruit, and flowers, and vegetables, on a fine day; but they often had quite other days, and the attempts at covering up and protecting the stalls then turned the market-place into a wretched collection of tumble-down huts—he had almost said as bad as Fleetwood. If the quarter were chiefly for artisans, public washhouses would be indispensable; and in any case, no matter what the class of inhabitants might be, he looked upon public baths also as a provision which could scarcely be valued too highly. He had not marked out definitely sites for these buildings, churches, chapels, or schools; but all these were provided for in the district as it existed, and sites would undoubtedly be claimed for and provided, whatever the general plan might be. He would proceed now to some other details, as to which he might not possibly have the assent of his audience. First, as to drinking fountains. That such small ones as were now commonly seen should be provided, all would doubtless approve; but he wanted something more than these, as much for the sake of health as for ornaments to the town. They all knew the conditions of house cisterns in many districts of the poorer class. He need not go into details, but would say that a good supply of water, pure for drinking, was an element of health which ought to be provided, and that it could not be provided in a better way than by fountains. These, in what were now called the dark ages, formed some of the chief ornaments of a town, and he saw no reason why they should not do so now. He did not want to bring in such vast bodies of water as were brought through miles of aqueducts into Rome, or such lavish displays as might be seen—*e.g.*, in Paris, or even such things as our fountains in Trafalgar-square. Nearly all these sent their waters into the drains. There were fountains even now in most of our towns, but with all the water running to waste; whereas in some of the most picturesque mediæval examples it came out in small useful jets, as he would have them there; and he felt no doubt that by a careful arrangement of gas-jets the effects of frost might be prevented, and a great boon thus conferred in winter on rich and poor alike; whilst, by a skilful design, they could be some of the most pleasing ornaments to the town that could be conceived. As part of the water must go to waste, send it to feed a small stream in the park, like the one at Bolton or at Hastings. Another accessory was that of seats placed at intervals between the trees, and to complete his plans he would have a small open space opposite to each railway station. Now they had to see, before entering into the question of the kind of houses to be provided, how much the plans suggested had trespassed upon the space now occupied. He had laid out his main roads in very much the same general direction as the present ones, though in less circuitous lines; but had made them 60ft. wide instead of 40ft., and had set apart spaces for public buildings, &c. The smaller streets he had made 40ft. wide, the width required by the Model By-laws being 36ft. The space assigned to the park need not be taken into calculation, as it was altogether outside that now built on; and it would therefore be seen by comparison of the plans that the great waste of space necessitated by the irregular plan of the district as now actually existing would allow to a very great extent, if not altogether, for the extra space which the suggested rearrangement would require. As to the general arrangements of the streets and houses, he called attention to some methods, unusual to us, with which one met abroad. Omitting any notice of the large many-storied houses familiar on the Continent, he would take as examples one of the northern towns in Europe, Hamburg, and one of the southern ones, Naples. At Hamburg, the president continued, the arrangement is peculiar. The main streets are wide, and give to a casual passer-by scarcely any indication of their affording access to any other streets. But a nearer inspection shows numerous doorways, so low and narrow that they appear to lead only into cellars, and through which you have often to descend by steps, and these lead into the streets behind, locally named Hofs, which we should call alleys, and which are, of course, completely closed against ventilation from the main street. They vary from 20ft. to as little as 5ft. in width, the houses in the wider streets overhanging on each side and being densely populated. They usually abut on canals, and when these are dry the result in hot weather may be imagined. This arrangement, intended, no doubt, to bring different classes of the people together, reminds one of the Wynds of Edinburgh, but with all their evils intensified, and a worse result could scarcely be imagined. Very many of these have been demolished, but a large number still remain. At Naples the same attempt has been made, and the particular class to which I have alluded may be seen to perfection in the drive through Portici. The streets throughout are wide, and lined for the greater part of their length with frames of macaroni hung out to dry. The houses on each side are several stories high, the first floors (*piani nobili*) having wide balconies, and altogether having a cheerful look, and being tenanted by well-to-do and often wealthy people, whose apartments are entered from an internal court approached from the street by a lofty carriage gateway. But the lower stories throughout, close on the ground, are tenanted by humbler classes, their rooms entered from the street. Here again we meet with an attempt to combine the classes, and thus prevent one neighbourhood being given up to the poor and another to the rich. But again this fails. The lower rooms have no windows or other openings at the back, and derive the whole of their light and air from the street. The state of the inner rooms, usually parted off by a curtain as sleeping apartments, in the heat of an Italian summer may be imagined. Were it not that the people live almost entirely in the open air they must be decimated. The same arrangement will be found in most other Italian towns; but in them there is usually some opening, however small, at the back. Something of the same kind would appear to be adopted, judging from the plan only, in a flourishing town in our own country—viz., Great Yarmouth, the arrangement of which is very peculiar, and unlike that of any other English town with which I am acquainted. The main streets are wide and well ventilated, and lined with good houses (mostly shops) several stories high; and running between these streets at intervals of about 45ft. are long narrow alleys, termed Rows, out of which lead houses of an inferior class. Looking at the plan only, this would seem to be no better than Hamburg; but in reality they are vastly better. The entrances are open for their whole height to a wide street at each end, or to the spacious quay, the alleys are cleanly kept and well paved, the houses in them are low, so as to intercept the light and air very slightly, and each has a small court attached to it; and the whole arrangement is not prejudicial to health. Nevertheless, the narrowness of the streets does, no doubt, to some extent, clash with the golden rule which Dr. Richardson put very strongly in his well-known lecture at Croydon (1879): "Make the sun your fellow-workman," which is much the same as the Italian proverb, "Where the sun does not enter the doctor does." Now, the president continued, in remodelling our district, what system shall we adopt as to the houses? The first question is as to their number of stories. This subject is a serious one, for hundreds of acres near our towns are now being covered with two-storied dwellings, clustered close together in populous neighbourhoods, or semi-detached when more in the suburbs. The governing idea in respect of the self-contained houses of two stories is that of privacy, or, in the better class of houses, the absence of stairs; but in many of our new London squares one large open space garden, or yard (according to the class of house), is common to all; and the separate houses are being largely superseded by the dwellings in flats. At the first sight the two-storied houses would appear to have the recommendation of insuring a less dense population than in the many-storied ones; but I wish to consider the subject on the basis of the same number of inhabitants in each case, the area gained by the extra stories being appropriated to open spaces in the way of yards or gardens, so that no question as to the bearing of the density of the population upon their health will arise here. In considering the relative merits of the different styles of houses, the first fact which presents itself is that with those of two stories only the whole of their inhabitants must live and sleep either immediately over the ground or directly under the roofs. The nearer to the earth the ground-floor is the cheaper it is to build, as less height of wall is required; the consequence is that the floor is raised a few inches only above the street level, and the occupant has only that space between him and the earth. The rest of the inhabitants must live and sleep directly under the roof—not a very pleasant experience even in well-built houses, whether through the heat of summer or cold of winter; and very many here doubtless know what is the case where the house is run up cheaply merely to sell. In point of economy of building, and of course of rent, it must be borne in mind that, though the thickness of the lower walls must be somewhat greater in a high house than a low one, one roof will cover, and one foundation hold up, four or more stories as well as they will cover and hold up two. As to the general feelings with respect to the subject, I recall and agree with the words of my predecessor, Prof. Roger Smith, in his address at Glasgow in 1883, that the system of flats is opposed to the general feeling; and I agree with him, also, when he says that they are not so unpopular now, and have many advantages. Of course the height of houses, whether in flats or separate, varies very much, buildings of five, six, or seven stories, being common enough—my own house has six; but I propose, in the comparative plans which I show, to limit our consideration to four stories, which is the limit suggested by Prof. Robinson, in his address at Newcastle, 1882. My plan shows, first, the actual space at present occupied by two blocks each of fifty-eight two-storied houses, and the open areas of streets and yards; and, secondly, the space which would be occupied and the area gained if the same number of inhabitants lodged in half the number of houses, but four stories in height. The contrast as to open space is rather striking, and with increased height the size of that space will of course increase. I leave this matter for your serious consideration. One thing more. In his well-known address in 1879, Dr. Richardson spoke of his ideal cities as competing with each other in the beautiful as well as the useful, and I have spoken all the way through of doing what we have to do in the streets, the building the fountains, in such a manner as to give a cheerful aspect to the scene, and afford some scope, however slight, to the feeling of beauty which is inherent in mankind, whether for colour or form, for a flower or a building, and not to offend the eye by the mean and the ugly. Years back, in the prime of his life, Mr. Ruskin pointed out most forcibly "that it is chiefly by private and not by public effort that a city is adorned, and that it did not matter how many beautiful public buildings it may possess, if they are not supported by and in harmony with the private houses (and, I may add, with the factories) of the town"; and if it be held that all we have to do is to provide houses which shall be fairly comfortable whether for rich or poor, and that rows of such houses will answer all the purpose if built with windows large enough and numerous enough, and that nothing else in them need be studied, then I say that our town lacks one great feature which might conduce to the pleasure of its inhabitants, and in neglecting that we have neglected one means, however slight, towards that healthful mental state which helps the bodily so well.

On the same day (Thursday) a conference of medical officers of health was held, and in the evening Dr. Arthur Ransome, F.R.S., delivered a lecture in the Town Hall. To-day (Friday) the section of architecture and engineering will hold a second meeting, and the inaugural address to Section III., "Chemistry, Geology, and Meteorology," will be given by Mr. August Dupré. Excursions are arranged for to-morrow (Saturday), and in the evening addresses to the working classes will be given by Major Lamorock Flower, Mr. A. Wyer Blythe, and Mr. Henry Law.

CLASSES FOR BUILDING TRADES

IT may be of service to call attention to the scope of the Technological Examinations of the City and Guilds of London Institute in connection with building. The programme of

the forthcoming session includes amongst the subjects the following of direct interest to the profession :—Iron and steel manufacture, glass manufacture, pottery and porcelain, photography, electrical engineering, the use of tools, plumbing, carpentry and joinery, brickwork and masonry. The class of questions on the ordinary grade relating to carpentry and joinery suppose an acquaintance with the nature and properties of the various woods used, the parts from which they came, methods of seasoning and preservation of timber, its strength, and mode of planning and converting materials so as to avoid waste and shrinkage and obtain the maximum strength of the material. The student will be required to know the names and uses of tools and labour-saving machinery ; and so much of mechanical drawing as is required to represent details of carpentry and joinery, and working drawings. A very useful series of questions refers to a knowledge of the proportions of stiles, rails, muntins in doors and windows, the proportions of rails for knobs or latches, a kind of knowledge often left to be picked up in practice. Other subjects are to be found in textbooks, such as the intersection of mouldings at various angles, enlarging and diminishing mouldings, modes of finding the sections of moulded bars and hip rafters in skylights, &c., the geometry of raking mouldings over square and oblique plans. Finding levels for hip rafters, splayed linings, and other work, newel and geometrical stairs, joints, hinging, and other general details referring to the carpenter and joiner's trade, are included, in addition to the mechanical principles of carpentry, as in the forming of roofs and trusses and partitions, bracing doors and gates, fixing and striking centres, and other matters. For the Honours grade, the candidate is supposed to have passed these subjects ; but the questions will be more advanced, and a knowledge will be required of : (1) the various methods of describing centres for arches of different curves ; (2) circular work, including methods of bending boards, ribs, or mouldings round circular work by kerfing, grooving, steaming, &c. ; the moulds and ribs in groins and domes, circle upon circle, &c. ; (3) handrailing, the proper height of handrails over fliers, winders and round landings, method of describing handrail scrolls, theory and use of tangent planes and lines as used in the tangent system of handrailing ; method of determining the position of the face-mould plane to pass through these points on the centre line of rail. The candidate will also be required to draw to scale. Data will be given him for the purpose, and during the year preceding the examination he will be required to design and execute an original piece of work and to forward the same a fortnight before the examination. A working drawing is to accompany the specimen with the quantities of materials used. The dimensions of specimen must be such as to fit in a box not larger than 15in. by 12in. by 12in. The candidate has the opportunity of selling his specimen, and the examiner is authorised to recommend to the Company of Carpenters the purchase of any work he considers of merit. The works of reference given include "Notes on Building Construction" (Rivington's), "Drawing for Carpenters and Joiners" (Cassell), "Handrailing and Staircasing" (Cassell).

The brickwork and masonry syllabus is equally comprehensive, and includes questions on the names and properties of bricks, excavating in various soils, mode of laying drain pipes, ventilating sewers, and the general principles of sanitary science. Limes and cements, mortar and concrete making ; the width and height of footings for walls of varying thickness ; damp-courses and air bricks, ventilating underground floors ; brickwork, bonding hollow walls ; construction of fireplaces, ovens, flues, are amongst the subjects, a general knowledge of which may be acquired by the study of the treatises on Brickwork and Masonry in Lockwood's series, and Rivington's "Notes on Building Construction." Stonework in its different branches has to be learned, besides the mechanical principles involved in brickwork and construction, weight, crushing strength, &c. In the Honours examination the candidate will, in addition, be required to know methods of cutting and rubbing for gauged brickwork, terracotta construction, vaulting, window tracery, &c. Perhaps the most necessary to the student of the long list of books mentioned are the following :—"Dobson's Treatises on Bricks and Masonry and Stone Cutting," "Foundations and Concrete Works" ; Bourgeois's "La Coupe des Pierres" (Paris), Hull's "Treatise on Building Stones," Pasley's "Limes and Cements" (Weale), Faija's "Portland Cement for Users" (Lockwood), "Builders' Work," by Seddon, in addition to Rivington's works already mentioned. Looking over the questions set for 1887 in Carpentry and Joinery, there is nothing extraordinarily difficult. In the Honours grade, which is the highest, we find the following question, which may be taken as a sample :—"Draw to a scale of $\frac{1}{2}$in. to a foot, plan and section of an open flight of stairs 3ft. 6in. wide, to rise 12ft. from floor to floor, and having a square landing at a height of 8ft. from the floor ; show carriages, wood panelled soffit, and central line of handrail, the well-hole to be 15in. in clear between the returned nosings."

In the plumbers' work, the questions are pretty searching, and a practical test is given of the candidates' handbook. For all those who are seeking to perfect their technical knowledge of the trades, these examinations offer the student the best opportunity of acquiring a theoretical and practical knowledge of his particular trade.

PIPES AND JOINTS.

ARCHITECTS' specifications are not very explicit about the fixing of vertical and horizontal lines of piping, matters which are considered beneath professional attention and care. These details are left to the builder or the foreman to look after, with the result that in a few weeks or months after the completion of the building inconveniences are suffered owing to leaking of soil or of water pipes. The cast-iron rain-water pipes break away from their connection with the head, or the joints open through the lengths not being firmly held up by proper pipe supports in the walls. What is commoner than to find that the drain pipe or trap has separated from the vertical stack of pipes, causing a leakage of the rain water through the wall? The papering of a room gets irretrievably spoilt or discoloured before the fault is discovered and rectified. A few plain rules are required to be observed in making the joints of cast-iron socket-pipes for drainage purposes, or wherever leakage is to be prevented. One of the best plans is to insert a gasket of picked oakum into the space between the spigot and hub, filling up the space with molten lead. The lead is afterwards consolidated by means of caulking tools, and if done properly a water-tight joint can be made in this manner. To secure iron pipes to a wall various plans are adopted. Iron hooks are generally used to clench the pipe ; but a proper mode of fixing can only be insured by giving each pipe length a solid rest or an iron support let into the wall, to take the socket or hub of each, so that the weight may bear on it. There are now introduced fastenings which keep the pipe a little away from an outer wall, so that in case of overflow from the gutter or head the water runs down the spout, and does not touch the wall. In America expanding conductors are used, so that during freezing weather the seams open and prevent the pipe from bursting. These pipe-fasteners can now be obtained if architects only take the trouble to specify them. In very lofty buildings the contraction and expansion of these pipes ought to be provided for, especially in waste pipes receiving hot water. The failure in the joints often arises from two different kinds of pipe coming together. The joints, for example, between stoneware pipes and iron pipes are seldom found perfect. The use of brass couplings or ferrules is preferable to cement, the iron pipe being securely caulked at the end. The jointing of wrought-iron pipes is best done by screw threads smeared over by a thick paste of red and white lead and boiled oil. For lead pipes wiped or blown joints are used ; the latter if properly done will answer for cold supply between cistern and tank or cylinder.

In iron service piping for gas the runs should be carefully marked, and be as straight as possible, avoiding bends. One of the chief directions to be observed by the gas-fitter is that the pipes should not be laid level, but should have a fall to the main or towards the meter. Every fitter is supposed to know this condition, to avoid the accumulation of condensed vapour in the pipes, and also that every socket and joint should be whiteleaded so as to insure air-tight junctions. Strange to say, however, the modern system of laying pipes is often sadly at fault, and whether it be the sanitary fittings, the water supply, or the gas service, it is not uncommon to find these rules neglected.

CORN-STALK COLUMNS.

ARCHITECTURE in America has been generally credited with having reproduced old works, or, rather, well-known periods ; but a recent writer, Eugene Ashton, has described what are the only truly American columns in existence. They are to be seen in the vestibule of the Capitol at Washington and attributed to Benjamin Henry Latrobe, who succeeded Messrs. Hallett, Hadfield, and Hoban as architect. The columns represent clusters of Indian corn-stalks ; these are so bound that the joints of the stalks form a spiral line round each column. The capitals are composed of ears of maize with half-open husks showing the corn. Writing to Thomas Jefferson, Latrobe thus alludes to his invention : —"I have packed up and sent to Richmond, to be forwarded to Monticello, a box containing the models of the columns to be used for the lower vestibule of the senatorial department of the north wing of the Capitol, which is composed of ears of maize. . . . . These capitals during the summer session obtained me more applause from the members of Congress than all the works of magnitude or difficulty that surround them. They christened them 'corn-cob capitals,' whether for the sake of alliteration, I cannot tell, but certainly not appropriately." It was doubtless owing to the suggestion of Jefferson that native vegetation might be appropriately conventionalised for columnar designs that Latrobe set to work and produced these columns. The writer who refers to these columns observes: "They are a bold stride towards forming for ourselves an ornamentation peculiarly in keeping with our new and vigorous Government. That our buildings have to be supported by Doric, Ionic, and Corinthian columns, unrelieved by anything of our own conception, is strange when we consider the independence of the people of the United States." We may remark in connection with columnar design that the Egyptians in the same manner conventionalised the lotus in their capitals ; the Corinthian capital was, no doubt, a suggestion from the natural acanthus leaves spreading through a basket, as related in the pretty story of its origin ; and the Mediæval artists in the same manner may owe the origin of their beautiful clustered shaft and folial capitals to a cluster of stems and the bursting out of foliage at the top. The first idea, at least, was doubtless suggested by vegetable growth, which the artist conventionalised for his purpose.

LATHING.

ONE of the latest building inventions introduced by our American cousins is the "Eureka Sheathing-lath," a kind of grooved and tongued boarding indented with a series of grooves of dovetail shape, intended to receive the mortar or plaster, and to act as the "key." The combined sheathing and lathing is being employed by the profession, and is meeting, it is said, with favour. No doubt there is less waste of mortar, as the material does not go through as it does between the common fir laths. The labour of lathing is also reduced, as the sheathing lath can be fixed quickly on a wall or ceiling. The wire lathing is now being introduced in many English buildings, and has been largely used in the United States Custom House, Court-house, and post-office buildings. This form of lathing has the advantage of being fireproof ; the plaster clinches on both sides, forming a double surface, and the plastering will not crack. These are certainly advantages.

Princess Louise has promised to visit Nottingham for the purpose of opening the Exhibition of work done at the recreative evening classes throughout the country, on returning from the Continent early in the winter.

WAYSIDE NOTES.

"Le bon temps viendra." When? The lists of tenders are down again: scarcely two columns and a half last week. Seriously we must all hope that Her Majesty's kindly words of encouragement to the bread-winners of the British Empire may rapidly come true, though things certainly do not look very clear on the horizon, especially to the average architect. Even the vast opportunities for building offered by the new streets formed by the Metropolitan Board of Works do not seem to have materially affected the sum of London business. Let us hope more rapid building operations will result from the proposed alterations to Parliament-street.

Tenders are advertised for by the Organising Committee of the Imperial Institute of the United Kingdom, the Colonies, and India. We may therefore expect to be shortly refreshed with some heavy amounts in the columns set apart fer these lists. It is very cheering to take up one's weekly journal and find a goodly array of weighty tenders, running into their hundreds of thousands of pounds; that is, if they be architectural, and not engineering and sewerage matters, as is so frequently the case.

In the matter of cubing: What is the average price per foot cube that an unscrupulous competitor puts on his designs? Assuredly it must often run at as low a figure as 3½d.! Well do I remember how, years back, I entered a competition only, alas! to meet with an opponent who cubed up at 3¾d. about, and won the day. How such persons can subsequently face the building committees is beyond comprehension. When this fellow's tenders came in they were just within a pound or so of our figure, and 30 per cent. above his own. May prosperity follow him just out of reach!

The detailed reports of the inquest at Exeter should be pasted in the architect's newspaper-cutting book. They are curious and instructive, and definitely show how little, with all the chronic talk about the subject, is really done to make our theatres fireproof. It will not be of much use to have certified theatre architects if the law is always to be as lax as at present.

Scores of suggestions are made by persons in every rank as to how to prevent fires in theatres. One says that the masher must not be allowed to smoke his cigarette; another that there should be external staircases, and so *ad infinitum atque ad nauseam*. Meanwhile, those who believe rather in prevention than cure are astonished to learn that there is only one theatre in London, and in the whole country for the matter of that, which possesses an iron curtain!

Recently I inspected a newly-opened building, and carefully examined the whole of the stage and its appliances. Being just completed one would naturally expect to see some attempt at fireproof construction. Not a bit of it. A wooden stage, an open wooden roof over, wooden construction in the flies, and scenes dangling about the gas-burners, which were only protected by a few horizontal wires. Of course there was no iron curtain. It is true there was a "patent" apparatus for flooding the stage; but such fittings, though better than nothing at all, are really but putting the value of *cure* before that of *prevention*.

Now this building is no worse, and, in fact, a good deal better, than most of our theatres and music-halls as regards plan and construction. But does it not seem a scandalous thing that there is no attempt to frame laws sufficiently stringent to compel the construction of properly fireproof theatres? Even in Spain I note that a regulation has been put into force which compels all theatres to be illuminated by the electric light. Electric illumination, fireproof construction, and iron curtains should be a *sine quâ non* if a new theatre is to be opened for the public.

On Sunday last the question of the removal of the block of houses between the Strand and Holywell-street was nearly being settled by fire. There is no doubt that, had the fire spread, it would have saved someone a pulling-down job. There being a good many timber houses, the block does not look as if it would take long to burn down. Few will regret the day when Holywell-street disappears; even the artist, as there are no over-picturesque objects even in that street or the adjoining north side of the Strand.

Mem.: On the south side of the Strand, about opposite the entrance to the Opera Comique, there are some old timber houses that deserve more than a passing glance. A very enthusiastic friend of mine says they are "lovely."

A chancel-arch only 6ft. wide! Why have any at all? At North Witham, in Lincolnshire, the recently restored parish church has only what is practically a doorway between chancel and nave. There is a certain amount of quaintness about such peculiarly small openings of the sacrarium. Examples, however, are few and far between. There is one, I believe, near Brighton. Is it not at the pretty village of Rottingdean, that nestles in the Downs near the coast, that there is an old, round-arched church with a tiny door only between the nave and chancel? I seem to have a recollection of tramping over the Downs to Rottingdean one Sabbath morning, and peeping into its venerable church, and seeing a quaint little chancel arch set some 5ft. or 6ft. above the floor-level of the nave.

I am glad to see that the Norwich Town Council have acquired the old castle, and that in the near future the massive Norman keep, formerly used as a prison, will be used as a museum, or otherwise dedicated to the benefit of the citizens. The castle, being very finely situated on an eminence in the centre, or nearly so, of Norwich, commands a fine view of this exceedingly interesting old city. The site was much too magnificent to waste on the convict class of the community.

Nota Bene.—The visit to-morrow of the A. A. is to a house in Cadogan-square, by Messrs. Ernest George and Peto. Members who enjoy a wealth of quaint composition and powerfully-conceived detail should not fail to join in the tour of inspection.

Another flagrant instance of the manner in which architects are ignored by the public and public Press has come under my notice. Last Monday, a detailed account of the consecration of the new English Church of St. Alban's, at Copenhagen, in a leading daily paper omitted all mention of the name of the architect. Professional men, of course, know all about who is doing this or that, but the public are left in ignorance.

Recently in Scotland (I believe at Edinburgh) a town council employed two individuals, an *architect* and a *builder* (we should say) to inspect some theatre or place of amusement and report as to its condition with regard to fire. In the reports in the papers, however, it was a *builder* and an *architect*!

Who is to blame? The public, the Press, or the architectural profession? On the Continent, especially in France, the architect is an infinitely more honoured personage than he is in England. If there is any report in the daily Press about the opening of new building works, the architect's name is mentioned as a matter of course, while here it is quite the exception. At any rate, no editor of a Parisian paper would put "builder" before "architect."

By the bye, the respectable builder seems nowadays rather prone to assuming the title "contractor" in preference to "builder." Why? Without a doubt, for the reason that he feels he is less liable to be taken for a jerry constructor, and it is greatly to be regretted that the good old word "builder" should be so falling into disuse. When we can snuff out the existence of jerry or demoralised speculating building, we may hope to see the honest church and house contractor assuming the honourable title of "builder" once more. "Carthage *must* be obliterated." "Jerry constructing *must* be annihilated," should be the watchword of the architect and the builder; and I would seriously recommend to the consideration of the promoters of the next R.I.B.A. conference that one of the discussions should be "On the jerry-building disease: its symptoms and predisposing causes, and the possibility of its eradication and cure."

Goth.

SKETCHES AT MESSRS. HALLIDAY'S SHOWROOMS.

We give illustration this week to a few sketches at the showrooms of the above firm at Eton, who have for some time been appointed art-furniture makers and wood carvers to Her Majesty the Queen, for whom they have lately made the beautiful Cradle shown. It is carved in limewood, and is for the infant Prince Battenberg. It is about 3ft. 2in. long by 2ft. high. The design is partly adopted from an old Florentine cradle. The work is pierced right through, and it is upholstered in red and white silk; the colours of Prince Henry. The work was designed as well as executed by the above firm. The casket shown was made for the Corporation of Windsor and presented to Prince Henry of Battenberg, together with the freedom of the borough. It was carved in brown oak, grown in Windsor forest. The Beatrice Table and Fire-screen combined was made in black walnut; the first having been made for H.R.H. Princess Beatrice. These are a few of the articles lately made by Messrs. Halliday for Her Majesty, and the Royal Family.

BIRTLEY CHURCH.

I send herewith tracing of sketches showing restoration of Birtley Church. The church is very ancient; parts are believed by Canon Greenwell, F.S.A., to be of Saxon date, but they are probably Early Norman—about A.D. 1100. The voussoirs of the arch have the characteristic axe and hatchet dressing in them. Excepting the walls, however, and the chancel arch, nothing save a few stones, crosses, &c., and the old priests' door, are now to be found, as about a century ago the windows, &c., were removed, and square-headed and wood-framed windows, and a plaster ceiling were inserted; these have now, however, been again removed, and the main part of the east end, and the spire and buttresses, &c., are newly built. The beautiful stained-glass windows at the east end are by Messrs. Powell, of London; Mr. William Wilton, of Birtley, was the builder. You will notice there are no windows in the north walls; this is usual in very old North-umbrian churches in exposed positions; the church stands on a hill top, with moorland, &c., around. The chancel tiles are laid by Messrs. W. B. Wilkinson and Co., of Newcastle.

Arthur B. Plummer.

CHIPS.

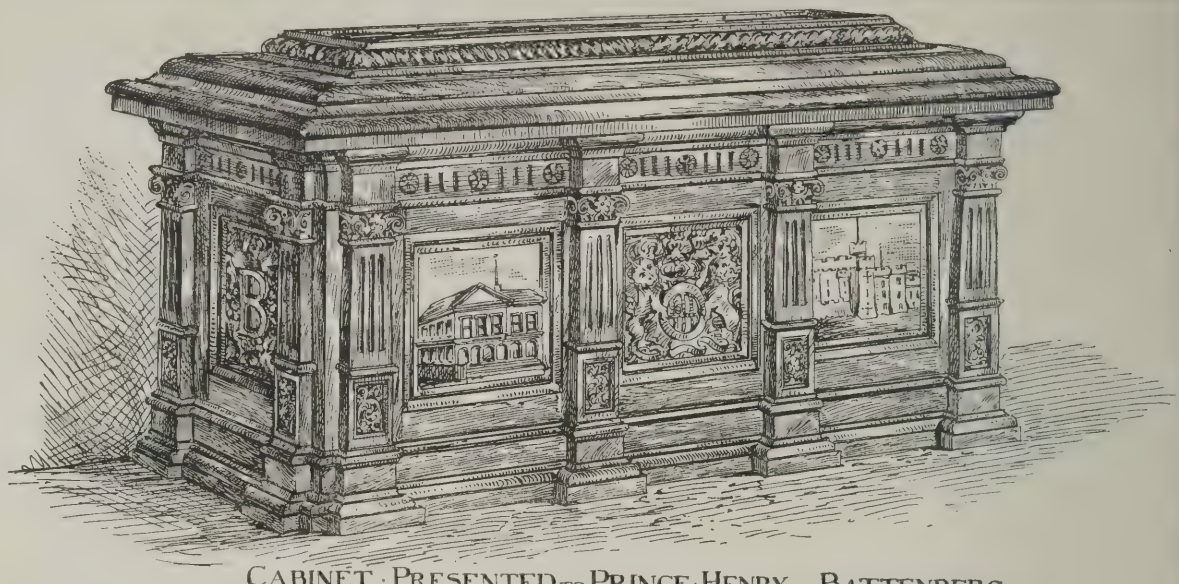
The second annual exhibition of the Southampton Art Society, under the presidency of Major-Gen Lacy, will be opened at the Philharmonic Hall Southampton, on October 12th. The private view will take place on the 11th, when there will also be a conversazione and an address by Mr. G. D Leslie, R.A. A good show of the work of local and other artists is expected, among the forme being pictures from Messrs. Masters and Skeats, o the Ordnance Department, Mr. Drinkwater Butt Mrs. Keary (the authoress), and others.

The chancel windows of Christ Church, Swan nell, Andover, have been recently filled with stained glass from designs by Mr. P. H. Newman of 45, Broadhurst-gardens, to the memory of th late Lieut.-Col. Earle, J.P.

At Upsall, near Thirsk, a new Wesleyan chapel was opened on Friday. It is Gothic in style, seate for 120 persons, and built in local stone with pitch pine fittings. Mr. Thomas Stokes, of Thirsk, w the architect.

St. Paul's Church, Bournemouth, was reopened on Thursday, the 15th inst., after the lengthenin westwards of the nave and north aisle, erection new reredos, and other works. Mr. Parker was th architect, and the work has been carried out b Messrs. George and Harding, at a cost of abo £1,900.

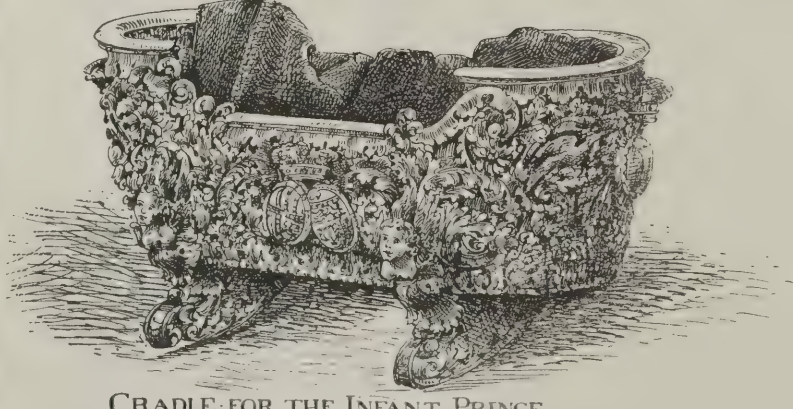
At a meeting of the master plumbers of Man chester, held on Wednesday week, under the cha manship of Mr. J. Jaffrey, a resolution was passe after considerable discussion in favour of th principle of registration for the craft, and a com mittee of twelve practical plumbers was elected t consider the best way of effecting registration.



CABINET · PRESENTED TO PRINCE · HENRY OF BATTENBERG



LID OF CABINET



CRADLE · FOR THE INFANT PRINCE



CARVED · TABLE & FIRE SCREEN

SKETCHES OF SOME PIECES · OF FURNITURE AT MESSRS HALLIDAY'S ETON



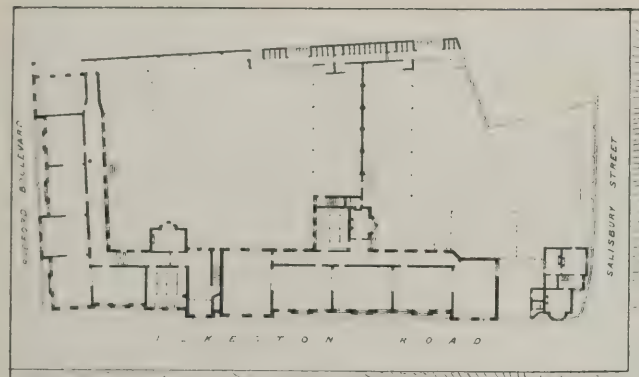
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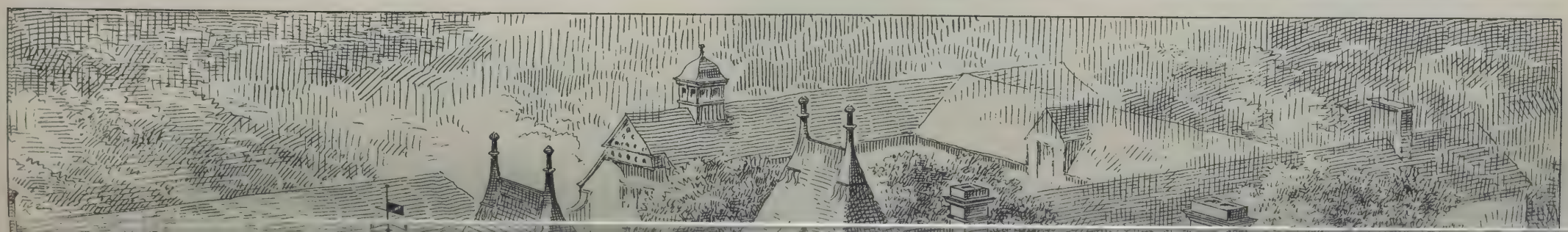
W. H. Young del.

NOTTINGHAM SCHOOL BOARD

Radford Boulevard Schools

GEORGE T. HINE, F.R.I.B.A.
ARCHITECT.





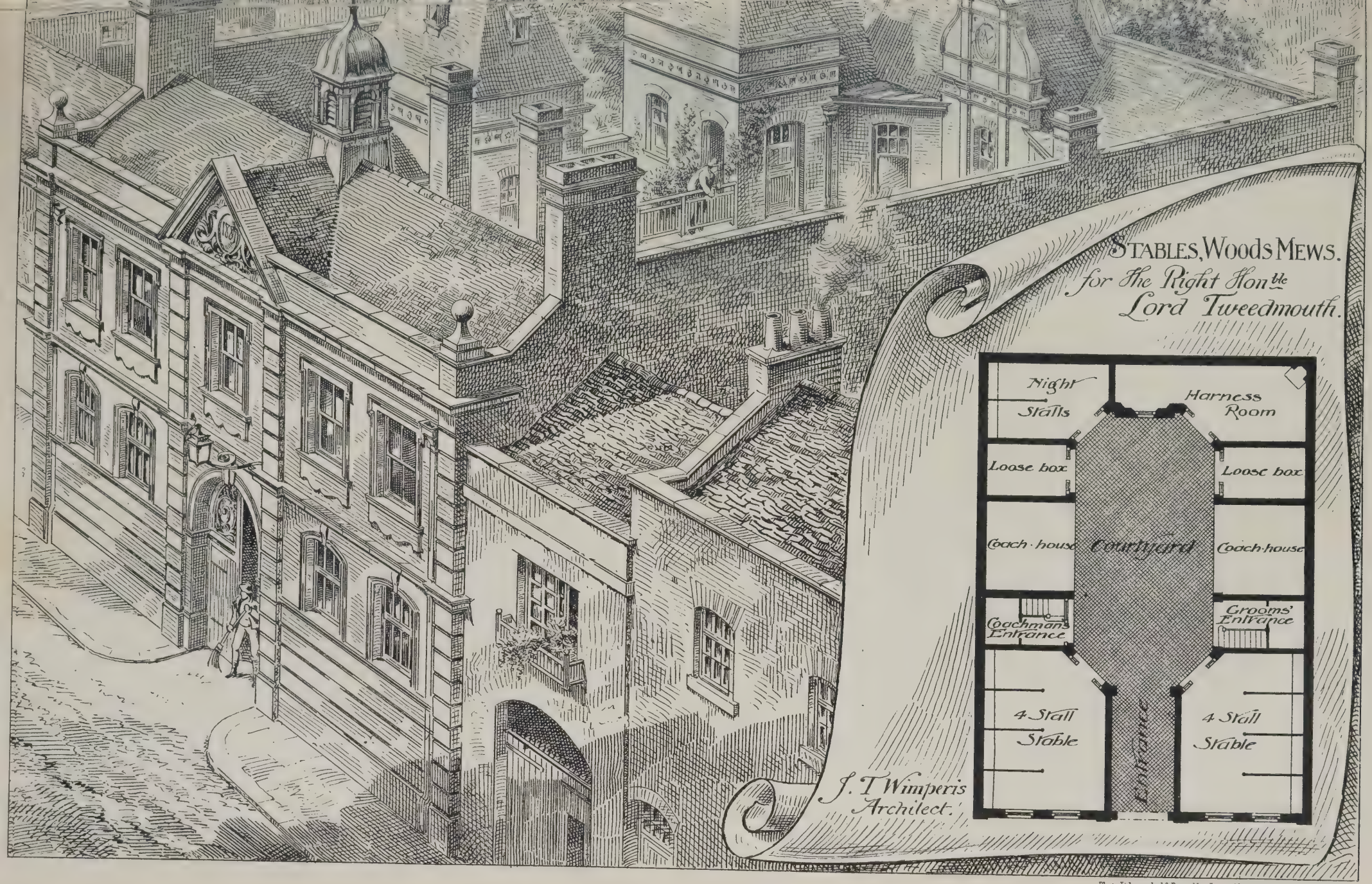
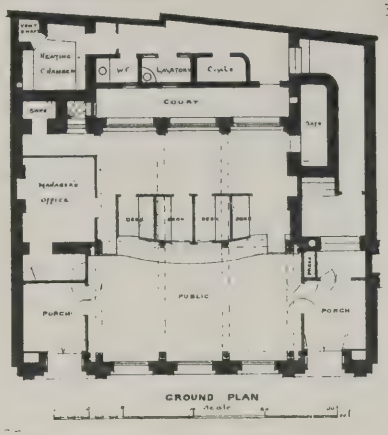


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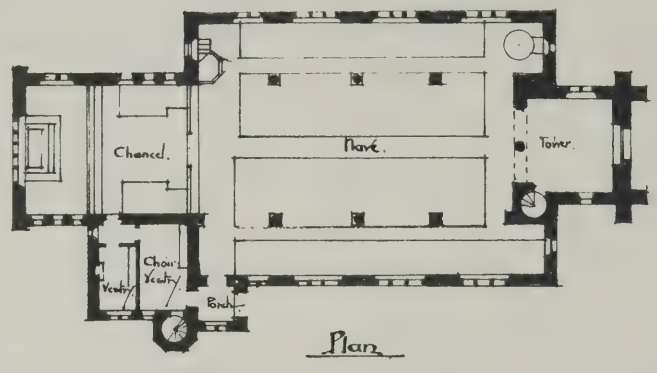


BELFAST A.D 1885 ROYAL AVENUE NORTHERN BANK BRANCH J LANYON ARCHT

Photo-Lithographed & Printed by James Akerman, 6, Queen Square.

Design for New Parish Church Haydock Lancashire.

By the late George Smith A.R.I.B.A. Arch.t Chester.



Plan

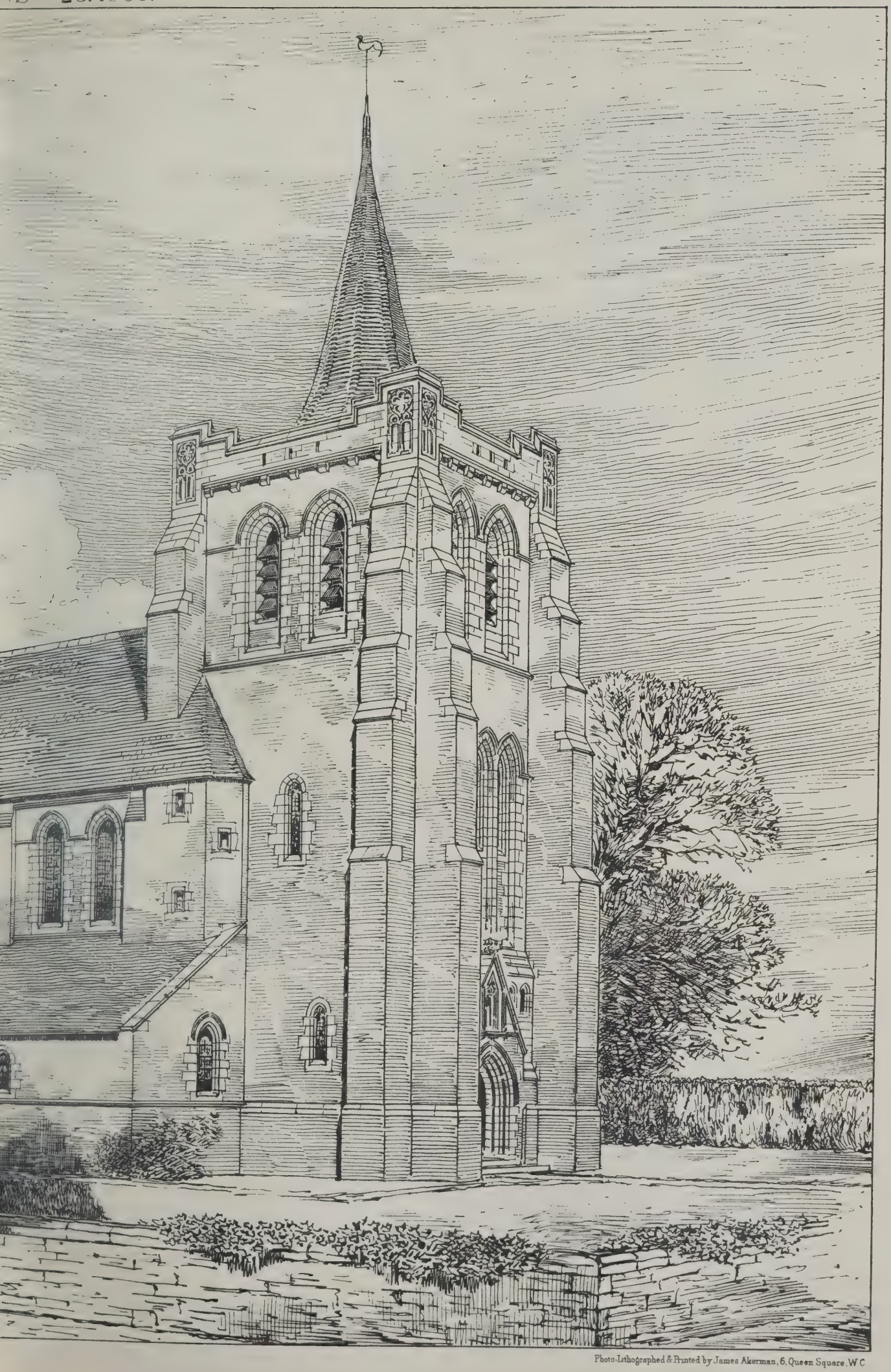
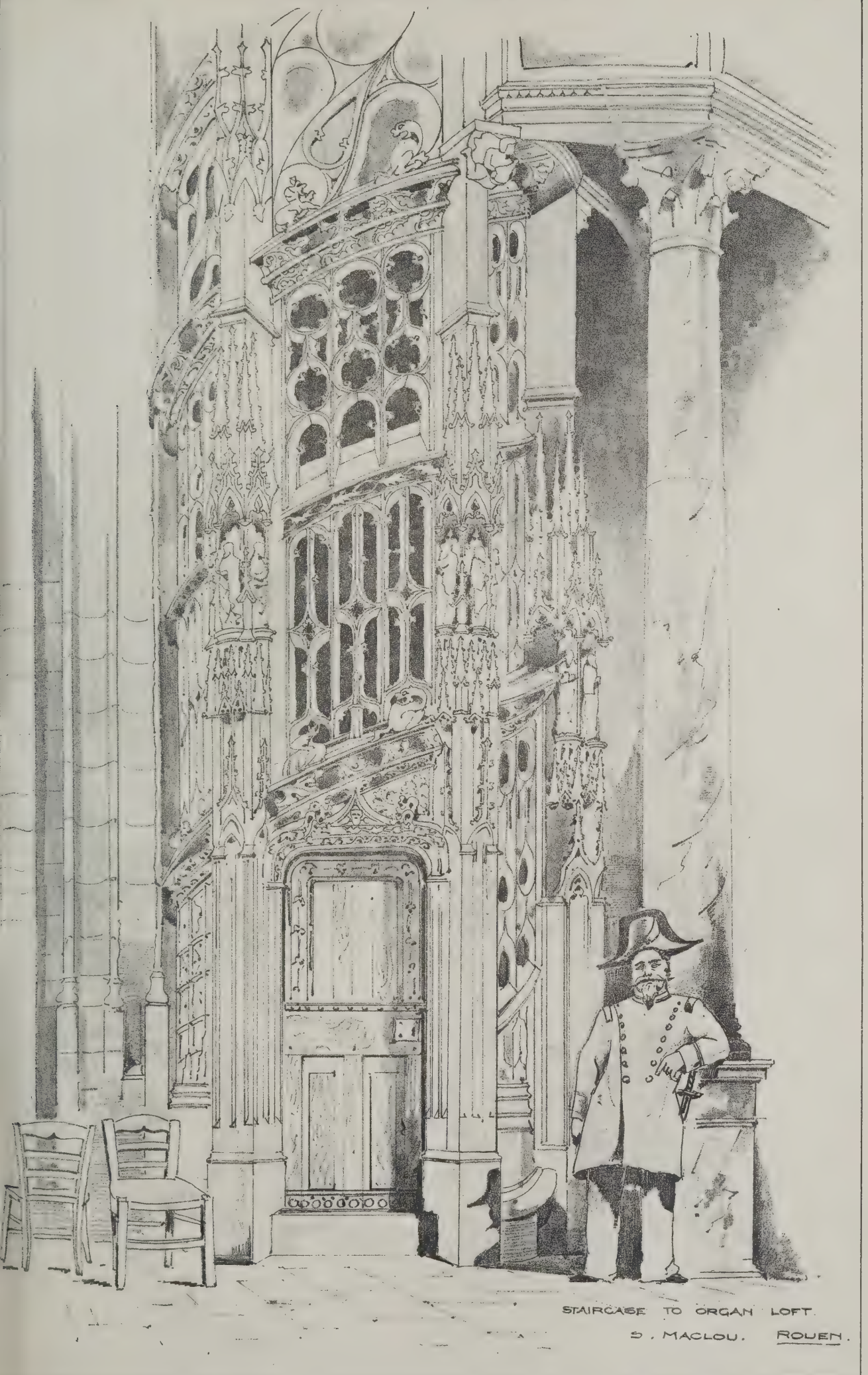
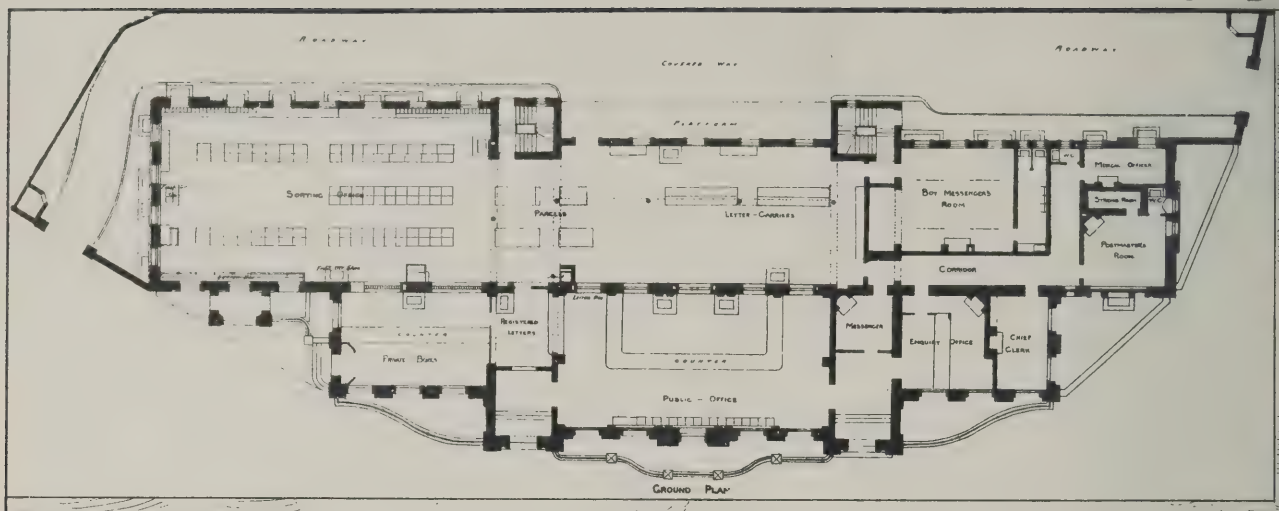


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"PHOTO-TINT" by James Akerman, 6 Queen Square London W C

FROM A DRAWING BY ARNOLD B. MITCHELL, SOANE MEDALLIST.

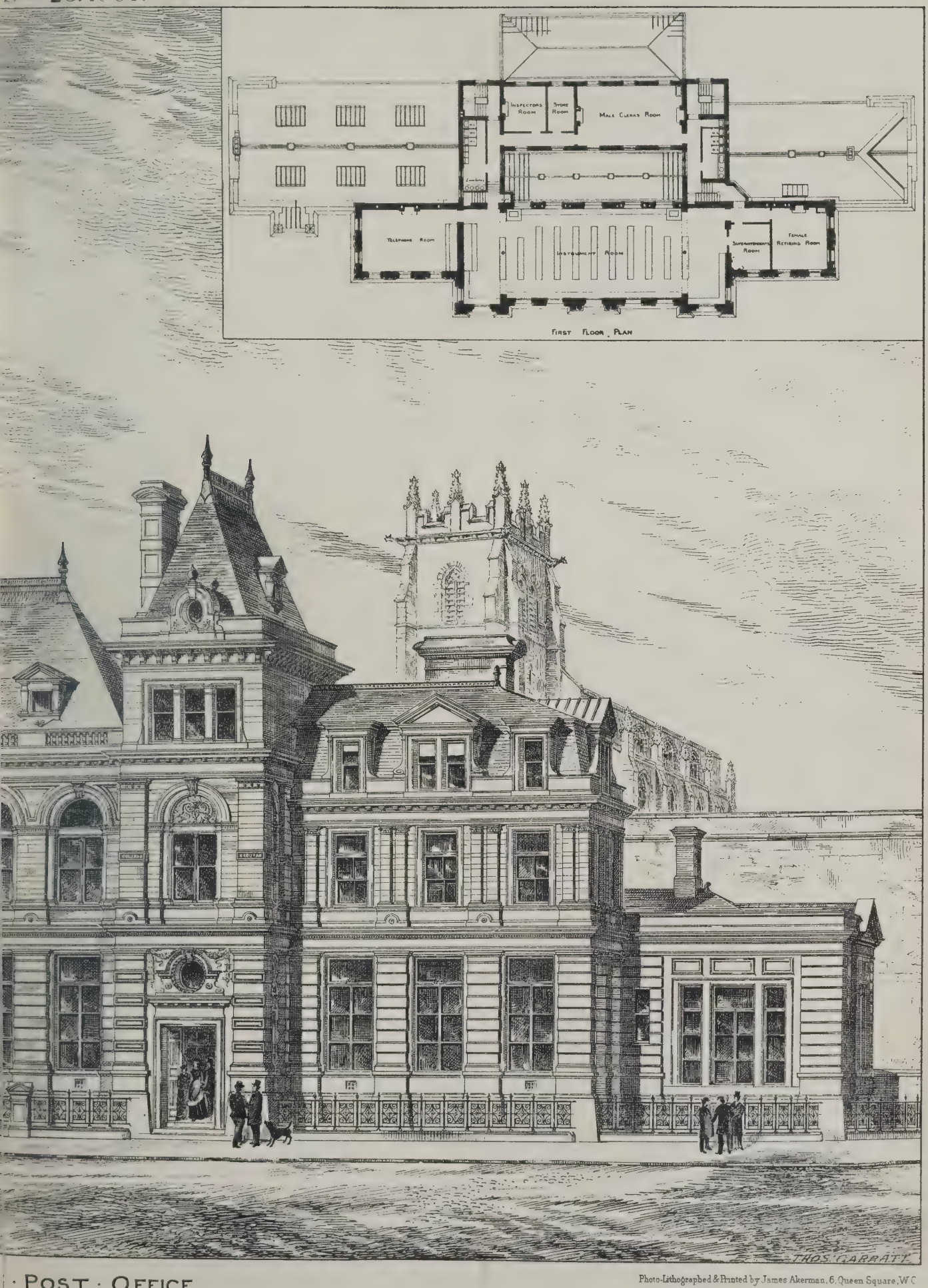




BRADFORD · GEN

HENRY · TA

SEP. 23. 1887.



· POST · OFFICE

ARCHITECT

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BIRTLEY CHURCH.

— NORTH TYNE. —

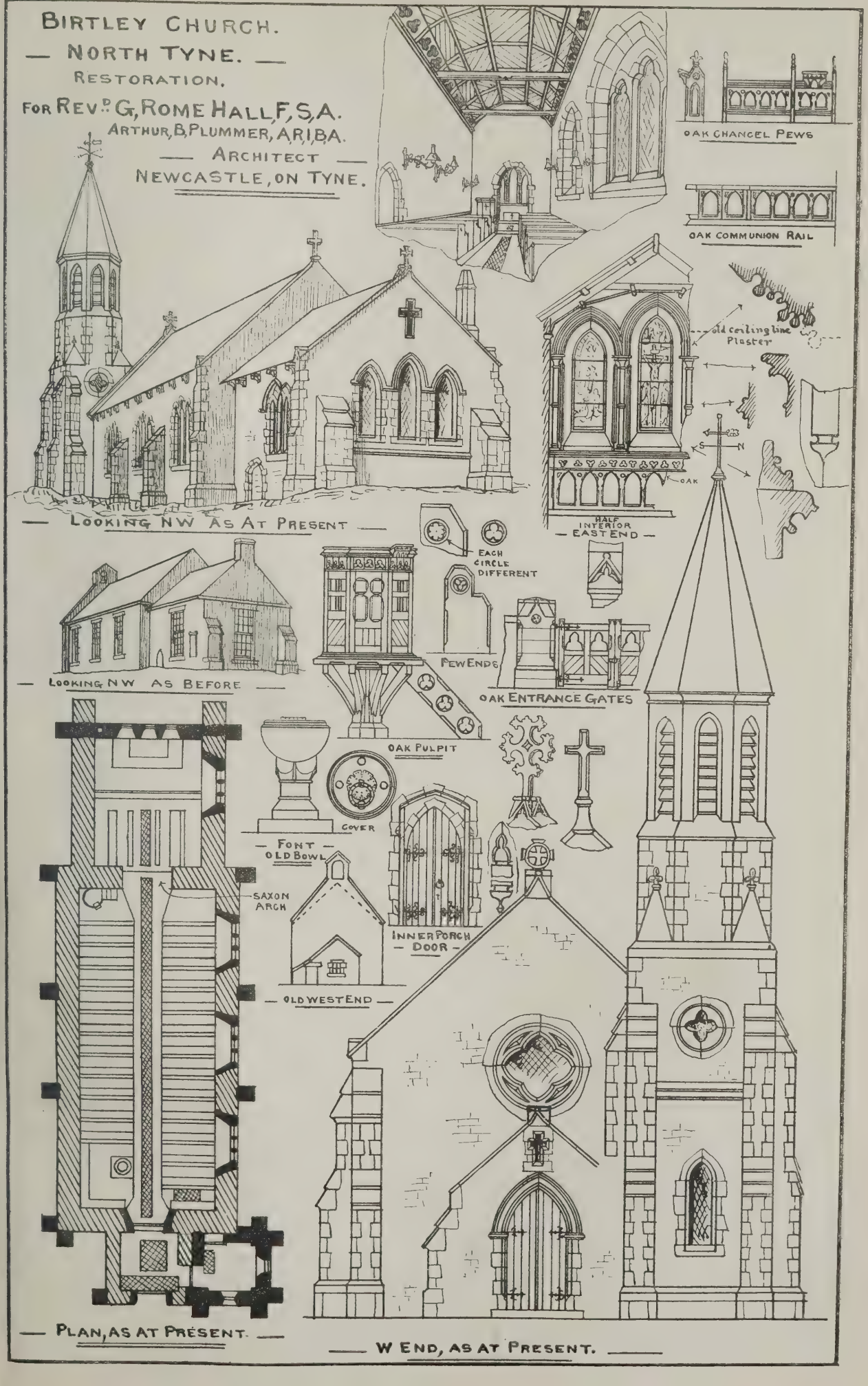
RESTORATION.

FOR REV.D G, ROME HALL, F, S, A.

ARTHUR, B, PLUMMER, A, R, I, B, A.

— ARCHITECT —

NEWCASTLE, ON TYNE.



LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

CONTENTS.

The Exeter Theatre Disaster 46 1
Sanitary Sites and Arrangemen's 461
Sanitary Drainage of Buildings... 462
Sanitary Congress at Bolton 463
Classes for Building Trades... 464
Pipes and Joints 465
Corn-Stalk Columns 465
Lathing 465
Wayside Notes 466
Sketches at Messrs. Halliday's Showrooms 466
Birtley Church 466
Our Lithographic Illustrations 487
The Effect of Freezing on Cement 488
Effect of Electric Light on Books 488
Books Received 488
Building Intelligence 488
Competitions 489
Engineering Notes... 490
Correspondence 490
Intercommunication 491
Stained Glass 492
Legal Intelligence... 492
Water Supply and Sanitary Matters 492
Statues, Memorials, &c. 492
Our Office Table 493
Tenders 494

ILLUSTRATIONS.

DESIGN FOR NEW PARISH CHURCH, HAYDOCK, LANCASHIRE.—NORTHERN BANK, BELFAST.—ORGAN LOFT STAIRCASE, ST. MACLOU, ROUEN.—RADFORD BOULEVARD SCHOOLS, NOTTINGHAM.—STABLES, WOOD'S-MEWS, FOR LORD TWEEDMOUTH.—GENERAL POST OFFICE, BRADFORD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW CHURCH, HAYDOCK, LANCASHIRE.

THIS church, illustrated from the drawing exhibited this year at the Royal Academy, was originally designed by the late Mr. George Smith, architect, and is now about being carried out by Messrs. Douglas and Fordham, of Chester. The style adopted is the Early Lancet period, good outline and dignity of effect being considered more suitable for a large colliery district than a style of a more ornate character. The exterior will be of local brick, with stone bands and weatherings, the moulded work for windows, doors, &c., of Ruabon brick. The interior will be plastered. In plan the church consists of nave, with north and south aisles, chancel and vestries. The tower, with slated spire, will be at the west end, and will form the principal entrance. The floors generally will be laid with wood-blocks, the chancel and sacrarium with encaustic tiles. The seats will be of American ash, with shaped elbows and open-framed backs. When completed, it will accommodate 480 adults. The cost will be about £4,000, defrayed by public subscription, and a long-needed church will be provided, and a handsome addition to the buildings of the neighbourhood will be obtained.

NORTHERN BANK BRANCH OFFICE, ROYAL AVENUE, BELFAST.

THIS building, which is in a central position, has been built of a somewhat warm-tinted sandstone from Dungannon in Co. Tyrone. The base is of polished dark grey granite from Castlewellan, Co. Down. The main columns, the jambs and pilasters of doorways, and the large panels between the bank windows are of polished "Shap" granite from Devonshire. The small circular panels are filled with mosaic work by Burke and Co. The building is strictly Classic in its general design and detail, but the features made by the square projecting windows over the entrances, and the bold projection on the sky-line, are very effective, and thoroughly well break up the street frontage, and give the building a light and artistic appearance. Carving of the Renaissance period has been fairly used outside and inside. On the ground floor, almost on the street level, and approached through deeply-recessed doorways, are two vestibules, through which the bank office, which occupies almost the whole of the ground floor, is reached. The walls of this office, and the vestibules and the screens, are all panelled in mahogany; the counter is of the same material, with walnut plinths, and having carved walnut balusters in front. The ceilings are of yellow deal; the cornices, pilasters, columns, &c., are of the Corinthian order, the cusps being carved in sycamore. All this work is half-polished, and the effect is most harmonious and business-like; indeed, the use of such a finish is much to be commended, superseding as it does the ordinary commonplace stucco-work, with its—alas! too often—accessories of vulgar and gaudy painting and so-called decorations. The safes are fitted with double burglar and fireproof doors by Milner and Co., the principal one being bolted at night from the manager's bedroom on the third floor, to which also are electric alarms from the bank doors and safes. On the first floor are the offices of the architect, Mr. Lanyon; and above, on the second and third floors, is the residence (having separate staircase) of the bank manager, and on the attic floor the residence of the bank porter, &c. There is a lift at the rear to all these floors. The floor over bank office is fireproof, Dennett's patent. Minton's tiles are used for the floors of vestibules, bank, and staircase. In a projecting wing at the back are the sanitary arrangements and a ventilating shaft, in which are all the pipes, dust shoot, &c., so arranged that all can easily be got at. The contractors for the work were Messrs. Silo and Matthews, of Belfast.

STAIRCASE TO THE ORGAN-LOFT, ST. MACLOU, ROUEN.

THE well-known church of St. Maclou, at Rouen, is in many respects a remarkable building, and even by the side of the magnificent church of St. Ouen, as also in comparison with Rouen Cathedral, it holds its own in points of interest as well as for the richness of its details and parts, particularly in the interior of the building. The most notable feature in the design externally is the great triple porch at the west end. The doors of these grand portals are especially elaborated with figures and carvings in bas-relief, representing amongst other subjects the Death of the Virgin and the Baptism of Christ. Jean Goujon, of Alençon, the great French sculptor, is said to have carved them. He died "in St. Bartholomew's," 1572. To the right hand of the western doors on entering stands the celebrated circular staircase leading to the organ-loft, which we illustrate to-day from the drawing of Mr. Arnold B. Mitchell. It is a singularly graceful and elegant structure, rich in Flamboyant traceries and sculptures, with figures in the niches and grotesques on the lower ramping string of its beautiful cage. It was erected in 1512.

RADFORD BOULEVARD SCHOOL, NOTTINGHAM.

THESE schools, which have been recently opened, are the last set erected by the Nottingham School Board, and provide accommodation for nearly 1,100 children. The boys' and girls' schools are contained in a two-story building, fronting the Ilkeston-road, with separate approaches from Salisbury-street and Ilkeston-road, while the infants' school fronts the Radford Boulevard, and is only one story high, with a separate entrance in addition to the entrance from Ilkeston-road, which is common to girls and infants. There are two large playgrounds in the rear, each having covered playsheds, one for girls and infants, and the other for boys. The closets and playsheds are so arranged that children from each department can enter them from the school at any time under cover. The schools are built on the class-room principle, having glazed sliding partitions separating all the rooms in each department, and a corridor in the rear communicating with each room. This corridor is only half the height of the classrooms, and between it and the corridor on the first floor is an open arcade into which are windows from the back wall of the lower school, giving cross ventilation to the classrooms. Similar windows over the corridor roof give a back light and cross ventilation to the infants' and girls' school. The schools are warmed by hot-water coils contained in chambers, one in each classroom, through which fresh-warmed air is admitted into the building, the vitiated air being extracted through gratings on the opposite side of the rooms, and carried through underground flues to the large air shaft in the tower, up the centre of which a cast-iron pipe carries off the smoke from the boiler of heating apparatus. This acts as a "teazer," assisting the up-draught in the tower, which in itself is 80ft. high, and a constant change of air in all the classrooms is the result. The schools are built entirely of red bricks, the moulded and ornamental work being made by Wain, of Heather; the roofs are covered with brindled Staffordshire tiles. The internal walls throughout are lined with glazed brickwork to a height of 5ft. from the floor, and above that the walls are neatly faced and pointed and coloured. The classrooms on ground are floored with solid wooden block paving laid on a bed of concrete in a preservative cement which keeps out the damp, and were laid by Mr. Roger L. Lowe, of Farnworth. The schools were built by Mr. C. Baines, of Newark, under the direction of Messrs. T. C. Hine and Son, of Nottingham, architects.

WOOD'S MEWS, PARK LANE, W.

THIS important block of stabling has just been completed for Lord Tweedmouth, from the designs of Mr. John Thomas Wimperis, of 25, Sackville-street, Piccadilly. The stabling has been designed so as to be self-contained, and has been arranged with an inner courtyard, in order that all the work may be done within the entrance gates. In the front are separate stables on either side of the entrance, and ranged round the symmetrical courtyard are two separate coachhouses, separate loose stalls, washing boxes, and harness rooms, while a stable for two horses is reserved for the animals on night duty. On the left of the courtyard is the head coachman's staircase leading to his residence, which overlooks the mews as well as the yard; and on the right is a similar staircase, which leads to the grooms' and helpers' mess-room and sleeping accommodation. The two residences are by this means kept entirely distinct. The towers contain the water store for cleaning, &c., and the fodder lofts, and a clock turret faces the entrance. The principal front is faced with Fareham red bricks and Portland stone dressings, while the courtyard is faced with gault bricks and Portland stone, above a high plinth of glazed bricks. The interior of the stables has been faced entirely with coloured glazed bricks, the pavings being in vitrified yellow clinkers. The fitting-up of the stabling and harness rooms has been entirely carried out by Messrs. Barton and Ballard, of 151, Oxford-street, W., and the general building work has been carried out by Messrs. Holland and Hannen; the carving is by Mr. Anstey.

BRADFORD NEW POST OFFICE.

THIS building has been erected on a site 2,500 yards in extent purchased from the corporation, and is in front of the Parish Church and near the Midland Railway Station. By arrangement with the corporation, the space in front is to be kept open, and is to be formed into a garden. The building has a frontage of upwards of 200ft., and has a private road on the two sides which do not face the streets. The main fronts are of Bolton Wood stone from the best beds, and the back fronts have dressings of the same stone, the walling being from the Heaton quarries. The carving in the spandrels and to the central dormer, which contains a clock with an illuminated dial, has been executed by Mr. W. S. Frith, of London. The roofs are covered with Bangor green slating, with ornamental lead ridging, finials, &c. The wrought and cast iron railing has been executed by Mr. Tomlinson Walker, of York. Public entrance doors have architraves of Shap granite and are of wainscot. The entrance lobbies are faced with stone, and the woodwork is of teak, with pilaster and pediments on the public office side. The latter is 60ft. by 30ft., has a dado of Burmantofts faïence, the walls have pilasters, and the ceiling is panelled and ribbed. At the rear is the sorting office, 155ft. by 32ft. average. In addition to these two offices there are on the ground floor private box and inquiry offices, boys' rooms, also rooms for the postmaster, chief clerk, and medical officer, loading platform with covered cart shed. The letter boxes are under a portico, but there are also boxes in the public office. On the first floor are the instrument room, 86 by 29; telephone room, 32 by 21, with retiring rooms for the male and female clerks approached by separate staircases from the private road, the superintendent's room, &c., and on the second floor are the battery room

(in the centre roof), and rooms for the engineer, mechanics, linesmen, and caretaker. In the basement are stores, retiring rooms for the clerks and postmen, and space for the pneumatic apparatus, gas-engine, &c. The builders are Messrs. Beanland, and the fittings have been supplied by Mr. Elder, of Hayes. The public office, sorting office, and instrument room are lighted by Fourness lamps. The architect is Mr. Henry Tanner, A.R.I.B.A. F.S.I.; and the clerk of works, Mr. Thos. Leake'

THE EFFECT OF FREEZING ON CEMENT.

THE effects of freezing on Portland cement mortar have not been found injurious. In America experiments have shown that masonry laid with Portland cement mortar has stood no ill effects from freezing, while the American natural cement mortars have shown disintegration to a considerable depth from the surface. Mr. Alfred Noble describes the building of piers of the St. Louis River Bridge on the Northern Pacific railroad in the winter of 1884-85. Portland cement was used, the proportions of cement and sand being 1 to 1½ for face stone and 1 to 2½ for backing. During the freezing weather salt was used in the mortar, and the sand was warmed; but the mortar froze with the temperature at 20 degrees on the stone. After some time the mortar was found to have set firmly and as well as that used in the milder weather. Other experiences have confirmed the author's statement. The American natural cements, on the contrary, have been found to disintegrate during frost. The Rosendale cement has, for instance, been proved to weather badly on the surface. But if during the cold weather brine or salt water is used for mixing strong enough, the results have been found satisfactory, even with Rosendale cement, when a large proportion of cement is used. When a strong solution of salt is not used in mixing, the failure of the mortar is almost certain. The proportion of salt necessary may be gathered from the following rule:—Dissolve 1lb. of rock salt in 18 gallons of water when the temperature is 32° Fahr., and add 3oz. of salt for every 3° of lower temperature. The masonry laid with mortar so prepared stood well. Many instances are recorded of the value of using Portland cement in places where the mortar is likely to freeze before setting. The use of salt in cement-mortars also greatly increases their tensile strength under the conditions of freezing. Salt-water is found, indeed, to be as good as fresh for mixing, especially in hydraulic works, though Mr. Faija concludes from experiments he has made that for marine purposes the portions of work below high-water level should be mixed with fresh water, and those above it with sea-water. There is clearly a want of agreement among English authorities upon the point; but if we take the experience of American engineers, the advantages of mixing with salt-water are strongly made out.

EFFECT OF ELECTRIC LIGHT ON BOOKS.

THE *Revue International de l'Electricité* observes that Professor Wiesner, of Vienna, has drawn attention to the discoloration of books in the Technical School library, due to the use of the electric light. A large number of the works have become very yellow, and the director of the school requested Professor Wiesner to ascertain the cause. Experiment has shown that the discoloration is due to the action of light upon the paper containing ligneous substances, such as wood, straw, and jute. When the lignine is removed by chemical means the effect is not produced. The yellowing is said to be due to a phenomenon of oxidation. Ordinary dispersed daylight exerts very slight action, especially in a dry room; on the other hand, the arc-electric light and all intense, luminous sources emit numerous refrangible rays, and these favour the yellowing. The same process of yellowing we know takes place when papers bleached with certain substances are exposed to strong sunlight. The opinions of the professor will rather go to favour gas as the illuminant in libraries.

St. Mary's Roman Catholic Cathedral, Sussex-street, Middlesbrough, was reopened on Sunday, after being redecorated.

BOOKS RECEIVED.

Husbands' Concise Handbook of Measurements in Feet, Inches, and Parts. (Liverpool: Blake and Mackenzie).—This is a most useful compilation for all engaged in building and valuation, especially to glass dealers and merchants, glaziers, timber merchants, stonemasons, and all those engaged in superficial measurements. The accuracy of the calculations can be depended on. The tables range from 2in. to 3ft. 4¾in. in breadth, and from 2ft. to 45¾ft. in length, the fractional ¼, ½, and ¾in. making them of much value in taking glass and any other accurate dimensions. The tables are clearly printed in columns, and form a convenient book for the office and pocket. Mr. E. T. T. Husbands, M.A., late principal of Wallington College, Surrey, is the compiler of these useful tables, which are to be had in sheet form. There is clearly a printer's error in the title page, the author's name being transposed.

CHIPS.

Eccleshill parish church, Sheffield, was reopened on Friday after restoration. Until now the church has had three galleries, with a semicircular front. The north and south galleries have been taken down, but the west gallery has been allowed to remain, and has been re-pewed, and a square front inserted. The box-pews in the nave have been replaced by open pitch-pine stalls varnished, each of which has been supplied with eight footstools of uniform pattern and design. Sitting accommodation is now provided for 800 persons. By the removal of the galleries the lighting of the church has been considerably improved, and the pulpit has been moved further into the chancel. The whole of the interior has been decorated in colour. Mr. George Booth, of Bolton, has been the contractor for the woodwork, and Messrs. B. Harland and Sons, of Bradford, for the painting and decorations. The outlay was £450.

Among the receiving orders granted under the Bankruptcy Act announced in Friday's *Gazette* are the names of W. H. Hulett, Sandmere-road, Clapham; John Walter Cox, James-street, Deptford, late of Abinger-road West, New Cross; John Thomas Mussell, of Plymouth, builders.

A mission church is about to be erected at Abergwgnfi, Glamorgan, from the designs of Messrs. Halliday and Anderson, architects, Cardiff and Llandaff.

Extensive additions are now being made to the Angel Factory, Westbury, Wilts, for Mr. W. H. Laverton, which comprise thirty new rooms, engine, and boiler houses, &c. Messrs. Taylor and Challen, of Birmingham, are the engineers. Messrs. Halliday and Anderson, of cardiff, are the architects.

A new Wesleyan chapel built at a cost of £1,000 was opened at Walkington, near Beverley, on Wednesday week. Mr. W. A. Gelder, M.S.A., of Bowl-alley-lane, Hull, was the architect; and Mr. J. Constable, of Beverley, the builder.

An alms dish, designed by Dean Kitchen's "architect son," and made by five of the choir boys (Masters E. Ashton, A. Ashton, Hayden, E. Newby, and F. Telbury), as a gift to the Dean and Chapter of Winchester, is now completed. It is in repoussé brasswork, the outer border having the words, "Benedicta Sit Sancta Trinitas, 1887." The other portions of the edge are decorated with bosses and conventional renderings of foliage and Tudor flowers, while the entire centre of the dish is occupied by a representation of the Tudor arms of the Chapter, conferred by Henry VIII. It represents, in a Gothic portal, the Holy Trinity, and the shield, which is supported by angels, has in a canton the Tudor rose on a sun in splendour.

A new gasholder, 51ft. in diameter and 20ft. deep, is being constructed at the Neston gasworks, in the Hundred of Wirral. Messrs. Hope, of Liverpool, and Messrs. Deemster, of Manchester, are the contractors.

The city council of York have adopted plans by the city surveyor, Mr. E. G. Mawbey, for alterations at the York Theatre, including the improvement of the means of exit.

New parsonages are being raised for St. Mary's, Nelson-in-Marsden, at a cost of £1,900; for Overton, near Lancaster, at a cost of £1,500; and for St. Andrew's, Livesey, Blackburn, at a cost of £2,825.

A stained-glass window, executed by Messrs. Kempe and Co., of London, has been placed in St. Andrew's Church, Eccles, in memory of the late Mr. Joseph St. John Yates, Judge of County Courts.

A cottage hospital is about to be built at Ashburton from designs by Mr. P. E. Masey, of London, at a cost of about £1,250. Messrs. Roberts and Hurrell, of Plymouth, are the contractors.

Building Intelligence

BIRKENHEAD.—After an interval of thirty five years since the edifice was originally raised the Congregationalists have determined to complete their chapel, at the junction of Oxton road, Ball's-road, and Woodchurch-road. The original plan included a massive tower, and spire that would have been loftier than any in Birkenhead. The plan has been modified, and a lofty pinnacled tower substituted for the spire. The new work, which includes additional buildings, at an estimated total cost of about £2,200 was begun three weeks since. The tower will, when completed, reach a total height of 109ft. from the street level, and as the site itself is one of the most elevated in Birkenhead, the building will be conspicuous on all sides for many miles. The upper portion will have louvred belfry windows. The buttresses will be surmounted by carved and croketted octagonal pinnacles, connected by moulded battlement with a gablet between each pinnacle. The material for facing will be stone from Storeton quarries, similar to the existing work. New school accommodation will be obtained by erecting a single story building to the south end of the church. It will include church parlour 23ft. by 13ft. 6in.; infant classroom 25ft. 6in. by 14ft.; minister's vestry and five classrooms. The front to Woodchurch-road will be faced with Storeton stone. The remainder of the walls will be faced with Buckley buff bricks, relieved by stone dressings. The whole of the buildings are being erected by Messrs. Sinclair Brothers, of Bootle, from plans and under the superintendence of the architect, Mr. Thomas Cubbon, Birkenhead and Douglas.

BLACKBURN.—The guardians of the Blackburn union having decided to erect new offices a competition limited to architects within the union was instituted; Mr. James Hibbert, architect of the Harris Institute, Preston, being appointed to assist the building committee in selecting from the plans sent in. In response to the invitations of the guardians designs were sent in by six different architects. Mr. Hibbert reported strongly in favour of the design submitted by Messrs. Stones and Gradwell, MM.S.A., of Richmond-terrace, Blackburn. The Board unanimously accepted his recommendation; and the buildings are now in course of erection under the superintendence of Messrs. Stones and Gradwell. The total cost will be about £8,000. On the ground floor a large general waiting-room for paupers is provided. Adjoining are four private rooms for the officers, and a serving-room for the storekeeper; two waiting-rooms for relief applicants, and two committee-rooms. The whole of the relief business is kept on one floor. The porter's house is placed at the back. The vestibule of principal entrance leads to a hall and also to the general office for clerks, the clerk's private room, and strong room. A flight of stairs leads to the boardroom, with anteroom, chairman's private room, assessment and rural sanitary authority committee and waiting rooms, guardians' private room, lavatories, &c. The boardroom is lofty, and provides accommodation for 73 guardians, besides officers and reporters. On the second floor six rooms are provided for use as stores and spare offices. The heating is by hot water on the low-pressure system. The ventilation is being carried out by Messrs. Robert Boyle and Sons, on the patent system of vertical tube inlets and patent air-pump extractors. Each department is separated by distinct shafts and extract ventilators. The front and return façades are of dressed stone, the remainder of brickwork with stone dressings. Glazed bricks have been freely used both for interior and exterior walls. The whole of the floors are to be fireproof. The work is being carried out by local contractors.

BRADFORD.—A new Roman Catholic Church of St. Joseph, Packington-street, Manchester-road, Bradford, was dedicated on Friday. The whole edifice is expected to cost £10,000, of which one-half has been raised. The architect is Mr. Edward Simpson, of Manningham, Bradford. The building comprises nave and aisles, with double transepts and chancel, with side chapels and organ chamber opening from the chancel. At the west end of the nave

aisle is a baptistery, and at the same end of the south aisles is the foundation for a tower. The style adopted is Early Decorated. The roof is 60ft. above the ground, and is of open-timbered construction, supported on arched principals, having cross-braced rafters filled in with tracery work and panels. The seats, roof, and flooring are of pitch pine. The passages are laid with mosaic marble pavement, and the chancel is floored with pitch pine and walnut parquetry. The columns are constructed of red Cumberland sandstone, and the arches and stonework are of local ashlar. The altar is by Mr. Wall, of Cheltenham. It is of alabaster. In the centre panel is to be carved a representation of the "Agony in the Garden." The reredos is diapered, and the wings are filled in with traceried panels, terminating in niches and canopies.

GARTON-IN-HOLDERNESS.—The church of St. Michael, Garton-in-Holderness, was reopened this week after reparation. The work done has consisted of the repairing and cleaning of the whole of the masonry in the interior of the fabric; this has been most carefully executed, in order that the character of the old work should be in no way impaired. A new 15th-century window has been inserted at the east end of the chancel, and on the north side of the nave and west end of the tower other windows corresponding with it. The nave has been reseated with open benches, free from stains or varnish; and stalls and prayer desk, of oak, are placed in the chancel. The pulpit is of a rich character, executed in various shades of Ancaster stone. The chancel floor is paved with encaustic tiles, and that of the nave with small, plain red tiles. The ancient rood screen has been carefully repaired and refixed in its old position. A screen has also been placed under the arch to the vestry. The several works have been executed from the designs and under the superintendence of Messrs. Smith and Brodrick, of Hull, architects. The general contract has been carried out by Messrs. Simpson and Malone, of Hull, and the screen work by Mr. Elwell, of Beverley.

KIMBERLEY (THE DIAMOND FIELDS), S.A.—The restoration of the Kimberley Club House, referred to in our issue of the 11th February of this year, has been completed. The expenditure, not including furniture, has been over £9,000. Externally it is a plain square red brick building, with a teak verandah and balcony 10ft. wide carried round the principal façades. This is divided into bays of 15ft. by heavy square columns arranged in couples. The verandah has been erected in teak at £800 less than the estimate for iron. Internally, more consideration has been given to architectural effect, and a polychromatic treatment has been adopted. The contract has been carried out by Messrs. C. R. Jones and Chas. Cole, from designs by Mr. Sydney Stent, M.Inst.C.E., F.R.I.B.A. The lavatory fittings are from Jennings's works, of Lambeth, S.E.; the tiles from Minton and Maw and Co.; Moules supplied the earth closets; and Horwood, of Frome, the glazing. The ironmongery was from Gardener and Sons, of Bristol; and Boyle's air exhausts are used in combination with vertical inlet flues for ventilation.

KILBURN.—The church of St. Paul, at Kilburn, N.W., has lately been undergoing considerable alterations and repair, and has just been reopened on completion. The building is one of the would-be Classic style, in stucco, and the paucity of funds has prevented the committee from undertaking more than the decoration of the existing surface of the walls. The alterations consist of new floors throughout the body of church, new open seats of pitch-pine in lieu of the old high pews, a new window in chancel, and the extension of Keith's heating system. The whole of the walls have been painted, and some portions decorated, while the ceiling of nave has been entirely renewed. The works, at a cost of about £930, have been executed by Mr. R. A. Yerbury, of Kilburn, from the plans and under the direction of Mr. Alexander N. Hansell, of 62, Basinghall-street, architect.

NORTH RUNCTON.—The parish church of North Runcton, near Lynn, was reopened on Wednesday week after restoration. The church is the only one in the Italian style in Norfolk, and was built in the 18th century on the site of the Mediæval church, destroyed by the fall of the tower in 1701, the old material being utilised as far as possible. The present works have been carried out from plans by Mr. Herbert J. Green, of Norwich, by Messrs. Storey and Thurston, of North Walsham. The whole of the internal fittings of the church and of the chancel, including the three galleries, have been removed; the timber of the roof has been put into good condition, and the roof covered with red tiles. The ceilings, which are flat, with a central dome, supported by four Ionic pillars, have been repaired, and the ornaments and mouldings reworked. The internal walls have been replastered, and the external plastering placed in proper order. The old window frames were removed and new ones substituted, the openings being filled with cathedral glass in geometrical patterns; it is intended to fill these openings with stained glass. The old wooden reredos has been preserved, and the old memorial slabs have been relaid in the floor. The chief feature in the restoration is the formation of three arches opening from the nave into the chancel. All the passages and the floor of sacrarium are paved with red, grey, and black mosaic marble, and the space under the seats is covered with noiseless wood blocks. The old pews have been replaced with oak open benches; the pulpit, lectern, choir seats, and reading-desk are also of oak and carved. The doorways in the north and south porches have been blocked up, and both porches are now used as vestries. Near a new west entrance is the marble font formerly used in St. Margaret's church, Lynn, and presented by that parish at a public meeting to North Runcton.

OVER WINCHENDON, BUCKS.—On Tuesday week was reopened the interesting little church of Over Winchendon, near Aylesbury, after renovation under Mr. William White, F.S.A. The chancel is of the period of Transition from Norman, with two lancet windows in the east gable, and a corbel between them inside, with the stringcourse mitred round it, on which was placed perhaps the image of a saint, or, more likely, a rood. There is a pointed chancel arch of simple, or rather, of rude construction, and a screen of later date against which new oak "return stalls" have been fixed. It is within memory that the wooden steps to the rood loft remained. The nave is of Norman date, and in its south wall is a richly moulded doorway, and one simple window, of Norman date, with a recessed arch inside. The timber porch has been reconstructed as before, but without the plastering. The north door has been opened out. The north aisle is of 14th century date, the windows having flowing tracery. The aisle opens from the nave with two round arches, and one pointed, with flat soffits and large rectangular piers, evidently cut through the old wall. The chancel fittings are of oak. The old altar and altar rails have been reused, somewhat altered. Some Mediæval benches have been refixed at the west end. The other benches are made up in deal; they stand on floors of wood block. The passages and the chancel are laid with the old slabs, one containing a good brass made up with tiles.

WATFORD.—A new Baptist chapel is being built at the corner of Derby and Grosvenor-roads. The plan internally is a Latin cross, the dimensions of which are 60ft. by 50ft., the main body being about 30ft. wide, and consisting of six bays. Three of these will be arcaded, opening on to the gabled aisles which forms the arms of the cross. At the eastern end, and separated from the nave by a pointed arch 24ft. in width, will be placed an elevated rostrum, having in front the baptistery for immersions. There are two vestries, each 14ft. square, and capable of being used as one room, a minister's vestry, and other accommodation. On either side of the chief porch, that to Derby-road, will stand a conical-roofed tower between 50ft. and 60ft. high, affording accommodation for the fire-proof staircases leading to the gallery. The nave, baptistery, and rostrum will be under one open-timbered, hammer-beam roof. The structure will be essentially a brick one, with internal linings of yellow stocks, and external linings of grey Franklin stocks from Laverstock Green, both relieved by red brick dressings. All the roofs will be covered with tiles and plain red cresting. The warming will be by hot water, and the ventilation by Tobin's tubes, and three of Kershaw's exhaust ventilators executed in copper. Yellow deal and pitch-pine are the materials selected for the seating, and red pine will be sparingly introduced in the open panelled work of rostrum and gallery fronts. The chapel will accommodate 420 adults, the side galleries raising that number to 500. A free treament of Early English has been selected as the style. The architect is Mr. W. H. Syme, A.R.I.B.A., of Watford, and the works are being executed by Messrs. Judge and Eames, under a contract amounting to £2,000.

COMPETITIONS.

KINGSWINFORD, STAFFORDSHIRE.—In the competition for the new schools at Mount Pleasant, Quarry Bank, Brierley Hill, for the Kingswinford School Board, the board have accepted the design submitted by Messrs. G. B. Nichols and Son, of 59, Colmore-row, Birmingham, and have given them instructions to at once proceed with the contract drawings.

LEIGHTON.—In response to the Leighton Jubilee Celebration Committee's advertisement for designs for a public drinking-fountain, four have been received, and at a meeting of the committee held on Friday last, that submitted by Mr. J. Sloan, architect, of Linsdale, was unanimously accepted, provided that the necessary funds can be raised.

CHIPS.

Mr. G. Sedger, of London, has been appointed architect for the proposed technical school for Stockport, which will be built on the estate.

The death is announced, at the age of 76 years, of Mr. John Gibson, architect, for the past 40 years of Malton, but formerly of Scarborough, where in his earlier years he was in business as a builder. He laid out the estate, designed, and carried out the buildings of the South Cliff Company, including the esplanade. For some years after leaving Scarborough, he was borough surveyor of Malton, and until his death held the office of professional adviser to Earl Fitzwilliam.

A meeting of the Doncaster town council in committee was held on Tuesday for the purpose of appointing a borough surveyor at a salary of £250 a year. Five candidates appeared before the council, and on a final division being taken Mr. Crabtree, engineer, Rotherham, and Mr. Duff, assistant surveyor of Doncaster, received an equal number of votes, when the Mayor gave his casting vote in favour of Mr. Crabtree.

The annual exhibition of the works of local and other artists, held by the Ryde Art Society, under the presidency of Sir William Levinge, Bart., will open on Sept. 28th, when Mr. Drinkwater Butt will act as judge in the competition classes. A good show is expected.

At the last meeting of the Senate of Sydney University, New South Wales, Mr. John Sulman, F.R.I.B.A., of Sydney, and late of London, was appointed Lecturer in Architecture, and a sum of £100 was voted for architectural diagrams and drawings. There were seven candidates for the appointment.

St. Mary's Church, Wavertree, Liverpool, has just been completed by the erection of a spire as a memorial to the late Mr. Hugh Hornby. The first section of the church, the nave and south aisle, was built in 1854, and the last, the tower, five years ago. The spire now added is built of Woolton and Runcorn stone, and is exactly 100ft. high, making the total height from the ground to the top of the cross 174ft. It is divided by two bands into three main stages, and has in each stage a tier of gabled lights. The work has been executed by Mr. Thomas Foxcroft, of Liverpool, from designs and under the supervision of Messrs. W. and J. Hay, architects, of the same city.

The work connected with the restoration of Stratford-on-Avon parish church, which involves an estimated outlay of £12,000, has been advanced another stage. It was announced on Friday that the committee have accepted Messrs. Bodley and Garner's plans for the removal of the organ from the north transept to the gallery placed above the tower arch, at the east end of the nave, at an estimated cost of £2,000. A new organ case and screen will be provided.

An advertisement in the daily papers announces that Mr. Ernest Claude Lee, architect, of No. 30, Great James-street, Bedford-row, and of Teddington, will adopt the prefix of Ayton, formerly his family name, as an addition to his surname of Lee.

Engineering Notes.

Bradford.—The Midland new station and hotel are now making good progress having been in hand three years. The station and hotel are being erected from plans prepared by Mr. T. Trubshaw, the architect to the company, and the contract is held by Messrs. Brown and Sons, of Salford. The main front of the premises, the design of which is Renaissance in charater, will be in Kirkgate, and in length it will measure 300ft. The front of the hotel buildings and offices, whose length will be 176ft., will be in Cheapside; the hotel itself, which will be five stories in height and will contain sixty bedrooms, being situate at the corner of Cheapside and Kirkgate, and facing both thoroughfares. This portion of the work is being pushed forward, and the workmen are now engaged on the second story. The walls of the building are being constructed of ashlar, with brick backing, the stone being obtained from local quarries. The main feature of the Kirkgate frontage will be an octagonal tower, springing from a square porch, and surmounted by a dome and finial. In front of the principal windows, which will be two-light, there will be balconies, guarded by balustrades. The building will have a Mansard roof. Immediately within the entrance will be a large hall, measuring 33ft. square, and corridors leading right and left. Off the corridors there will be lavatories, manager's staircase, office, bar, restaurant and service-room, smoke and billiard rooms, &c. On the first floor will be coffee-room, service-rooms, still-rooms, and smoke-rooms, &c. The next floor will be occupied by 25 bedrooms and bath-rooms, the third floor will be similarly planned, and the kitchen is on the fourth floor. The new station will have an internal width of 170ft. There will be a cross platform 80ft. in width, and to the right of this there will be the usual waiting-rooms, the refreshment-rooms and hotel buildings being to the left. Within the area will be offices for station-master, clerks, and these will command a view of the three platforms, each 32ft. in width, and more than 500ft. in length. The platform on the Cheapside or outgoing side of the station will measure 200ft. in length, the rest being 450ft. long. Rapid progress is being made with the second half of the Exchange Station (Lancashire and Yorkshire and Great Northern). It will be practically a counterpart of the new portion at present in use, except that on the Drake-street side there will be a suite of offices, &c. It is expected that the station will be completed early next year.

The Ribble Navigation Works.—Mr. Sykes, the newly-appointed engineer of the Ribble Navigation Improvement Works, in place of his partner, Mr. E. Garlick, who resigned on account of ill-health, has just issued a report in which it is stated that the Parliamentary estimate of the cost of the works was £558,000; that the borrowing powers of the Corporation of Preston for their construction was £662,000; that the total estimated cost as being and recommended to be carried out will be £1,171,000, and that therefore a further sum of £509,000 will be required for the completion of the undertaking. The Ribble committee have announced that at the next town council meeting they will recommend that an application be made for sanction to borrow an additional sum of £510,000.

A reredos recently erected in the newly-restored parish church of St. Mary's, Bickington, near Ashburton, has just been completed by the introduction of some sculpture from the chisel of Mr. Harry Hems, of Exeter. These additions were unveiled at the harvest festival on Thursday, Sept. 17. The reredos itself was made by Mr. Hems, having been designed by Mr. R. Medley Fulford, F.R.I.B.A., M.S.A., by whom the church was restored in 1884. It is made entirely of English oak, and the new sculpture is all in the same material. The subject in the central panel is the "Nativity," and in the side niches and beneath canopies are angels in various attitudes of adoration.

The recently-published report of the Parliamentary Committee on Public Accounts states that in future Mr. Clutton and Mr. Gore, receivers, will receive commission on the net rents, and not on the gross receipts as heretofore.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

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RECEIVED.—H. S. and Co.—A. L. Co.—J. H. M.—H. S.—J. K. and Co.—L. G. I. Co.—J. L.—W. P. B.—A. W.—J. H. T.

H. B. WARNE. ("Merrett's "Land and Engineering Surveying" is an old and valued work, and the examples and plates are of importance to the student; but for a beginner we should recommend the "Treatise on Surveying," by T. Baker, published in Weale's series, price 2s. The mathematical portion of the former work is rather too-lengthy and laborious; but if E. C. W. begins at Part II. and follows each problem up by referring to examples, he will soon be able to master the subject.)

Correspondence.

THE YORK MEETING OF THE SOCIETY OF ARCHITECTS.

To the Editor of the BUILDING NEWS.

Sir,—Would you permit us to call the attention of your readers to the fact that the Society of Architects intend paying a visit to York during the first week in October in conjunction with the York Architectural Association?

All architects are invited to attend the visits and meetings, full particulars of which can be obtained on application to the undersigned.—We are, &c.,

EDGAR FARMAN, Hon. Sec.
G. A. T. MIDDLETON, Sec.

St. James's Hall, Piccadilly, London, W.,
September 22.

Sir,—During the visit of the Society of Architects to York, at the invitation of the York Architectural Association, there are to be several interesting meetings for the discussion of subjects of architectural interest. The importance of one of these meetings in particular I would draw the attention of your readers to—viz., that set down for Monday, the 3rd October, at 7.30 o'clock, at which the question of the proposed Architects' and Engineers' Registration Act is to be discussed.

The opportunity thus afforded to those architects practising in the North of England of discussing this important subject should not be missed; and it is hoped that all who can will attend.—I am, &c.,

EDGAR FARMAN,
Hon. Sec. Architects' and Engineers' Registration Act Committee.

99, King-street, Cheapside, E.C., London,
September 21.

FIRES IN THEATRES.

Sir,—The letters which have appeared in your columns refer to future improvements upon the *buildings*, but as a great part of the loss of life occurs from the *conduct of the audience*, something might be done at once in all theatres to prevent those present losing first their presence of mind, and then their lives through crushing to all get out at once. I would suggest that in all theatres it be made imperative to fix up a number of instructions, printed in large letters, to the effect that in case of alarm from any cause the audience are to *avoid crushing*, which will enable them all to get out much more quickly, while the ladies are to lift the tails of their dresses high enough not to be trampled on, in order to prevent them being dragged down. With intimations such as I refer to prominently put up in sufficient numbers in all theatres, both presence of mind and chivalry might take the place of senseless panic, and so many lives might be saved and much after evil prevented.

Crushing of a most shamefully selfish kind sometimes takes place at the entrance of theatres, &c., when some popular actor or speaker is to appear. We had a disgraceful specimen of this here on the 9th inst., when it took about thirty-five minutes for two or three hundred people to get into the theatre owing to the crushing, whereas had there been no crushing they might all have got in in from five to seven minutes. In this case ladies were fainting, and strong men looking as if they had been fixing a steamer in the Red Sea. It is generally the outside people who crush those before them. The police ought to be empowered to stop this.—I am, &c.,

PRO BONO PUBLICO.

Glasgow, Sept. 16.

CHURCH RESTORATION.

Sir,—I have heard so much about the "careful" restoration of Chester Cathedral by the late Sir Gilbert Scott that, on a recent visit there, I expected to find only necessary work done. Such, however, is not the case.

When the restoration was commenced there were no flying buttresses on either side of the nave. The piers between the clerestory windows on the north are weak, and bulge outwards considerably. Here flying buttresses are absolutely necessary for the preservation of the building; but because the north side is greatly hidden by buildings and trees, and the south exposed to view, the latter, which did not require strengthening because the piers are thicker, is given flying buttresses and made handsome, while the former is left to itself.—I am, &c.,

CHARLES F. MOXON.

Beach Cliff, Westgate-on-Sea.

FOREMEN OF MASONS.

Sir,—Occasionally in your journal and contemporary appear advertisements for first-class foremen of masons. Now, in the case where the advertiser is an employer who is credited with having in his employ a staff of first-class masons, is it an unreasonable question to ask, Could not the ranks of the staff be sought through for a foreman? Is it just to the men, some of whom may be capable and worthy of the position, for a stranger to be brought into their midst?

In my experience, I have always found in any average mason's shop one or two, or more sometimes, of the men quite capable of discharging a foreman's duty.—I am, &c.,

Sept. 17. BANKER HAND.

A NOVEL CRANE.

Sir,—A paragraph in your issue of yesterday, copied from the *Scotsman*, describes a crane in use at South Bruntsfield-place, Edinburgh, as a "novelty."

This is far from being the case, and I will describe, in almost the same words, a crane I used in the erection of Colston Hall, Bristol 16 years since, when carrying out that work

for Mr. James Diment, of that city, the then head of the firm, now known as Stephens and Bastow, of Bristol and London.

It consisted of a derrick crane (with 60ft. jib) and a mortar mill, worked simultaneously by a single engine. The crane was elevated in the usual fashion on a timber scaffolding at a considerable height above the engine, which stood on an iron bogie upon the ground. The chain led up from the winding barrel through a hole in the base of the crane, and thence over the top across pulleys for the purpose of hoisting the jib and materials. The mortar mill stood some distance from the engine, and was of the ordinary type, driven by a belt attached to a special pulley on the engine.

Mr. Diment's own engineer from the woodworking machinery shop made the patterns and fitted up the crane; but I am not aware that he claimed to be the originator of this duplex action, which overcame the necessity of the employment of two engines, &c., &c. See paragraph referred to, page 459.—I am, &c.,

S. B. BURTON.

16, Ridley Villas, Newcastle-on-Tyne,
Sept. 17.

THE ITALIAN MARBLE TRADE.

SIR,—The following figures may be of interest to your readers. They represent the gross production of Italian marbles from the quarries at Carrara and Massa, the total exportation to all countries, and the amount and value exported to British ports during the past seven years:—

	Production. Tons.	Exportation. Tons.
18[illegible]	154 277	131,571
18[illegible]	159,169	122,305
18[illegible]	168,565	157,969
18[illegible]	173,582	127,251
18[illegible]	175,773	142,133
1886	168,942	152,445
1886	156,058	161,543

TOTAL EXPORTATION TO BRITISH PORTS.

	Tons.	Value.
18[illegible]	16,[illegible]	£[illegible]
18[illegible]	14,[illegible]	114,161
1882	20,427	137,872
18[illegible]	17,[illegible]	124,[illegible]
1884	20,097	132,918
1885	18,648	116,224
1886	20,336	122,646

—I am, &c.,

ARTHUR LEE.

Canon's Marsh, Bristol, Sept. 20.

CHIPS.

A new church is about to be consecrated by the Bishop of Manchester at Longton, Lancs. It provides sittings for 520 worshippers, and has cost, including site, £5,455.

The Plymouth board of guardians have instructed Mr. H. J. Snell, of that town, to prepare plans for the gradual reconstruction of the workhouse, the first section to be carried out being measures for the addition of fireproof staircases to the lunacy wards.

A new theatre is approaching completion in Heath-street, Crewe, from plans by Mr. Alfred Darbishire, of Manchester. Mr. George Cawdrey is to carry out the construction of the stage, flies, and paint room, which are to be exceptionally complete for a provincial theatre.

A building at Wickham Market, Suffolk, formerly used as the town hall, has been acquired by a local court of Foresters, and was reopened last week after enlargement and improvement. The works have been carried out by Mr. H. Dale, of Wickham Market.

A bronze statue to Dr. Agostino Bertani, surgeon-in-chief to Garibaldi's expeditionary corps in the Italian wars of independence, is to be erected at Milan. The sculptor is Vela, of the canton Ticino.

The tower and spire and peal of eight bells just added to St. Paul's Church, Wood-green, near Wednesbury, were consecrated by the Bishop of Lichfield on Saturday. Mr. E. F. C. Clarke was the architect, Mr. Willock, of Wolverhampton, the builder, and Messrs. Taylor, of Loughborough, were the founders. We illustrated the tower in our issue of Jan. 21 of the present year, and the church itself, built from the same architect's designs, in our issue of April 5, 1872.

A bas-relief in Carrara marble has been recently found in a tomb in the Via Portuensis at Rome. It represents a nude youth defending himself from two women, each clothed in a short chiton and himation. According to Luigi Borsari, it portrays the fate of Pentheus, who was torn to pieces by Mænads for reviling the Bacchic mysteries.

Intercommunication.

QUESTIONS.

[9399.]—**Quantities.**—Prof. Kerr read an important paper last session before the R.I.B.A. on "The Architect's Functions in Building Contracts." In the discussion which followed, a great difference of opinion was expressed with reference to the quantities forming part of the contract. I should be very glad of replies to the following questions:—1. Why do many architects object to the quantities forming the basis of the contract? If the builder bases his tender upon the quantities, is it fair dealing, or is it common sense to exclude them from the contract, and to ignore them after the contract is signed? 2. On what grounds is the assertion made, "If the quantities form part of the contract, the quantity surveyor is absolved from all liability for errors"? If I am not mistaken, in law all men are liable for negligence and incompetency in the exercise of their profession, and my contention is that whether the quantities form part of the contract or not, the amount of the surveyor's liability is precisely the same, although the person to whom he is liable may not be the same. The extent of his liability must be in proportion to the extent of his shortcomings, and cannot depend upon arbitrary exclusion of the quantities from a contract to which he is not a party. 3. Assuming that the quantities are excluded from the contract, what legal decisions have been given establishing the principle that the quantity surveyor must pay to the builder, out of his own pocket, the amount of any deficiencies? 4. Again, assuming that the quantities are not in the contract, to whom is the surveyor responsible in the event of excessive quantities? It must not be forgotten that the low-class or incompetent surveyor is much more likely to err on the side of excess than on the side of deficiency. It is easy enough with a stroke of the pen to weight quantities to any extent, and there is no check upon abuses of this kind; certainly the builder will say nothing about them. Excessive quantities are much more serious to the proprietor for this reason, that he pays money for nothing at all. For example, if the value of the excesses amounts to £500, he pays that sum and receives absolutely no consideration whatever. If, on the other hand, the quantities are deficient to the same extent, at the worst he only pays £500 more than he expected to pay, and he gets his money's worth. A discussion on the points raised by these questions will be interesting to many readers of the BUILDING NEWS, and a reply from authorities, like Mr. Banister Fletcher, would be of great value.—SURVEYOR.

[9400.]—**Acoustics.**—In a church with a high-pitched roof the sound of the preacher's voice carries so badly that most of the sermon is lost. Is there any remedy, or, at least, mitigation of the evil? Can any correspondent give the name and date of an article in one of the monthlies on the acoustics of the Albert Hall, London, and the plan there adopted successfully?—E. M. J.

[9401.]—**An Architect in a Fix.**—May I ask through your paper if any of your readers were ever in such a fix as this? A client of mine wished to build two pairs of houses at about £2,000 each pair, and he asked me to prepare the drawings and specification, and get tenders from builders, which I did, to the satisfaction of all concerned. When the first pair were ready for the roof the owner gave me a letter, in which he said that he would be his own architect for the second pair. Accordingly he told the builder to begin them in accordance with his contract and my drawings and specifications, thus simply copying in the second pair what was done by me in the first pair. The whole position is to me painfully ludicrous, more especially as he refuses to pay one penny on the second pair. If this is brought before a judge he will rule according to the usages of the profession, I presume. May I ask you or any of your readers to give me their opinion as to the case?—A. B. C.

[9402.]—**Dark Oak Stain.**—Could any of your readers recommend me a good dark oak stain for white pine, and oblige?—SCOTUS.

[9403.]—**Half-Timbered Work.**—Would any kind reader give me his experience as to the best cement for finishing, or skim coat for panel work? I have arranged for grounds or foundation coat, the best Portland cement, and wish to know what cement is best to use for finishing coat so as to leave all perfectly smooth and paintable?—J. H. D.

[9404.]—**Royal Engineer Department Examination for Assistant Surveyor.**—I should be glad if any reader would oblige me with a list of the best books on the following subjects in relation to the above exam.?—1. Theory of Construction; 2. Strength and quality of materials, and description of workmanship, tools, and plant; 3. Analysis of prices.—G. W. C.

[9405.]—**English Manor Houses.**—Would anyone kindly inform me which are the twenty or thirty most important English manor houses to students of architecture, or in other words, what are the houses that are to England what the following are to France?—Chambard, Blois, Chaumont, Pierrefonds, Le Lud, Maintenon, Loches, Azi-le-Rideau, Cour-Cheverny, Valency, Chenanceaux, Amboine, Versailles, Fontainebleau, Chateau d'Usse, Chantilly, Montresor, Serront, Montrail, Bellay, Brissac, Chateau d'Eau, &c.? One more question: What work best illustrates the English Houses?—A STUDENT OF ARCHITECTURE.

[9406.]—**Paint for Hot-Water Pipes.**—I have to paint some hot-water pipes which are exposed to view. Would any reader please inform me what paint would be most suitable for the purpose?—PAINTER.

[9407.]—**Specification not Agreeing with Quantities.**—When work is described in the specification, but not in quantities, can the contractor be justly asked to execute such work, although there is no clause in the specification to that effect?—ENQUIRER.

[9408.]—**Architectural Perspectives.**—Are arches, &c., in perspective generally inked in by curves? If so, are the ordinary French curves used? Some draughtsmen seem to use a slightly jagged or indented straight edge for the sake of picturesqueness. Is this so? Any practical hints on this subject would be welcome to—A LEARNER.

[9409.]—**Warehouses.**—Will some reader experienced in the Metropolitan Building Acts kindly say—1. If shops with dwelling-rooms over come within the definition of the "warehouse class," and explain where the line is drawn? 2. If a building as mentioned above could have a Mansard roof with a pitch of over 47° to cover the domestic rooms. 3. Are there any regulations in force respecting cranes over public thoroughfares?—R. J. BEALE.

[9410.]—**Concrete Floors.**—Will some readers of this paper kindly send answer to the following questions next week? A corridor leading to a mission hall is about 22ft. long by 6ft. wide. The floor is composed of cement concrete 8in. thick, in some places rather more. The concrete forms a slab resting partly on set-offs in the wall on either side, and partly on a projecting curve of bull-nose brick. The corridor may at times be full of people, moving either to or from the hall. Do my fellow-readers consider this construction quite safe? If not, what remedy do they recommend?—CAUTIOUS.

[9411.]—**Flue Linings or Tubes of Glazed Fireclay.**—These I understand are given to cracking where subjected to much heat or pressure, whilst unglazed fireclay pipes are free from same. Can anyone give me information on these points?—TOLOP.

[9412.]—**The Eyesight.**—I venture to bring this subject before your readers, believing that it is a matter of vast importance to the architectural profession, and hoping that by so doing we shall be able to obtain some advice, of value to all draughtsmen, as to the proper means of protecting the eyesight, of restoring it when affected, of preserving it, and also of the best method of getting as much work out of those important members—the eyes—without doing them a permanent injury. Of late I have heard of numerous architects and draughtsmen who have been obliged to give up work for lengthened periods, and have even been compelled to spend the greater part of the day in a dark room because their eyesight has begun to give way through the great strain brought to bear upon them. I have lately felt it somewhat myself, though up to last winter my eyesight never failed me in the least. Then, being busy on some competition work (work which has doubtless many things to answer for besides this) and for several weeks, my eyes being forced to bear the glare of white paper continuously for many hours of the day, and then also for several hours of the night, by gaslight, I found that towards the end, on looking at the paper, all lines seemed to run into one another. My eyes at once commenced to stare as though at some point far beyond, and every detail was rendered obscure. As to putting in any minute work, it was totally impossible until I obtained a pair of "smoked glasses," which shut out the intense glare of the paper to a large extent. I still find the effects of this strain on the eyesight if for any lengthened period my eyes are brought to bear continuously on white paper, and I, and no doubt many more sufferers, will be thankful to any one who can suggest any remedy, or give any suggestion as to the proper means of preserving and strengthening the eyesight. The advice of any medical friends who are authorities on this subject will especially be acceptable.—VEDRA.

REPLIES.

[9334.]—**Half-Timbered Work.**—There are no special works on this subject that I am aware of; but a few general remarks may serve "Iona's" purpose. The old builders did not fill in with brick and plastered over; they used wattle and plaster, and the best modern substitute is double lath and London Portland cement, finished flush with the timbers. On no account let the timbers project; it is a mistaken notion. If brick filling-in is used, let it be flush, and not plastered over, and arrange the timbers so as to avoid closers and cut bricks. If the ordinary whole or half bricks will not suit, have them made the proper size by hand, and not pressed. By the same rule the timbers should be framed from the saw, and not wrought, and the oak pins cut off to project ¼in. from face. The wood should have several coats of Stockholm tar and no paint. It is a fact not generally known that timbers exposed to the weather are more durable if unwrought than wrought and painted. The first coat of plaster should be half and half good hair mortar, and London Portland cement (White's or Nine Elms); second coat, Portland cement and clean washed sand; and last coat left floated face, with white-washed sand. The cement should be spread out on a floor to cool for about a week before using. If "Iona's" will state if he wishes to fill-in with brick or plaster, I may help him by sketches.—JAMES THORNELOE.

[9286.]—**Railway Gauges.**—The general gauge of Russia in Europe is 5ft. (having been chosen to put obstacles in the way of invasion from Western Europe). There may be a few narrow-gauge exceptions, but I can give no particulars about them. The Central Asian lines I believe are also 5ft. gauge; but of them also I have no particulars. The Trans-Caspian was originally laid down on some very narrow gauge, but has since, I believe, been altered to Standard. There are two principal gauges in India, the broad, or Standard, of 5ft. 6in., and the metre, of 3ft. 3⅜in. The Standard gauge comprises all the main lines of communication with the exception of the Rajputana-Malwa system, a question of whose alteration to Standard gauge is now under consideration. The Standard gauge, open and working on the 31st March, 1886, comprised 7,583 miles, or 61¼ per cent. of the whole. The metre gauge on the same date comprised 4,552¾ miles, or 36¾ per cent. There were also 127¾ miles of 2ft. 6in. gauge, 80½ of 2ft. gauge, and 27¾ of 4ft. gauge, total, 12,376 miles. If "An Engineer" will get the admirable "Administration Report Bluebook on Indian Railways" for 1886-7 (price about 2s. 6d.), which will be out in a week or two's time, he will find in it all he can want to know.—BROAD GAUGE.

[9397.]—**Exam. for Assistant Surveyor, Civil Service.**—"A Candidate" can inspect specimen examination papers by calling on me by appointment. Subjects, examiners, and conditions are constantly being changed. At one time, "water supply," "levelling and chain surveying," and "applied chemistry" were among the subjects for competition. Previous to this year, civil engineers' assistants were not allowed to compete. On the other hand, surveyors' assistants are not now eligible. Admiralty candidates have two extra compulsory subjects

this year. The preliminary examination lasts one day (about four hours), and the competitive takes seven days (about 42 hours). London, Edinburgh, Bristol, Leeds, and Shanghai are the Office of Works stations to which assistant surveyors may be sent. Chatham, Devonport, Gosport, Pembroke, and Portsmouth are the outposts at which Admiralty draughtsmen may be stationed. I shall be glad at any time to answer queries which readers of the BUILDING NEWS may address to me.—J. R. SMITH, 22, Salcott-road, near Battersea Rise.

STAINED GLASS.

DUNDEE.—Messrs. Barnett and Sons, glass stainers, Leith, have just completed for St. Joseph's Roman Catholic Church, Dundee, a memorial window. It is formed by a triplet of lancets, and above these a circular light, in which is represented a dove hovering over the group of figures below. The latter consists of the Virgin with the infant Jesus in her arms, and in the side lights sitting and kneeling figures of saints. In the side lights are representations of St. Anna, St. Joseph, St. John, and St. Dominic. These are flanked by two smaller lancets containing figures of St. Andrew and St. Patrick.

THE ENGLISH CHURCH AT COPENHAGEN.—The stained glass windows in the chancel have been presented by Sir Francis Cook, and the west windows by his Excellency the Hon. Sir Edmund Monson, K.C.M.G., Her Majesty's Minister in Denmark, the whole work being by Messrs. Heaton, Butler, and Bayne, of Garrick-street, London.

ST. ALBAN'S CATHEDRAL.—A new memorial window has just been completed in the south side of the ante-chapel to the Lady-chapel, in memory of Jane Elizabeth Gape, aunt of Major Gape, who died in the year 1872. The window has been fixed by Messrs. Burlison and Grylls, of Newman-street, Oxford-street, and it is a two-light window with an upper light, and bears large figures and groups, representing St. Margaret and St. Catherine, and the parable of the Foolish Virgins. A memorial window of stained glass is to be fitted by the same firm in the opposite angle of that part of the chapel.

WANGFORD.—The old parish church at Wangford, Suffolk, has lately been restored, and a four-light west window erected, to the memory of the late Earl of Stradbroke, by the members of his family. The window represents "Our Saviour driving the money-changers and those who bought and sold doves from the Temple," in the left-hand light, while the two centre openings are occupied by the subject of "Solomon building the Temple," and the fourth light represent "The bringing back of the Ark to the Temple by the Priests." These three subjects are surmounted by Perpendicular canopies, having in each case a corresponding base. There is some very intricate and imposing tracery, in which floating angels bearing shields, with the "Alpha" and "Omega" and emblems of the four Evangelists, form the principal part. The window was designed and executed by Messrs. Gibbs and Howard, 64, Charlotte-street, Fitzroy-square, London, under the superintendence of Mr. E. P. Blackburn, architect, of Winchester.

LEGAL INTELLIGENCE.

IN RE C. J. C. PAWLEY.—A first meeting in this case was made on Sept. 15 before Mr. Wildy, assistant receiver. The receiving order was made upon a creditor's petition, the debtor being described as of 26, Moorgate-street, City, and now or late of Sydenham, architect and surveyor; and it appeared that he had been engaged in speculative building. The unsecured liabilities were stated in the accounts at £6,983, and debts fully secured £80,080; assets £65. It was stated that the Court had made an order for summary administration, and the debtor had been adjudged bankrupt. No offer was made, and the creditors left the matter in the hands of the Official Receiver.

On Saturday the remains of Mr. George Fawcett, builder and contractor, Quarry House, Teale-street, Wakefield, who died suddenly on the previous Wednesday, were interred at the Wakefield Cemetery. The funeral was of a public character. The procession included the Borough Police and Fire Brigade, about half of the members of the Corporation, with which the deceased gentleman had been connected for nearly nine years, and the members of the Wakefield Master Builders' Association.

The Dover Harbour Board have decided to employ Messrs. Lucas and Aird to widen the Wellington Bridge and gateway 10ft., at a cost of about £20,000.

A public park, 11 acres in extent, was opened at Peebles on Saturday by Sir J. A. Hay, by whom the site has been severed from Kingsmeadows Park and presented to the townspeople.

WATER SUPPLY AND SANITARY MATTERS.

COUNTY DOWN UNITED DISTRICT WATER SCHEME.—A scheme of considerable magnitude is in preparation for affording a supply of water to a number of towns in Down and Armagh. Mr. Henry Smyth and Mr. Macassey are the engineers engaged, and they have selected Slieve Croob Mountain, near Ballynahinch, as the source of the proposed supply. The water will be collected on the southern slopes of the mountain, and then stored in large reservoirs. The latter will be situated at the level of some 900ft. above sea-level, from whence distributing pipes will convey the water to the different towns joining in the scheme. Each town will have its own service reservoir, into which its share of the supply will be passed. The towns to be joined in the undertaking include Ballynahinch, Downpatrick, Crossgar, Dromore, Banbridge, Lurgan, and Portadown, and the villages situated on the lines of pipes.

HORSFORTH, LEEDS.—A third reservoir has been constructed for the supply of this town, and will be brought into use very shortly. It covers seven acres of land, and it has been constructed from plans prepared by Messrs. McLandsborough and Preston, engineers, by Mr. John Brigg, of Bingley, and has cost about £2,000, exclusive of land and fence-walling. It will hold eight million gallons, the storage capacity of the three reservoirs being 18 million gallons. It is also proposed to raise the embankment of the middle reservoir 6ft. The land for this purpose has been purchased, and the preliminary work of removing the fence-walls, weir, and by-wash has commenced. This will increase the storage capacity eight million gallons, making a total of 26 million gallons in all. While constructing the new reservoir a spring of good water was tapped, which yields 5,000 gallons per day. The new filter beds, which have been constructed at a cost of £2,000, are now in full working order, and are calculated to pass off 150,000 gallons per day.

MANCHESTER.—The present water supply to Manchester from Longdendale, and the works in progress in connection with the Thirlemere Lake scheme, are described from official sources in a handbook recently published. The cost of the waterworks at Longdendale is put down at £2,600,863, and that of the old company's works at £533,561, making a total of £3,134,424. Supply of water, 1886, 19,464,597 gallons per day. Area of drainage ground, about 19,300 statute acres, or 30 square miles. Distance of Manchester from Woodhead reservoir, 18 miles. Population supplied, about one million. Consumption equal to 20 gallons per head per day for all purposes. Area of district supplied, 84 square miles, comprising 34 townships. Compensation water, a quantity equal to 59 cubic feet per second for 12 hours of every working day, divided by arrangement with the millowners into about 16,800,000 gallons for the first five working days of the week, and 11,000,000 on a Saturday. New works in course of construction at Lake Thirlemere, Cumberland:—Elevation, 533ft. above Ordnance datum; area of drainage ground, 11,000 statute acres; present area of lake, 328¼ acres; area when raised, 793 acres; contents when raised, 1,300,000,000 cubic feet, estimated to supply 50,000,000 gallons per day; tunnels and aqueduct for supplying water to Manchester, 7ft. diameter; gradient, 20in. per mile; total length, 95 miles; estimated cost of works, £3,424,530. The powers to construct these works were obtained under the 42nd Vic. cap. 36 (23rd May, 1879), after two severe Parliamentary struggles. The total area of the reservoirs amounts to 154½ acres, and the total storage capacity 5,985,000,000 gallons.

East Huntspill Church has been reopened, after extensive alterations, a sermon being preached by the Bishop of Bath and Wells. The edifice was erected in 1838, and is in the phase of Norman then in vogue. It consists of a chancel and nave, and is without a tower. The gallery at the west end of the church has been removed, and the organ has been re-erected on the north side of chancel, in an organ chamber; the chancel enlarged, and a new vestry constructed on the north side. All the work has been carried out with stone from Puriton. The architect was Mr. Hans F. Price, of Weston-super-Mare, and the contractor was Mr H. W. Pollard, of Bridgwater.

A new Presbyterian church in the Crescent at Belfast was opened last week. It has been built by Messrs. Fitzpatrick, of Belfast, from designs by Mr. Wilson, of Glasgow.

The plan for the new Eden Theatre, to be erected in the King's-road, Brighton, were passed by the local board last week, and the work will be commenced in a few days. The building will be practically fireproof, and provided with ample exits. Some special features will be introduced in the construction by the architect, Mr. Frank Matcham, of 3, Great James-street, London, W.C.

STATUES, MEMORIALS, &c.

UPTON PYNE.—The restoration of Upton Pyne Church has just been completed by the erection of a reredos and superaltar. The reredos, designed by Mr. R. Medley Fulford, M.S.A., to frame a valuable altarpiece brought from Italy 170 years ago by Mr. Hugh Stafford, of Pynes, and presented to the church, formed part of the plan of restoration, and the Dowager Countess of Iddesleigh has had it carried out as a memorial of her late husband. The reredos is of carved oak and walnut, the super-altar of Corsehill stone, surmounted by a slab of Devonshire marble. The work has been executed by Messrs. Luscombe, of Exeter. The painting in the reredos is a representation of Our Lord's Supper, and it has been carefully restored by Mr. Worth, of Exeter. In the churchyard over the vault of the late Lord Iddesleigh a memorial cross has been erected. The cross, like the three massive steps on which it stands, is of white marble; the arms and head have crosslet terminations with moulded margins; in the extremity of each limb is a raised Greek cross, and in the centre the sacred monogram X P, while on the base of the stem is represented an Ionic capital bearing a Greek lamp. On the principal front of the surbase is the inscription in bold Roman capitals, "Sir Stafford Henry Northcote, first Earl of Iddesleigh," and on the sides are other inscriptions. The cross has been executed from designs by Mr. J. Jerman, of Exeter, by Mr. Harry Hems, of the same city.

CHIPS.

Professor Vischer, the eminent German art critic, died at Gmünden on Wednesday evening, in his eighty-first year.

Mr. H. E. Armstrong, medical officer of health of Newcastle-on-Tyne, describes, in an interesting letter published in a Newcastle daily paper, a model dwelling which has been erected in the Royal Jubilee Exhibition of that town. The dwelling, which is detached, is built with materials and appliances which have been presented by different exhibitors. The house has been planned by Mr. R. J. Leeson, and consists of four rooms on each floor, which with the offices are well arranged. The building will remain permanently after the Exhibition is over.

The awards of the jurors at the Adelaide Jubilee Exhibition were completed on the 14th instant. Of the 237 British exhibitors 93 have secured recognition in the shape of medals and certificates. Among those who receive gold medals are the following:—Art pottery, Doulton and Co., London; mosaics, Minton, Stoke-on-Trent; pens, Gillow, Birmingham; carriages, Morgan and Co., London; alkalies, Brunner.

Mr. William Ray, now of the Yorkshire College, Leeds, has been elected headmaster of the School of Science and Art, Kidderminster, and the architect of the school buildings, Mr. Getting, has been directed by the committee to obtain tenders for fitting up and furnishing them.

The Congregational chapel at Needham Market was reopened last week after having been renovated from plans by Mr. A. Pells, of Beccles. The church was originally founded in the year 1662 by the Rev. John Fairfax, M.A., who was ejected from Barking; and the present chapel (the third built in Needham since the church was founded) was opened in November, 1837. A lecture hall has been thrown into the chapel; all the ground floor of the building has been reseated with pitch-pine benches, and a new pulpit, standing on a platform, has been erected, while the hot-water pipes have been laid in the passages. The whole chapel has been re-coloured and re-painted under the direction of Mr. F. Blomfield, of Needham, while the other part of the work was carried out by Messrs. Theobald and Sons, of Needham. The cost amounts to £360.

The Royal Jubilee Hall, Weymouth, has just been completed and licensed for theatrical performances. It has cost £6,000, and is 140ft. long by 90ft. in width; the height from floor to roof in the centre is 51ft., and to the wall plates 32ft. Messrs. Crickmay and Sons, of Westminster and Weymouth, are the architects, and Mr. G. R. Crickmay, in giving evidence before the magistrates, said every attention had been paid to the entrances and means of exit. He regarded the place as absolutely fireproof, being constructed of brick and iron.

Referring to our notice in our issue of the 16th inst. of the restoration of St. Leonard's Church, Walford, from plans by Messrs. Nicholson and Son, Hereford, we should have said the floors were laid in Lowe's patent system of wood-block flooring.

The memorial stones of a new Wesleyan chapel, to be known as St. Levan's, was laid on Tuesday at Pennycomequick, near Plymouth. Mr. Trenaman, Stuart-road, Plymouth, is the contractor, and the cost will be about £1,000.

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THE BUILDING HANDICRAFTS.—I.

IN the early days of architecture, the building artificer and artist craftsman contributed their share to the development of the art; in truth, it was more from within that the art grew than from external influences; but if we compare the action of our modern craftsmen, we shall find very little growth takes place in this way, as their work is controlled by external circumstances. Instead of being operative artists they have become mere instruments in the hands of the general contractor. We must bear these altered circumstances in view in estimating the influence of the various trades upon architecture; how far each can be said to have improved or otherwise, and to what extent modern architecture is indebted to the building operative. And if we were asked which of the trades had done the most for the art in recent times we should be inclined to answer, taking the order of them in building—the bricklayer, the carpenter and joiner, the engineer, the plumber, the plasterer, and decorator. What about the mason? There are excellent masons, no doubt,—some of them equally skilled with those of old who reared the arcades and vaults of Amiens, of Salisbury, and the elaborate fan vaults of Gloucester, King's College Chapel, and Henry VII.'s Chapel; but they are few, and their services are now fallen to a discount. In the roofing to our churches and schools the mason has been seriously supplanted by the carpenter and plasterer. In fact, the work which raised the mason to the highest point of geometrical and artistic skill, and the art of masonry to a high pitch of perfection in the arts, is very seldom required. Not 15 per cent. of our modern churches are vaulted with stone, and very few of them exhibit the elaboration and intricacy of stone-cutting which was found some years ago. So of masonry we must say that the art and craft have fallen greatly from their once high estate, due largely to the diminution of buildings requiring the highest skill in the masonic arts. Moreover, the brick-cutter and setter has, in many districts, to a considerable extent superseded the stone mason, and the trade of bricklaying has immensely risen during the revival of brick architecture. It will be evident that, in both the cases of the mason and bricklayer, the rise or decline of the art and the craft has depended a good deal on the material used and the locality. Better masons were to be found in the Southern and Eastern districts of England fifty years ago than now, and better plasterers than bricklayers. And why? Because at that time stone was more generally used for churches than brick, and stucco was more common than brick. The use of a material will, therefore, always have a great deal to do with the position of the craftsman, as has been the case in manufacturing industries. Even in such matters as ladies' fabrics, we know how much depends on the materials in fashion; we know that some industries have completely died out owing to the disuse of the material upon which they depended, or its being superseded by another. The employment of a particular material led, of course, in time to the exercise of skill upon it, and experts or schools of craftsmen followed in every district. Let us take, for example, the masonry of the Eastern Counties—the "flush work," as it is called, of Norfolk and Suffolk, where flint is introduced in panels formed of stonework. The masons learned this combination so perfectly that it became a beautiful feature in the porches and parapets of their buildings, as we notice in the fine churches of Long Melford, Eye, and Woodbridge, in Suffolk, and we have mainly to notice that it was the abundance of flints in these localities that led the masons there to the invention of this beautiful flint panel work in their walling. So, again, turning to the magnificent roofs, rood screens, and bench ends to be found in this part of England. We can only account for the perfection in them by the carpenters and carvers having formed guilds and devoting themselves to the perfection of woodwork. The same development in this branch is to be noticed in Devonshire and Somerset, where many churches have roofs carved and painted like those of Norfolk and Suffolk, and where remarkably fine carved screens are to be found, as in the church of Wrington. In Somerset the masons and carvers appear to have been remarkably proficient. The stone-cutting of the grand towers of Wrington and St. Cuthbert, Wells, among many more, display much elaboration and scientific skill, notably in the grouping of pinnacles and in the intricate stone-cutting of the angles of the towers. In short, the student of local peculiarities cannot fail to mark that wherever there has been a school of masons, of wood-workers, or of carvers, there has been an unrestricted supply of good stone or wood. But we cannot expect to find skilled artists in any materials, when every few years the taste changes, and we turn from stone to brick, and from brick to stucco. Change of style has been inimical to development such as we are considering, as it supposes a revulsion or drawing back from all that we had done previously, and working artists are not prepared to unlearn what they have acquired, and to begin to be taught new modes and details of work. Such was the case when Gothic succeeded Italian, and "Queen Anne" the Gothic. In the historic periods the change was gradually brought about, owing to the foreign artists who came over, as during the age of Elizabeth and the later days of Charles II. The Stuarts, indeed, encouraged foreign artists, and the workmen were instructed in new modes of working. But there was something stronger than foreign influence: there was the individual unfolding of ideas which the earlier guilds promoted in every locality; the apprentice was instructed in the "mystery" of his craft, and learned to become a proficient in it; he was not restricted as to time or material, and was permitted to exercise his own talents. In this manner invention was encouraged, a new stage was entered upon, and expressed itself outwardly. As we have said, the growth was from within outwards, not as now—a forcing process by which all, except the architect, become mere tools.

But to take each trade in the order we have named them, and first the bricklayer. We have said he has superseded in some districts the mason. During the last ten or fifteen years the bricklayer has recovered his somewhat fallen condition under the reign of "compo." We see examples of brickwork now which equal the brick architecture of the Tudors and the Dutch of the 17th century. Owing to the taste and labours of Mr. Norman Shaw, Messrs. Ernest George and Peto, Mr. John L. Pearson, R.A., and Mr. A. Waterhouse, R.A., amongst modern architects, ornamental brickwork in England has made great strides. The "Queen Anne" craze, to its credit, has restored the reputation once enjoyed by our brick-cutters and setters, and we need not go far to point out in London some fine examples of modern workmanship that worthily compare with the Flemish. Italian, Gothic led the way. Mr. John L. Pearson, R.A., in his fine church of St. Augustine's, Kilburn, and St. John's, Upper Norwood, has shown what can be done by modern hands in brick groin vaulting. At the recent Architectural and Building Trades Exhibition at Islington we noticed some excellent rubbed and carved brickwork, executed by T. Lawrence, of Bracknell; we also see red brick houses at Kensington, designed by Mr. J. J. Stevenson and Messrs. George and Peto, which are masterpieces of the bricklayers' and the brick-cutters' arts. Yet not long ago, the English bricklayer was looked upon as occupying not a very important position in the building fraternity, and, in fact, only a little above a hodsman. His attainments were then measured by the operation of laying bricks. But the skilled bricklayer is a great deal more than a layer of bricks. His knowledge of practical geometry should be not less extensive than the mason's if he understands the method of setting out such things as oblique arches, groined vaults, gauged arches, niches, &c. This setting out has been generally intrusted to foremen and clerks of works, though there is every reason why the operative should know the principles, especially if he desires to raise himself amongst his fellows. The drawing and cutting of arches, the taking off the bevels and moulds for an arch on a circle, require at least intelligence, and when to these things we add a knowledge of architectural features and ornament, it will be easily seen that the superior operative in this department should possess attainments as respectable as those of the mason.

He should particularly welcome the efforts made to raise the handicraft by the establishment of classes for apprentices, such as those of the City and Guilds of London Institute. The opportunity will be lost to him later in life. It is for the workman alone to raise himself to the position of an artist in the material he works with, and till he earnestly sets this ideal before him, the contractor will continue to use him as a mere tool. An accomplished bricklayer or mason is intrusted with a great deal of the architectural design; he should be able to second the architect's efforts, and, if necessary, be competent to suggest modifications and improved details as the work advances. Very few do anything of the kind; they simply execute orders as expeditiously and thoughtlessly as they can—they have no interest to do more. But taking the trade all round, we may say there are indications of more intelligent interest and higher artistic culture in the craft. To be a successful worker in brickwork, a man ought to have some knowledge of art, to have a correct eye, to understand technical drawings, and to know when a thing looks well and what to do to increase its effect. Without he knows this he is only a bungler.

The art of the modern carpenter and joiner holds, it must be confessed, an inferior place to that of his predecessors. Triumphs of the carpenters' art, such as we meet with in the noble roofs of Westminster Hall, the Great Hall of Hampton Court, Eltham Hall in Kent, and in the beautiful examples of hammer-beam roofs in the old churches of Norfolk and Suffolk, are no longer to be met with. Iron has seriously interfered with the greater constructive feats of the carpenter; while his artistic skill has very little scope left under the modern contracting system of dividing labour. The old carpenter, although his scientific construction was not always perfect, produced works of art; his eye and hand were cultivated, and expressed themselves on the work he did. Machinery has lightened his labour; but without, alas! increasing the artistic cultivation of the worker. Though he has less drudgery to perform, he has not benefited; the hand and eye are no longer associated,

and a marked separation of the artist and operative has taken place. We can explain it on no other assumption than that labour-saving machinery has benefited only one class, and has taken away from the craftsman the means he had before of developing his skill and exhibiting his art. Things are done piecemeal; the capitalist only reaps the benefit. In this trade also, therefore, as in that of the mason, development from within has been impaired. The highest class of joinery to be found nowadays is in the hands of a very few men, who do the best church work, and are located in the principal towns. They contract for fittings. The skilled village or journeyman carpenter is now no longer met with. The consequence of these things is that the carpenter and joiner is no longer associated with building, except as an independent factor in its production, and contributes very little of his head and heart to the work. The recent statistics published on the depression of the building trades show two main causes of depression in this trade: the importation of manufactured materials and joinery, and speculative building. Reckless speculation is, we believe, the bottom of the trouble, as it draws into competition with skilled hands the inferior workman. But we still look to the carpenter and joiner. His labour constitutes a very considerable and important part of architecture, and the influence of the carpenter on architecture will always be felt. The Carpenters' Company, by providing technical instruction and free lectures, and exhibitions of handicraft, is recovering lost would ground, if only the London apprentices take advantage of them. Again, let not the youth believe he can do without apprenticeship. In London the apprenticeship system is dying out, and the market is being flooded with unskilled workmen. With unskilled joiners, architectural detail must need suffer, and when internal finish deteriorates, the exterior architecture becomes neglected. To masonry and joinery belong the essential part of architecture, and for the credit of art we must preserve them from falling into merely mechanical operations.

BUILDING LAW ADMINISTRATION.

THE irregularity with which the machinery of the law is found to work is one of the grievances of the public. If it is not a blunder or omission on the part of those vested with authority to carry out laws, it may be a dereliction of duty of a more reprehensible kind. The laws in force which concern the architect and builder are few and fragmentary; they are directed to insure the objects of safe and sanitary buildings, and they are supposed to be administered by authorities who are fully versed in the statute book, and who cannot go wrong. Unfortunately, there is no guarantee that these objects are attained. As we are repeatedly reminded, local control may be perfect in theory, but is anything but satisfactory in practice. With divided authorities there is a source of danger as well. Let us take as an example the statute law relating to building in the Metropolis. The application of the Acts, the rules for construction, regulations as to the line and height of buildings, the by-laws as to alterations of buildings not constructed in agreement with them, the regulations of structure of theatres and music-halls, the erection of buildings for dangerous or noxious businesses, are among the statutes in operation. These provisions are on the whole very fairly put into force by the existing administrators of the Acts; the districts are large but are well looked after by the surveyors, and the members elected by the respective vestries and district boards in the Metropolis are supposed to know the requirements of their several localities. But though the machinery is in good working order, there are occasions when the builder has not found it difficult to evade the law in the substitution of inferior materials and workmanship, and even in the carrying out of objectionable arrangements.

More cause for complaint, however, exists in the administration of the law in other towns, where, unfortunately, the web of old and modern legislation is no easy matter to unravel. Early in this century many towns obtained Improvement Acts, and the Public Health Act of 1848 was passed, which applied to the whole country. This Act was supplemented by various special Acts, till in 1871 the Local Government Board was constituted, with powers to control the local authorities; and the Public Health Act of 1875 was passed, sweeping away many local Acts, which by this time had become very troublesome and vexatious. The tangled web of legislation in sanitary matters is even now a source of bewilderment and difficulty in carrying out the intentions of the Legislature. It must be said, too, that the qualifications of members and mode of election of local boards are not all that can be desired to insure the carrying out of regulations of public importance. The members constituting urban authorities are usually property holders, often of a class of buildings which are not models of sanitary arrangement or good construction; and the same remark applies more forcibly to the guardians of the poor, who are owners of property in the rural districts. To qualify them as elective guardians they are to be owners or occupiers of property. Some time since we reported a glaring instance of neglect to provide sufficient closets to a house—the owner of the property being a member of the local authority. The regulations respecting lodging houses are perfect, but are being constantly evaded, owing to the diffidence of surveyors in putting into force rules against members of their boards. How many districts have the by-laws in force respecting houses let in lodgings? Just now, when many seaside towns are full of visitors, attention to certain rules are of urgent importance. For example, there is a by-law which can be put into force by the urban sanitary authority for any district, for fixing the number of persons who may occupy a house, or part of a house, which is let as lodgings. Is this salutary rule followed at Brighton, Hastings, Margate, or any of our popular resorts? Are houses so let registered or inspected; and, above all, we should like to know how many of them are provided with proper closet accommodation and ventilation? The fact is apparent that the local authority is often asleep when it ought to be on the alert, and that the section in the Act which empowers them to make inspections of their district to ascertain nuisances and to abate them is a dead-letter. In large towns like Manchester and Salford the Sanitary Acts have as yet done little to remove the close courts and alleys and the back-to-back houses, to which Dr. Ransome, in his address on consumption at the Sanitary Institute last week, attributed nearly all the phthisical cases in those parts. All borough surveyors are aware of the responsible and onerous duty cast upon them by Section 160 of the Public Health Act, which empowers them to act immediately upon the discovery of any "building, wall, or anything affixed thereon," being in a ruinous or dangerous state, and enables them after giving three days' notice to make complaint before justices, and order the owner or occupier "to take down, rebuild, repair, or otherwise secure," the same. This provision is found in the Towns Improvement Clauses Act, 1847, and is incorporated in the Public Health Act. So with respect to the previous sections, 158 and 159, of that Act, which give power to the urban authority to exercise their authority in cases of rebuilding or the erection of "new" buildings. Surveyors do not like to act upon their sole responsibility—they are, in point of fact, not willing to offend large property-holders, and the consequence is that old and dilapidated structures remain which are dangerous to the public. The borough surveyor has generally to attend to a multiplicity of daily duties, and it is often impossible for him to see that the 99 clauses of the by-laws of the Local Government Board have been enforced. The general opinion of the borough surveyors is that the machinery of administration—the inspection of buildings—is at present completely inadequate to cope with the actual demands. Inspectors of buildings, sanitary and constructive, are not half numerous enough in the larger towns and districts.

We have lately had a very painful experience in the case of fires, both in theatres and houses, of the very unsatisfactory state of local action. The Exeter Theatre calamity is a case in point. There was plenty of legislation, but no one to see that the rules were carried into effect. The authority in that city intrusted with the protection of the public declined even to be represented at the coroner's court. The urban authority are vested with certain powers to make by-laws, but in regard to theatres they are practically without a voice. Plans have to be deposited with them for permission to erect a building, but not to obtain a licence. The regulations of the Metropolitan Board of Works require that every person desirous of opening a place of public resort for the performance of stage plays must give notice to the licensing authority, which notice must be accompanied by plans, drawings, and specifications, the number of persons accommodated in the different parts of the house, and of the area to be assigned to each; they further require that the proscenium wall is to be of brick, not less than 13in. in thickness, 3ft. above the roof. Other local authorities have no authority to enforce these regulations, for, as we find in the evidence, the proscenium wall was only 9in. thick under the stage, the doors in the wall for the orchestra were of wood; while, worse still, the stairs leading from the foyer to the upper circle, the top landing on the entrance to gallery, and the passages round the upper circle and dress-circle boxes were of wood. The evidence will show other departures from these rules, especially as regards the all-important question of exits. The Act of Parliament for the licensing of theatres is an authority of general application. The justices have an assumed power to attach to their license the regulations of the Lord Chamberlain. The statute was passed in 1843, and, as the coroner said, does not limit the power of the justices. But the questions that occur are: Who makes the rules for the regulation of local theatres, and how are they enforced? The Exeter theatre furnishes the answer. It was given in evidence that the rules were prepared by the committee and approved by the justices. The statutory duty of inspection, according to one witness, was not the duty of the magistrates, but of the town council, whereas the city surveyor declared he was solely the custodian of the plans, and not the adviser of the justices. The latter contended that the construction and safety of the building devolved on the town council, and the justices' rules related only to the internal management, a division of duty which accords with the jurisdiction exercised by the Metropolitan Board of Works and the Lord Chamberlain, the latter of whom supervises the internal management. In short, this case furnishes us with a striking instance of the uncertainty which exists in the minds of local authorities as to their precise duties. The magistrates evidently thought the town council was the authority in respect of construction, and therefore did not con-

sider they were to be held responsible. While it is clear there is nothing which requires the justices to make rules, it is reasonable to think the urban authority should possess the requisite power to regulate entrances and exits. The by-laws of towns are chiefly directed to ordinary buildings and to sanitary measures; they are quite inadequate to provide means of ingress and egress to public buildings, and the enforcement of any rules is not clear. We certainly think it time that the Legislature should invest the urban authority with the necessary powers to act in all these and similar cases.

The licensing of buildings for special purposes is a question that must be taken up more thoroughly than it has been. We have now a variety of buildings erected for business and commercial purposes, for recreation and amusement. If a building is erected for a block of offices it should be so licensed, the owner or lessee being held responsible if the premises are let or applied to any other purpose for which it was not designed—if, for example, it should be converted into a factory or store. Premises intended for shops ought to be licensed as such, certain rules being required as to the number of bedrooms that should be allowed within the given area, a condition being that separate entrances and exits should be provided, and that on no account should the upper floors be divided into tenements. Public buildings ought in like manner to be classed and placed under control, the number of entrances and exits being proportioned according to a fixed scale on the number admitted. It would be easy and practicable to devise a code of rules that would apply to every description of building. The too easy conversion of buildings erected for one purpose and used for another would be checked by these regulations, and the licensing would carry with it an authoritative guarantee of the fitness of each structure, which deposit of plan and very uncertain inspections during the progress of erection so often fail to afford the public.

OUR WORKING MEN AND WHAT THEY MAY DO.

IT must needs seem to very many not a little surprising, when carefully thought about, that in a great manufacturing country like this, and in one in which the "fustian jackets" are always and everywhere at work and visible, that so little opportunity has ever—if at all—been given them to publicly exhibit, and to individually show to the world, each one's special aptitude for the work he does, whether by himself or in concert with others. It would be not a little difficult to find perhaps in a day's walk through London town any one single object which could fairly be evidenced as the handiwork of *one* man, and as thus showing what he, as a workman, can do. It is, indeed, surprising to find how little the outer world knows, or can know, of what its individual members are fully capable of, and what amount of mental, we will not say poetic, impression or imaginative power they each one of them can put before the eyes of the outer and non-professional world. Yet more surprising is it to find how impossible it is to do this from the want hitherto of any public institution which might be supposed to exist purposely for such work, and for which but so very few, if any, can provide for themselves. If this should be at all difficult of apprehension, it will certainly cease to be so, and will become evident enough, after the visits made to the late Chelsea Industrial Exhibition, where a series of works of all kinds were to be seen under conditions and opportunities somewhat new and hardly to have been anticipated; and now that this has somewhat too rapidly come to a close, we would for a moment take a lesson from it, imperfect as such may be.

We but venture a word or so about it, and that but generally, for there having been no catalogue, it is a little difficult to point to specialities; but this is the less to be regretted here, as it is on the main idea of the whole display that we would venture a word or two, now that the trial has been made, though only, as we trust, to be revived in the next year and in following years. The artist and academician have always had their own special means of putting the results of their work before the public, and in circumstances where they might be compared with others of a like kind; but the common workman, whatever his work, has not had this chance, and thus without doubt much has been lost not alone to himself as a workman, but to the public for whom he has worked. There are so many differences between the art work (to confine ourselves for the moment to that of the past, and to its then mode of production) and to that of the present of such like work, and to its mode of production—putting aside for the moment the aid of machinery, which is so fast doing all the old-fashioned hand work—that in this short note on one of its specialities we may well put it on one side, and dwell for the moment on the "hand-made" work as it now is, little as there may yet be of it, and that not so much for what it now produces, but for the purposes of comparison, and to show how very much is lost in giving to the "machine" what can really be only done, humanly and characteristically, by the human hand, brain-guided, and by the hand alone, for this hand work cannot even be copied by machinery, though it be so often, and at times so cleverly, attempted.

Among the multitude of contrasts that are to be found, as they are looked after between the work of the past and that of the present, there is nought greater than is to be found between their several modes of utilising, if we may so phrase it, the art capacities, the highest as well as the lower powers, of the working artists of the day. In the old world, the great artists and sculptors of the time, as in Egypt, cut through the hard granite their hieroglyphic writing as carefully and skilfully as they did the lines of the human face above them, and there is to be found in this "writing" almost as much of interest as in the forms which it illustrates, and we allude to this patent fact here in the hope that it may help to encourage those who have, as in this Chelsea working art show, evidenced the individual art power of the ordinary workman. We are here asking attention to the main principle involved in this unique display of hand-work by working men; but now that the late display of it is over, can hardly refer to individual examples of it, though doubtless many such will recur to the recollection of those who were specially interested in this first effort to show to the world the individual capabilities of our working men, and that not only, or even so much, as to their capability of working out in material more or less costly the thoughts of others, but as thinking each one for himself, and as showing to the world as a workman, he can do in the working out of material forms—the true secret, be it noted, of the power of past and antique art over and in the minds of the outer world.

We have thus been led to dwell for a moment on the great principle involved in the simple fact of the late industrial show at Chelsea, having been what it was, a working man's exhibition. It was not a little remarkable in very many ways, but most certainly in none more so than in the fact of its bringing before the public—of a special locality at least—examples of the art and fine art, and manipulative skill and hand-power of very many who have hitherto in these days hardly been thought of sufficient importance, considering their individual artistic position and power, to be thus publicly made note of. In the older and antique world, the work of the workman, whatever it might have been, whether high or low, whether rough as that of the men of the Romanesque, or refined and careful as was that of the Greek in the days of Phidias, each working artist producing it was, it is plain, an art power in himself, and simply wrote within the lines indicated by the architect of the structure a something more or less in connection with it. The Parthenon of the Greek and the cathedral of the man of the Middle Ages alike show this. The structure and the stone surface of it to write on was true, and the subject to write about may be indicated; but the work itself and its artistic teaching and teaching power was, without doubt, the work of the artist and workman by whom it was executed, and its inventiveness and art strength came, without doubt, from such art sculptor himself, each workingman, where there were more than one, as in the Parthenon, doing his own work in his own special manner, but yet as a workman. All this nowadays is reversed. Each workman is but one of many, all working, as much as may be, alike. C. B. A.

BUILDING MATERIALS.—IV.*

By W. Y. Dent, F.C.S., F.I.C.

(*Concluded from page* 428.)

IN distilling coal tar on a manufacturing scale, it is placed in a large iron still capable of holding about 2,500 gallons, heated by a furnace underneath, sometimes assisted by the injection of steam, and the application of an exhaust air-pump. As the still becomes heated, a light naphtha distils over between about 170deg. and 320deg. Fahr., which is of great commercial importance, inasmuch as it contains benzole or benzene, from which is obtained aniline, the basis of a series of colours, such as mauve and magenta. Between the temperatures of 320deg. and 370deg. Fahr. is distilled the liquid known as coal-tar naphtha, which is used so extensively for burning in lamps, and as a solvent for indiarubber. The liquor used for creosoting timber, termed "dead oil," or heavy oil of tar, from its being heavier than water, distils over between 370deg. and 750deg. Fahr.; the residuum in the still is run out whilst hot, becomes perfectly solid on cooling, and constitutes the substance known as coal-tar pitch. This dead oil, or creosoting liquor is of a very complicated character, consisting of a variety of hydrocarbons of different degrees of volatility, and possessing by no means the same antiseptic properties, the relative value of which, in this respect, it is difficult to estimate with any degree of accuracy. In the lighter portions are found carbolic and cresylic acids, substances which have long been known as possessing very great disinfecting properties, so much so, that for a long time they were regarded as the active agents upon which the value of the creosoting liquor (as a preservative agent for wood) depended. Within the last few years, however, the opinions of chemists have undergone considerable modifications in this respect, and there appear to be sufficient grounds for believing that the relative value of creosoting liquors is not represented by the percentage of these acids which they may contain, since, owing to their volatility, they are not retained by the wood for so long a time as some of the other constituents. In the heavier portions of the liquor, or "green oil," as it is termed, distilling over between 550deg. and 750deg. Fahr., are found a number of alkaloids, or bases, amongst which is a powerful germicide of a very pungent and acrid character, termed "acridine," which having a very much higher boiling point than that of carbolic or cresylic acids, is more permanently retained by the wood. The minute glistening scales generally observable on recently creosoted wood consist of naphthalene, a substance that possesses considerable antiseptic properties; when this substance exists in the liquor in moderate quan-

* Being the Cantor Lecture delivered before the Society of Arts.

and a marked separation of the artist and operative has taken place. We can explain it on no other assumption than that labour-saving machinery has benefited only one class, and has taken away from the craftsman the means he had before of developing his skill and exhibiting his art. Things are done piecemeal; the capitalist only reaps the benefit. In this trade also, therefore, as in that of the mason, development from within has been impaired. The highest class of joinery to be found nowadays is in the hands of a very few men, who do the best church work, and are located in the principal towns. They contract for fittings. The skilled village or journeyman carpenter is now no longer met with. The consequence of these things is that the carpenter and joiner is no longer associated with building, except as an independent factor in its production, and contributes very little of his head and heart to the work. The recent statistics published on the depression of the building trades show two main causes of depression in this trade: the importation of manufactured materials and joinery, and speculative building. Reckless speculation is, we believe, the bottom of the trouble, as it draws into competition with skilled hands the inferior workman. But we still look to the carpenter and joiner. His labour constitutes a very considerable and important part of architecture, and the influence of the carpenter on architecture will always be felt. The Carpenters' Company, by providing technical instruction and free lectures, and exhibitions of handicraft, is recovering lost would ground, if only the London apprentices take advantage of them. Again, let not the youth believe he can do without apprenticeship. In London the apprenticeship system is dying out, and the market is being flooded with unskilled workmen. With unskilled joiners, architectural detail must need suffer, and when internal finish deteriorates, the exterior architecture becomes neglected. To masonry and joinery belong the essential part of architecture, and for the credit of art we must preserve them from falling into merely mechanical operations.

BUILDING LAW ADMINISTRATION.

THE irregularity with which the machinery of the law is found to work is one of the grievances of the public. If it is not a blunder or omission on the part of those vested with authority to carry out laws, it may be a dereliction of duty of a more reprehensible kind. The laws in force which concern the architect and builder are few and fragmentary; they are directed to insure the objects of safe and sanitary buildings, and they are supposed to be administered by authorities who are fully versed in the statute book, and who cannot go wrong. Unfortunately, there is no guarantee that these objects are attained. As we are repeatedly reminded, local control may be perfect in theory, but is anything but satisfactory in practice. With divided authorities there is a source of danger as well. Let us take as an example the statute law relating to building in the Metropolis. The application of the Acts, the rules for construction, regulations as to the line and height of buildings, the by-laws as to alterations of buildings not constructed in agreement with them, the regulations of structure of theatres and music-halls, the erection of buildings for dangerous or noxious businesses, are among the statutes in operation. These provisions are on the whole very fairly put into force by the existing administrators of the Acts; the districts are large but are well looked after by the surveyors, and the members elected by the respective vestries and district boards in the Metropolis are supposed to know the requirements of their several localities. But though the machinery is in good working order, there are occasions when the builder has not found it difficult to evade the law in the substitution of inferior materials and workmanship, and even in the carrying out of objectionable arrangements.

More cause for complaint, however, exists in the administration of the law in other towns, where, unfortunately, the web of old and modern legislation is no easy matter to unravel. Early in this century many towns obtained Improvement Acts, and the Public Health Act of 1848 was passed, which applied to the whole country. This Act was supplemented by various special Acts, till in 1871 the Local Government Board was constituted, with powers to control the local authorities; and the Public Health Act of 1875 was passed, sweeping away many local Acts, which by this time had become very troublesome and vexatious. The tangled web of legislation in sanitary matters is even now a source of bewilderment and difficulty in carrying out the intentions of the Legislature. It must be said, too, that the qualifications of members and mode of election of local boards are not all that can be desired to insure the carrying out of regulations of public importance. The members constituting urban authorities are usually property holders, often of a class of buildings which are not models of sanitary arrangement or good construction; and the same remark applies more forcibly to the guardians of the poor, who are owners of property in the rural districts. To qualify them as elective guardians they are to be owners or occupiers of property. Some time since we reported a glaring instance of neglect to provide sufficient closets to a house—the owner of the property being a member of the local authority. The regulations respecting lodging houses are perfect, but are being constantly evaded, owing to the diffidence of surveyors in putting into force rules against members of their boards. How many districts have the by-laws in force respecting houses let in lodgings? Just now, when many seaside towns are full of visitors, attention to certain rules are of urgent importance. For example, there is a by-law which can be put into force by the urban sanitary authority for any district, for fixing the number of persons who may occupy a house, or part of a house, which is let as lodgings. Is this salutary rule followed at Brighton, Hastings, Margate, or any of our popular resorts? Are houses so let registered or inspected; and, above all, we should like to know how many of them are provided with proper closet accommodation and ventilation? The fact is apparent that the local authority is often asleep when it ought to be on the alert, and that the section in the Act which empowers them to make inspections of their district to ascertain nuisances and to abate them is a dead-letter. In large towns like Manchester and Salford the Sanitary Acts have as yet done little to remove the close courts and alleys and the back-to-back houses, to which Dr. Ransome, in his address on consumption at the Sanitary Institute last week, attributed nearly all the phthisical cases in those parts. All borough surveyors are aware of the responsible and onerous duty cast upon them by Section 160 of the Public Health Act, which empowers them to act immediately upon the discovery of any "building, wall, or anything affixed thereon," being in a ruinous or dangerous state, and enables them after giving three days' notice to make complaint before justices, and order the owner or occupier "to take down, rebuild, repair, or otherwise secure," the same. This provision is found in the Towns Improvement Clauses Act, 1847, and is incorporated in the Public Health Act. So with respect to the previous sections, 158 and 159, of that Act, which give power to the urban authority to exercise their authority in cases of rebuilding or the erection of "new" buildings. Surveyors do not like to act upon their sole responsibility—they are, in point of fact, not willing to offend large property-holders, and the consequence is that old and dilapidated structures remain which are dangerous to the public. The borough surveyor has generally to attend to a multiplicity of daily duties, and it is often impossible for him to see that the 99 clauses of the by-laws of the Local Government Board have been enforced. The general opinion of the borough surveyors is that the machinery of administration—the inspection of buildings—is at present completely inadequate to cope with the actual demands. Inspectors of buildings, sanitary and constructive, are not half numerous enough in the larger towns and districts.

We have lately had a very painful experience in the case of fires, both in theatres and houses, of the very unsatisfactory state of local action. The Exeter Theatre calamity is a case in point. There was plenty of legislation, but no one to see that the rules were carried into effect. The authority in that city intrusted with the protection of the public declined even to be represented at the coroner's court. The urban authority are vested with certain powers to make by-laws, but in regard to theatres they are practically without a voice. Plans have to be deposited with them for permission to erect a building, but not to obtain a licence. The regulations of the Metropolitan Board of Works require that every person desirous of opening a place of public resort for the performance of stage plays must give notice to the licensing authority, which notice must be accompanied by plans, drawings, and specifications, the number of persons accommodated in the different parts of the house, and of the area to be assigned to each; they further require that the proscenium wall is to be of brick, not less than 13in. in thickness, 3ft. above the roof. Other local authorities have no authority to enforce these regulations, for, as we find in the evidence, the proscenium wall was only 9in. thick under the stage, the doors in the wall for the orchestra were of wood; while, worse still, the stairs leading from the foyer to the upper circle, the top landing on the entrance to gallery, and the passages round the upper circle and dress-circle boxes were of wood. The evidence will show other departures from these rules, especially as regards the all-important question of exits. The Act of Parliament for the licensing of theatres is an authority of general application. The justices have an assumed power to attach to their license the regulations of the Lord Chamberlain. The statute was passed in 1843, and, as the coroner said, does not limit the power of the justices. But the questions that occur are: Who makes the rules for the regulation of local theatres, and how are they enforced? The Exeter theatre furnishes the answer. It was given in evidence that the rules were prepared by the committee and approved by the justices. The statutory duty of inspection, according to one witness, was not the duty of the magistrates, but of the town council, whereas the city surveyor declared he was solely the custodian of the plans, and not the adviser of the justices. The latter contended that the construction and safety of the building devolved on the town council, and the justices' rules related only to the internal management, a division of duty which accords with the jurisdiction exercised by the Metropolitan Board of Works and the Lord Chamberlain, the latter of whom supervises the internal management. In short, this case furnishes us with a striking instance of the uncertainty which exists in the minds of local authorities as to their precise duties. The magistrates evidently thought the town council was the authority in respect of construction, and therefore did not con-

sider they were to be held responsible. While it is clear there is nothing which requires the justices to make rules, it is reasonable to think the urban authority should possess the requisite power to regulate entrances and exits. The by-laws of towns are chiefly directed to ordinary buildings and to sanitary measures; they are quite inadequate to provide means of ingress and egress to public buildings, and the enforcement of any rules is not clear. We certainly think it time that the Legislature should invest the urban authority with the necessary powers to act in all these and similar cases.

The licensing of buildings for special purposes is a question that must be taken up more thoroughly than it has been. We have now a variety of buildings erected for business and commercial purposes, for recreation and amusement. If a building is erected for a block of offices it should be so licensed, the owner or lessee being held responsible if the premises are let or applied to any other purpose for which it was not designed—if, for example, it should be converted into a factory or store. Premises intended for shops ought to be licensed as such, certain rules being required as to the number of bedrooms that should be allowed within the given area, a condition being that separate entrances and exits should be provided, and that on no account should the upper floors be divided into tenements. Public buildings ought in like manner to be classed and placed under control, the number of entrances and exits being proportioned according to a fixed scale on the number admitted. It would be easy and practicable to devise a code of rules that would apply to every description of building. The too easy conversion of buildings erected for one purpose and used for another would be checked by these regulations, and the licensing would carry with it an authoritative guarantee of the fitness of each structure, which deposit of plan and very uncertain inspections during the progress of erection so often fail to afford the public.

OUR WORKING MEN AND WHAT THEY MAY DO.

IT must needs seem to very many not a little surprising, when carefully thought about, that in a great manufacturing country like this, and in one in which the "fustian jackets" are always and everywhere at work and visible, that so little opportunity has ever—if at all—been given them to publicly exhibit, and to individually show to the world, each one's special aptitude for the work he does, whether by himself or in concert with others. It would be not a little difficult to find perhaps in a day's walk through London town any one single object which could fairly be evidenced as the handiwork of *one* man, and as thus showing what he, as a workman, can do. It is, indeed, surprising to find how little the outer world knows, or can know, of what its individual members are fully capable of, and what amount of mental, we will not say poetic, impression or imaginative power they each one of them can put before the eyes of the outer and non-professional world. Yet more surprising is it to find how impossible it is to do this from the want hitherto of any public institution which might be supposed to exist purposely for such work, and for which but so very few, if any, can provide for themselves. If this should be at all difficult of apprehension, it will certainly cease to be so, and will become evident enough, after the visits made to the late Chelsea Industrial Exhibition, where a series of works of all kinds were to be seen under conditions and opportunities somewhat new and hardly to have been anticipated; and now that this has somewhat too rapidly come to a close, we would for a moment take a lesson from it, imperfect as such may be.

We but venture a word or so about it, and that but generally, for there having been no catalogue, it is a little difficult to point to specialities; but this is the less to be regretted here, as it is on the main idea of the whole display that we would venture a word or two, now that the trial has been made, though only, as we trust, to be revived in the next year and in following years. The artist and academician have always had their own special means of putting the results of their work before the public, and in circumstances where they might be compared with others of a like kind; but the common workman, whatever his work, has not had this chance, and thus without doubt much has been lost not alone to himself as a workman, but to the public for whom he has worked. There are so many differences between the art work (to confine ourselves for the moment to that of the past, and to its then mode of production) and to that of the present of such like work, and to its mode of production—putting aside for the moment the aid of machinery, which is so fast doing all the old-fashioned hand work—that in this short note on one of its specialities we may well put it on one side, and dwell for the moment on the "hand-made" work as it now is, little as there may yet be of it, and that not so much for what it now produces, but for the purposes of comparison, and to show how very much is lost in giving to the "machine" what can really be only done, humanly and characteristically, by the human hand, brain-guided, and by the hand alone, for this hand work cannot even be copied by machinery, though it be so often, and at times so cleverly, attempted.

Among the multitude of contrasts that are to be found, as they are looked after between the work of the past and that of the present, there is nought greater than is to be found between their several modes of utilising, if we may so phrase it, the art capacities, the highest as well as the lower powers, of the working artists of the day. In the old world, the great artists and sculptors of the time, as in Egypt, cut through the hard granite their hieroglyphic writing as carefully and skilfully as they did the lines of the human face above them, and there is to be found in this "writing" almost as much of interest as in the forms which it illustrates, and we allude to this patent fact here in the hope that it may help to encourage those who have, as in this Chelsea working art show, evidenced the individual art power of the ordinary workman. We are here asking attention to the main principle involved in this unique display of hand-work by working men; but now that the late display of it is over, can hardly refer to individual examples of it, though doubtless many such will recur to the recollection of those who were specially interested in this first effort to show to the world the individual capabilities of our working men, and that not only, or even so much, as to their capability of working out in material more or less costly the thoughts of others, but as thinking each one for himself, and as showing to the world as a workman, he can do in the working out of material forms—the true secret, be it noted, of the power of past and antique art over and in the minds of the outer world.

We have thus been led to dwell for a moment on the great principle involved in the simple fact of the late industrial show at Chelsea, having been what it was, a working man's exhibition. It was not a little remarkable in very many ways, but most certainly in none more so than in the fact of its bringing before the public—of a special locality at least—examples of the art and fine art, and manipulative skill and hand-power of very many who have hitherto in these days hardly been thought of sufficient importance, considering their individual artistic position and power, to be thus publicly made note of. In the older and antique world, the work of the workman, whatever it might have been, whether high or low, whether rough as that of the men of the Romanesque, or refined and careful as was that of the Greek in the days of Phidias, each working artist producing it was, it is plain, an art power in himself, and simply wrote within the lines indicated by the architect of the structure a something more or less in connection with it. The Parthenon of the Greek and the cathedral of the man of the Middle Ages alike show this. The structure and the stone surface of it to write on was true, and the subject to write about may be indicated; but the work itself and its artistic teaching and teaching power was, without doubt, the work of the artist and workman by whom it was executed, and its inventiveness and art strength came, without doubt, from such art sculptor himself, each workingman, where there were more than one, as in the Parthenon, doing his own work in his own special manner, but yet as a workman. All this nowadays is reversed. Each workman is but one of many, all working, as much as may be, alike. C. B. A.

BUILDING MATERIALS.—IV.*

By W. Y. Dent, F.C.S., F.I.C.

(*Concluded from page* 428.)

IN distilling coal tar on a manufacturing scale, it is placed in a large iron still capable of holding about 2,500 gallons, heated by a furnace underneath, sometimes assisted by the injection of steam, and the application of an exhaust air-pump. As the still becomes heated, a light naphtha distils over between about 170deg. and 320deg. Fahr., which is of great commercial importance, inasmuch as it contains benzole or benzene, from which is obtained aniline, the basis of a series of colours, such as mauve and magenta. Between the temperatures of 320deg. and 370deg. Fahr. is distilled the liquid known as coal-tar naphtha, which is used so extensively for burning in lamps, and as a solvent for indiarubber. The liquor used for creosoting timber, termed "dead oil," or heavy oil of tar, from its being heavier than water, distils over between 370deg. and 750deg. Fahr.; the residuum in the still is run out whilst hot, becomes perfectly solid on cooling, and constitutes the substance known as coal-tar pitch. This dead oil, or creosoting liquor is of a very complicated character, consisting of a variety of hydrocarbons of different degrees of volatility, and possessing by no means the same antiseptic properties, the relative value of which, in this respect, it is difficult to estimate with any degree of accuracy. In the lighter portions are found carbolic and cresylic acids, substances which have long been known as possessing very great disinfecting properties, so much so, that for a long time they were regarded as the active agents upon which the value of the creosoting liquor (as a preservative agent for wood) depended. Within the last few years, however, the opinions of chemists have undergone considerable modifications in this respect, and there appear to be sufficient grounds for believing that the relative value of creosoting liquors is not represented by the percentage of these acids which they may contain, since, owing to their volatility, they are not retained by the wood for so long a time as some of the other constituents. In the heavier portions of the liquor, or "green oil," as it is termed, distilling over between 550deg. and 750deg. Fahr., are found a number of alkaloids, or bases, amongst which is a powerful germicide of a very pungent and acrid character, termed "acridine," which having a very much higher boiling point than that of carbolic or cresylic acids, is more permanently retained by the wood. The minute glistening scales generally observable on recently creosoted wood consist of naphthalene, a substance that possesses considerable antiseptic properties; when this substance exists in the liquor in moderate quan-

* Being the Cantor Lecture delivered before the Society of Arts.

tities it thickens and improves its consistency; but when there is a very large proportion, as is frequently the case with creosoting liquor obtained by the distillation of coal tar produced at gas factories in which Newcastle coal is employed, it makes the liquor too solid. To be of proper consistency the liquor should be completely fluid at 100deg. Fahr., and should exhibit no signs of any deposit on cooling down to a temperature of 90deg. Fahr. There are two classes of creosoting oil, known in the trade as London oils and country oils. The London oils, which consist of those obtained from the gas-tar derived from Newcastle coal, contain a larger proportion of naphthalene, and are heavier and thicker than the country oils of the Midland districts, which yield a larger proportion of tar acids (as they are termed), consisting of a distillate which is capable of being dissolved by a solution of caustic soda containing 9 per cent. of the alkali. Previous to the year 1863 only a comparatively small quantity of these thin country oils had been used for creosoting purposes, but they subsequently became more in demand, under the impression that the value of the oils depended upon the proportion of tar acids they contained. This question was investigated in 1866 by Mr. Coisne, an engineer in the service of the Belgian Government, whose experiments were continued during a period of five years, and the results obtained led him to the conclusion that the so-called green oils, distilling over at high temperatures, formed the best portions of the creosoting liquor, and that the importance of the tar acids had been much overrated. In carrying out the creosoting process on a large scale, the dried wood (cut up into the sizes in which it is going to be used) is placed upon iron trucks, which are run on a tramway into large air-tight cylinders 6ft. in diameter, and from 20ft. to 70ft. in length, heated by steam-pipes placed along the bottom. When the trucks have been run into the cylinder, the end is closed, steam is admitted to the heating pipes, and an exhaust-pump is put in action which is capable of creating a vacuum of 25in. When this has been attained, the creosoting liquor is admitted from a reservoir, in which it has been kept at a temperature of 120deg. Fahr., by means of steam-pipes. A force-pump is now put in action, by which a pressure of 150lb. on the square inch is maintained for a period of from 6 to 10 hours, the temperature of 120deg. Fahr. being also kept up by means of the steam-pipes; the amount of pressure given, and the length of time that the steeping is continued, depends upon the description of wood to be treated, and the quantity of creosote that is required to be absorbed. When cost is no object, the penetration of the liquor as regards some descriptions of wood which absorb the most readily, such as beech and deal, is capable of being extended to a depth of 10in., but, as the process is usually carried out, the penetration does not extend further than from ½in. to 4in. The progress of the absorption of the liquor by the wood is ascertained by observing the quantity left in the reservoir, which is registered by a gauge, the amount usually required being about one gallon to a cubic foot of timber of the sizes employed as railway sleepers. When the wood has absorbed this quantity, the pressure is removed, the liquor remaining in the cylinders is run off, the end is opened, and the trucks with their loads of creosoted wood are withdrawn. I have stated that in carrying out the creosoting process, as above described, it is necessary that the timber should be dry. Now it is well known that timber is injured by exposure to a dry heat, 230deg. Fahr. being the extreme limit to which it can be exposed without liability to injury, and all attempts that have been made to effect the drying by stoves, currents of hot air, or superheated steam, have had to be abandoned; but by a modification of the creosoting process patented by Mr. Boulton, the moisture can be removed at the commencement. For this purpose a dome is fitted to the top of the cylinder, the liquor is admitted at a temperature only slightly exceeding 212deg. Fahr., and the action of the exhaust-pump is continued for some time after the admission of the liquor. It will be seen that the wood is thus subjected to a moist heat above the boiling point of water, by which the water in the pores of the wood is converted into vapour and drawn off by the action of the suction-pump, the creosoting liquor taking the place of the water withdrawn from the wood. When the creosoting process has been properly carried out, the wood will be found to have increased in weight to the extent of from 8lb. to 10lb. per cubic foot, and to have been rendered so secure against the attacks of the marine boring worm, that a piece of timber has been known to have been riddled by such attacks in places where the liquor has not reached, and to be untouched where it has been properly impregnated with the creosoting liquor. This tar liquor not only possesses those antiseptic properties by which fermentation and the growth of insect life is arrested, as well as the power of coagulating the albumen of the sap in the same manner as is the case with copper sulphate or corrosive sublimate, but it also possesses the additional advantage of impregnating the wood with a liquid of an oily nature which is repellent of water. The efficacy of this process, and its superiority to all others that have yet been tried, is supported by the results of numerous experiments that have been made with great exactitude and care, both in this country and abroad, by engineers and others. There is no country so deeply interested in the protection of timber as Holland, on account of its having such a large extent of coast protected from encroachments of the sea by dykes that are constructed of timber. On several occasions fears have been entertained of large portions of the country becoming submerged owing to the destruction of the timber dykes by the ravages of the teredo, which works with such rapidity that in some instance piles have been known to have been eaten away to a dangerous extent in the course of a few months. The question of the preservation of their timber piles became one of national importance to the Dutch Government, and a commission was appointed, consisting of engineers and members of the Royal Academy of Amsterdam, to institute a thorough investigation of the subject. The experiments carried out by the commission were divided into three groups:—(1) Applications to the surface of the wood; which included carbonising or charring the wood, by subjecting it to a high temperature; treatment with paraffin; covering with sheet copper or zinc; covering with broad, flat-headed iron nails, driven in close together and allowed to rust. (2) Impregnation with different liquids, including solutions of sulphate of copper, sulphate of iron, acetate of lead, water glass, chloride of calcium, and creosoting. (3) Different kinds of unprepared wood. The conclusions that they arrived at were—That the only reliable process for protecting wood from the attack of the teredo was that of creosoting, and that even this fails if the process has not been properly carried out; that no kind of unprepared wood (greenheart included) is to be altogether relied upon as secure against the attacks of the teredo. The descriptions of wood used in the construction of the dykes are fir, beech, and poplar. Some time ago twelve piles of each of these woods were sent over to this country to be creosoted; these were returned to Amsterdam, and placed in positions where improperly creosoted wood had previously been destroyed, and in no instance were any of the twelve piles attacked by the teredo. Some years ago experiments were made at Plymouth with different kinds of wood, consisting of red and yellow pine, American and English oak, elm, beech, fir, and pitch pine, which, after being dried in an open shed, were subjected to the following processes—viz., creosoting (one gallon of the liquor per cubic foot being forced into the wood), kyanising, and the sulphate of copper process. Blocks of each kind of wood, after being subjected to the several processes, as well as others without any preparation, were sunk in still water to the depth of 20ft., and, after remaining for 2½ years, were taken up and examined. All the creosoted pieces were found to be sound, and all the unprepared pieces were worm-eaten. Of the kyanised, five were sound, and three slightly attacked; and of those prepared by the sulphate of copper, only one was sound. The increased use of creosote is shown in a report of July, 1884, to the Technical Convention of the German Railway Union, in which it is stated that in 1865 there were fifteen railway companies in Germany employing the sulphate of copper process, whilst eleven had adopted that of creosoting. We have now had nearly fifty years' experience as regards creosoted timber. Wood so prepared was employed in the construction of dock gates at Monk Wearmouth as far back as the year 1839; creosoted wood was also employed on a considerable scale, in 1846, at Lowestoft. The evidence that can be produced of the value of this process as a means of preserving wood so far exceeds anything that has been advanced on the part of any other, that its claim to be regarded as superior to all other processes at present known, and as that upon which the greatest reliance can be placed, may be considered as fairly established. The teredo is a grey-coloured worm, ordinarily, when full grown, about 10in. or 12in. in length, but in favourable situations (such as the Gulf of Mexico) it will sometimes attain a length of 23in. It is a species of mollusc, having at one extremity a boring apparatus of the most perfect description, consisting of a hard, shelly-like substance, which fulfils the part of an auger and a rasp. The teredo first makes its appearance in the form of a very minute egg; the eggs are laid at the commencement of the warm season, and are hatched in the water, giving out larvæ so small as to escape notice of the inexperienced observer, being not more than about 1-25th of an inch in length. After swimming about for a day or two, they begin to search for timber, which they enter by boring a very minute hole not larger than a pin's point; it is, therefore of the greatest importance that no portion of the surface of the wood should be left unprotected by the preserving agent employed, and hence arises the necessity for cutting up the wood into the sizes in which it is to be used before submitting it to the creosoting process. The teredo grows rapidly under favourable circumstances, enlarging its hole as it increases in size. Its smaller end (consisting of two tubes) is attached to the end of its burrow, whilst its other extremity, armed with the auger, is pushed forward into the wood, the length of the tunnel corresponding with that of the teredo. As it progresses, it deposits a coating of carbonate of lime upon the sides of its cell, in which it continues to increase for from twelve to eighteen months, and then dies, after blocking up the entrance to its burrow with carbonate of lime. This stopping is soon penetrated by the water, which washes out the lining, leaving a smooth, clean hole to bear witness to the destructive habits of this dangerous enemy to wooden structures. The teredo perforates in the direction of the grain of the wood as far as possible, but on meeting with a knot or anything which it regards as obnoxious, it avoids the obstacle by working round it, or it will work back and begin a branch tunnel, taking care to seal up the abandoned portion of its cell with carbonate of lime. It is a curious fact that although there may be hundreds of these worms in the same piece of timber, they never break into a neighbour's tunnel, although they will cut away within a hair's breadth of each other, or of the outside of the timber. A division, however thin, is always left intact. The teredines thrive best in salt water and in warm climates, muddy fresh water being destructive to them.

PAINTING.

The method ordinarily adopted for preserving wood is that of painting, and in order to secure the attainment of this object, it is necessary that the material used for the solid portion or pigment should consist of some substance which can be obtained in a very fine state of division, and which is but little liable to change by long exposure to the weather. Various metallic oxides, such as the oxides of lead and zinc and the higher oxides of iron, fulfil these requirements, and we consequently find that these substances enter largely into the composition of paints. By far the most important of all the substances employed as pigments is that which is known by the name of whitelead, which varies in its character according to the process adopted in its manufacture. In spite of the very numerous alleged improvements that have been announced within the last thirty years as having been made in the manufacture of whitelead; the largest portion of the best whitelead is still manufactured by the old "Dutch" process, as it is termed, from its having been introduced into this country from Holland. This process depends upon the corrosion of metallic lead; it is well known

that when lead is exposed to moist air, the surface of the lead is corroded—that is, it is converted into a white substance which consists of carbonate and oxide of lead. The purest metalllic lead is most susceptible of this change, and it is partly on this account, and partly because the whitelead produced from the purest lead is of a better colour, that manufacturers of whitelead are always anxious to obtain the best brands of metallic lead in the market. Nearly all lead contains traces of copper and silver, and very small quantities of these impurities affect the quality of the whitelead so much so that, when silver is present, even to so slight an extent as 1½oz. in a ton of lead, it imparts a distinctly pink colour to the whitelead. In carrying out the manufacture by the Dutch process, the lead is first cast into gratings or crates by pouring the melted lead into an iron frame with longitudinal and transverse grooves into which the lead runs. This is done by machinery; the iron moulds are fixed on to an endless chain, and are being continually filled by a small stream of melted lead flowing from an orifice which can be opened or closed at pleasure, so as to regulate the flow of the metal. As the chain moves round, the crates of lead, when they have become solid, are thrown out, and are taken away to be placed in the corroding pots. The object in casting the lead in this form is to promote a freer circulation for the corroding vapours, and a larger amount of surface of metal to be acted upon than would be the case if the lead were cast in solid thick pieces. The corrosion is effected by exposure to the combined action of the vapour of acetic acid, carbonic acid, and moisture. The pots in which the lead is placed are made of earthenware, and have a shoulder in the interior about one-third of the height of the pot, upon which the coiled crate of lead rests. The pots are stacked in large beds of spent tan, which is spread evenly over the floor to the depth of 2ft. or 3ft., upon which the pots are arranged in rows. Into each of the pots is put about one pint of acetic acid of about the strength of ordinary vinegar, which fills the pot up to the shoulder upon which the crate of lead rests. Tan is then placed around the pots to a level with the top, and a floor of loose boards is laid across the whole; this flooring is again covered with tan to the depth of 12in., a second series of pots, tan, and boards follow, which are succeeded by others, the stack being completed by a layer of tan from 24in. to 30in. in thickness. These stacks are of very large dimensions, often containing as many as from 6,000 to 10,000 pots, turning out from 30 tons to 40 tons of whitelead. Ventilating shafts are left in various parts of the stack for promoting the circulation of the corroding vapours through the several rows of pots, and for the escape of moisture. In the course of six or seven days after the completion of the stack, the tan begins to ferment and become hot, which promotes the rapid corrosion of the lead. The process is completed in about twelve weeks, and the stack is then taken to pieces. The temperature is regulated, as far as practicable, by covering or uncovering the ventilating shafts, but it is difficult to secure a uniform temperature throughout the whole of the stack. It will sometimes rise in the centre to 180deg. or 190deg., which causes the acetic acid to evaporate too rapidly without a corresponding increase in the corrosion being effected, whilst at the exterior portions of the stack the temperature is sometimes not high enough, which is also detrimental to the quality of the whitelead produced, the best results being obtained when the temperature ranges from 150deg. to 160deg. Fahr. It will be seen that the lead in this process is placed under the most favourable conditions for corrosion, being exposed to the action of acid fumes assisted by heat and moisture. On breaking up the stack and removing the upper layer of tan, as well as the boards which covered the pots, the lead is found to have become thickly incrusted with whitelead, only a thin core of metallic lead remaining. If the process has been properly carried out, no acetic acid is left, it having been dissipated by the heat generated during the fermentation of the tan. The separation of the whitelead from the metallic lead, or blue lead, as it is called, which remains, is effected by placing the corroded lead in a covered hopper, where it meets with a stream of water, and falls into a trough in which it is knocked about with wooden rakes. The whitelead, which is easily detached from the lead core which has not been acted upon, is then conveyed to a series of grindstones, by which it is reduced to a very fine state of division, and is carried off suspended in water to tanks, in which it is allowed to deposit. The clean water is siphoned off, and the paste of whitelead is placed in bags and subjected to hydraulic pressure (by which the greater part of the water is squeezed out), dried, and ground. The grinding is conducted in a mill so inclosed as to prevent the escape of dust. The reaction which takes place in the production of whitelead by this process consists in the formation of a basic acetate, which is subsequently decomposed by the carbonic acid generated by the fermented tan, the final result being (when the process has been carried out in the most perfect manner) the production of a basic carbonate consisting of two equivalents of carbonate of lead and one of hydrated oxide. The process is a slow one, involving a great amount of labour; moreover, the arrangements for accomplishing a very simple operation appear clumsy and unscientific; many attempts have consequently been made at different times to supersede it by others of a more rapid and economical character. These attempts, however, although they appeared to be full of promise, have not hitherto been attended with that success that had been anticipated by their originators. It was very naturally supposed that a similar result would be produced by exposing sheets of lead in a closed chamber to the joint action of air, carbonic acid, vapour of water and acetic acid, and various attempts have been made on this basis. The method proposed by the celebrated French chemist, Thénard, consisted in passing carbonic acid through a solution of the basic acetate of lead, and whitelead thus made was for some time sold under the name of Clichy white. Numerous patents have since been taken out for the manufacture of whitelead upon the same principle, but differing in detail. Martin's process consisted in exposing metallic lead in the condition of thin scales (obtained by causing the melted lead to fall upon a revolving copper cylinder kept cool by a current of water) upon a series of racks placed over each other, through which a solution of acetate of lead trickled. The basic acetate thus formed being subsequently decomposed by carbonic acid, the carbonate of lead thus obtained was then mixed with lead oxide prepared by exposing granulated lead in a barrel perforated so as to admit air, and caused to revolve in a trough containing a little water, which washed off the oxide as it was formed. It was found, however, that the product obtained by the precipitation of a salt of lead from solution, even when so manufactured as to possess precisely the same composition as that made by the Dutch process, is more or less crystalline in its character, and does not possess that density upon which the excellency of the whitelead produced by corrosion depends, which is known in the trade by the term "body." The chief objection to the Dutch process is the fact that it cannot be carried out without injury to the health of those engaged in the manufacture, owing to the absorption of lead into the system, partly from the floating particles in the air, and partly through the pores of the skin from handling the whitelead during the several processes it undergoes. The workpeople are, consequently, liable to attacks of painter's colic, a disease which produces pains in the limbs, a characteristic blue discolouration of the gums, and sometimes partial paralysis. The evils arising from this cause have, however, in all well-regulated works been greatly diminished by taking care that, as far as possible, the various operations of scaling, &c., should be carried on in water, by providing respirators for those exposed to the dusty particles, and gloves for those who have to handle the whitelead, and by enforcing the strictest regulations as to cleanliness. The assertion is often made that persons may be affected with lead poisoning by the vapours arising from a newly-painted wall, but such assertions are not supported by any sufficient evidence. Experiments that have been carefully made show that no lead in any form or shape either evaporates or is carried off mechanically during the drying of the paint. The fact is, that the vapours arising from the oil and turpentine affect some people to such an extent as to make them seriously ill, and the effects produced by fresh paint would be the same whether the pigment employed consisted of whitelead or zinc oxide. Whitelead, as ordinarily used, is mixed to a large extent with sulphate of baryta, a substance which, on account of its high specific gravity, is in much request as an adulterant. Amongst the most recent substitutes for whitelead as made by the Dutch process is the so-called "non-poisonous whitelead" of Messrs. Freeman, which is prepared by grinding under considerable pressure a precipitated sulphate of lead with 25 per cent. of zinc oxide, whereby the density of the mixture is greatly increased. This preparation possesses the advantage of a very simple and unobjectionable method of manufacture, and of keeping its colour better than ordinary whitelead when employed in situations in which it is exposed to air containing sulphur compounds, such as in railway tunnels. It is equal to the ordinary whitelead in point of colour, and is reported to be so as regards "body" and durability, but this last point can only be decided after the lapse of sufficient time. For situations in which paint is likely to be subjected to the influence of gases containing sulphur, zinc is decidedly to be preferred to lead as the basis of the pigment to be employed, inasmuch as zinc sulphide, instead of being black like lead sulphide, is of a light colour. Zinc white is an oxide of zinc prepared by burning metallic zinc in a retort or furnace in a current of air, the zinc oxide passing over a bridge into a chamber, in which it is collected. It is then placed in canvas bags, and pressed into a hard mass with the object of increasing its density. It may also be prepared by precipitation from solution by means of lime, drying and calcining at a red heat. By whatever method it may be prepared, it will not compete with whitelead as regards density, neither will it stand the same amount of exposure to the weather. A patent white sulphide of zinc paint is manufactured at Liverpool by the Sanitary Paint Company, which consists of a mixture of sulphide of zinc and sulphate of baryta, produced by adding a solution of sulphide of barium to a boiling hot solution of sulphate of zinc. The precipitate produced is pressed, dried, and ignited in a furnace to drive off excess of sulphur. It is then levigated with water to wash out soluble salts, and the pigment is completed by again pressing, drying, and grinding. This paint, when not properly manufactured, has sometimes been found to become discoloured under the influence of strong sunlight, the dark tinge which it assumes passing off again after a few hours. For coating iron work the black and red oxides of iron have been extensively employed for many years; one of the first paints of this description was introduced about thirty years ago under the name of Torbay paint, from its having been prepared from a brown iron ore found at Torbay, in Devonshire, to which various tints from a light brown to a very dark red can be given by altering the conditions under which it is roasted. The black oxide of iron, which is obtained as a by-product in the manufacture of aniline dyes, is also employed in the preparation of a paint for iron work. These last-named metallic oxides have not, however, the power of combining chemically with the linseed or other oils used for grinding with the pigment to the same extent as is the case with oxide of lead, which, by combining with the fatty acids of linseed oil, readily produces a soap such as that known under the name of lead plaster. There is another pigment of some importance that is now manufactured on a considerable scale at the works of the Bristol Sublimed Lead Company, obtained from the condensation of the fumes given off during the process of lead smelting, the escape of which into the atmosphere is known to produce such deleterious results in the neighbourhood of lead works. The fumes consist mainly of sulphate and oxide of lead in the condition of a very fine, impalpable powder, which cannot readily be made to subside, the various attempts that have been made for the achievement of this object having been the subject of numerous patents. It is, however, now successfully accomplished by means of flannel bags, through which all the gases and volatilised products from the lead furnaces are forced, the solid particles being retained by the flannel. This powder is collected, and when re-sublimed

yields a white pigment which varies in its composition according to the nature of the lead ores employed, but usually consists of about 70 per cent. of sulphate of lead, 23 per cent. of oxide of lead, with a little oxide of zinc. In point of colour it cannot compete with ordinary whitelead, but it forms a good basis for lead-coloured paints, of which vast quantities are required. I stated at the commencement of these lectures that it was not my intention to enter more fully into the nature of the great variety of substances used for painting than was necessary to give a short description of the pigments usually employed as a basis for the commoner kinds of paints most generally used for the preservation of wood and iron. All that I have endeavoured to accomplish has been to afford some information as to the general principles upon which the technical value of the different building materials passed under review depends, without going more fully into details than is necessary for explaining the matter in hand, and occupying more time than a course of lectures on so wide a subject permits.

IRON STAIRCASES.*

[WITH ILLUSTRATIONS.]

STAIRCASES serve as a means of communication between the several stories in a building. They are a succession of steps, or grades, supported by, and framed into, one another on the slant, and consist of a horizontal part, called foothold or tread, and of a horizontal part, the riser.

Of the Foothold.—In straight staircases, the breadth of the step taken mid-way between the extremities is the foot print. In balanced staircases, or such as have dancing steps exceeding one mètre in length, the breadth of tread or foot print must be taken parallel to the horizontal projection of the hand rail at 50 centimètres distance therefrom. The line formed by the successive foot prints is called the line of traffic. This distance of 50 centimètres from the handrail represents the position of a person ascending or descending and holding the rail.

Balancing.—The breadth of the treads in their curved or straight portions is arrived at by making a drawing on the floor or wall. First, the number of dancing steps or winders, deemed indispensable, is determined, and then the minimum dimension of the smallest inner angle. In the next place the compasses are brought into requisition to settle the measurement of the tread in the centre, gradually decreasing the opening, until it equals the measurement of the smallest inner angle, taken as a starting point. It is by a tentative process, rendered easy by practice, that the best result is obtained. Geometrical methods are hardly ever resorted to.

Height and Breadth of the Steps and Landings.—The height and breadth of the steps are very variable quantities, generally subject to the exigencies of the space reserved for a staircase. As a rule, the broader the tread at the line of traffic, the lesser ought to be the riser or the height of a step. The breadth of the treads varies from 23 to 40 centimètres, and the height of the risers from 11 to 19 centimètres, a maximum and minimum that should never be exceeded. The most ordinary dimensions are from 25 to 35 centimètres for breadth, and about 16 centimètres for height. Within these limits stairs are always easy of ascent and not tiring. On the ground floor it is usual to allow more breadth for the first three steps; for the first step, an extra 3 centimètres; for the second, 2 centimètres; for the third, 1 centimètre extra. Thus, for instance, in a staircase of which the breadth of tread is equal to 30 centimètres, the first step will be 33; the second, 32; and the third, 31 centimètres. Where we are not obliged to observe fixed dimensions in the staircase cage and in the height of ascent, in getting out plans the step may be set down as $2h. + b. = 60$ to 66 centimètres, or twice the height and once the breadth equal 60 to 66 centimètres, a formula that works out well. An ordinary staircase to be convenient should be kept to a pitch ranging between 24° and 30°. It should consist of steps uniform in height, at least, in each flight or difference of level between the floors of each story, measured from flooring to flooring. The landings should be 80 centimètres broad as a minimum, and in any case not fall short of the sum of three steps measured horizontally at centre of the tread. This remark applies particularly to back stairs and small staircases, where space is limited. Speaking generally, landings should be made as broad as possible.

Character and Dimensions of Stairs.—Steps are made in chequered masonry, cement, &c., of fir, pitch-pine, beech (rarely), stone, marble, and iron. Thicknesses for wooden steps in staircases vary from 27 to 54 millimètres. In large staircases, such as we find in railway stations, for instance, the thickness of the treads attains to as much as seven centimètres (planing will reduce it by three to four millimètres). The thickness in the case of stone or marble varies from six to eight centimèters. However, in staircases not exposed to rough usage, marble slabs may be used as thin as three centimètres as a minimum, provided they be fairly and squarely placed on a bed of plaster.

Head Room or Height of Passage.—An important question in the construction of staircase, and which should be well considered in working out the plans, is the allowance of a sufficiency of head room. In stairs of the most usual style, those of the ordinary dwelling house let out in flats, we must bear in mind: (1) The head room in the stairs leading down to the cellars. Fourteen steps are required as a minimum, to allow two mètres for the cellar door, a height which, according to the importance of a house and its destined uses, may be reduced to one mètre and eighty centimètres, or even to 1¾ mètres. (2) The ground floor, always having a greater elevation than the other stories, requires a larger number of steps, which can only be provided by advancing the point of departure to make up the difference; the consequence being that the landing of the first story must stand over the sixth or seventh step, thus reducing the headroom by that much. Now, to get over this difficulty, we may increase the height of the steps, in order to lessen their number, and thus bring the landing over the third or fourth steps. The steps of the first revolution may, without disadvantage, be increased in height by 8 to 10 millimètres, and it is more particularly in the upper stories that the rise of the steps should be kept down as much as possible. The headroom should not fall short of 2 mètres and 20 centimètres; below this height the moving of the furniture is apt to spoil the ceiling. The starting-point of a staircase should be placed beneath the first-floor landing.

VARIETIES OF STAIRCASES.

The "Miller's Steps."—This style of stair is simply a straight flight of treads without risers, with a pitch sometimes attaining to, and even exceeding, 45°. The treads are about 20 centimètres in breadth and 20 centimètres in height. The same arrangement is adopted for cellar stairs.

Straight Flight Stairs.—These are generally used as outside stairs. Their dimensions are the usual ones—viz., 90 to 120 centimètres for length of step, and they can be supported by means of brackets, columns, or posts. In the example we give, Fig. 17, the stringboard consists of two T-irons, 45in. by 50in., united by means of 4 millimètre iron braces or plates, and rests upon a 10-centimètre, cross-shaped iron, into which the lower T-irons vanish, taking the shape of brackets. Figs. 18 and 19 show the jointing. A rack made of flat iron, 30in. by 7in., receives the risers and treads made of striated sheet-iron, the other extremity of which is run into the wall. Fig. 20 is the staircase on plan.

Stairs between Walls.—In this mode of construction there is no stringboard, the treads and risers being built into the wall at each end, and the masonry walls serve alike as supports and as handrails for the stairs. Sometimes a handrail is let into the wall, consisting of a round iron rod, or an iron bar cased in a wooden rail.

Helicoid, Spiral, or "Limaçon" (Snail-shaped) Staircases (Figs. 1 to 10).—These stairs are of two kinds: first, those built round a solid newel post supporting all the steps (Fig. 8), in which each riser is a species of independent gibbet, joined to the rest by the string-board. When such stairs are contained in a cage, the stringboard is dispensed with, and the steps are built into the wall. If there be points of contact only with the walls, it is right to avail oneself of them to fix a stringboard, so as to relieve the strain on the risers.

Plan of a "Limaçon" or Snail-shaped Staircase.—This form of stair finds its application in warehouses, shops, &c., for purposes of direct communication either with the basement or the first floor. The available space in such cases is limited as a rule, and these staircases at times are reduced to 50 or even 45 centimètres length in the treads. So reduced, the central portion, or rather the breadth of the tread in the middle, is very small, something like 15 centimètres to 50 of length of tread, and we are confronted with the problem of the head room, or sufficiency of space to admit of persons standing erect in ascending and descending. This height, with rare exceptions and to admit of the staircase fulfilling the necessary requirements, should never be less than 1 mètre 85 centimètres to 1 mètre 90 centimètres. It will be readily understood that in such cases it becomes impossible to increase the breadth of the treads. If, for instance, we desire to have 25 centimètres to give the foot a solid rest, we shall get, in working out a snail-shaped staircase of 50 centimètres length of tread, a radius of 30 centimètres, taking the radius of a newel of 10 centimètres, say $2 \pi R = 1{\cdot}8849$ mètre of circumference at the middle of the step, and if we divided 1·8849 mètre by 25 centimètres we should obtain about seven and a half steps or treads. Let us take eight, and reckoning on a maximum of 19 centimètres of height, we shall get 1 mètre and 52 centimètres of elevation between the No. 1 and the No. 8 treads, an insufficient space to stand erect in. To save the loss of time involved in a process of groping, we shall here offer a method of setting out adopted by specialists in the building trade, which always insures sufficient head room. The dimensions of space and height of ascent being determined, let the circumference be divided into 13 equal parts (Fig. 9), and the height into parts of 17 centimètres as a minimum. Thirteen treads on plan give 14 heights. By deducting that of the fourteenth, there will be secured free passage, $17 \times 13 = 2{\cdot}21$m.; and if we take into account the head room at the landing, we shall have to deduct two treads, or $2{\cdot}21\text{m.} - 0{\cdot}34 = 1{\cdot}87$m. To increase the head room as much as possible, the landing is shaped into a curve, as shown in Fig. 9. In building with iron, the newel post is made, according to the lengths of the treads, of tubes measuring from 8 to 14 centimètres diameter, the stringboard of 3 to 6 millimètres hoop or sheet iron, and the risers of from 2½ to 3 millimètres thickness. The risers are invested at the top and bottom with angle irons, and likewise at their extremities, and jointed by means of screws to the newel-post and the stringboard. We show at Fig. 10 an arrangement of great solidity, which allows in staircases of small dimensions of substituting a plain flat sheet of iron, 50 by 7, in the room of the stringboard. This plan consists of making the angle iron, forming the border for the tread at the outer end, broader in the wing—say, about 45 millimètres—and of putting a bolt of 14 millimètres through the newel-post which keeps together the ascending flight. The second type of winding or spiral staircase has a hollow newel. It is more properly called an open circular staircase. This is far more convenient than the staircase with a solid newel; but it involves the necessity of finding more space, though not so much as the square, rectangular, and other types of stairs. It lends itself more readily to purposes of decoration, and may be used for private houses, shops, offices, &c. The hollow or open space should be kept to from 40 to 60 centimètres measurement. The oval and elliptical forms are adaptations of this type; the figure-of-eight-shaped one, shown in Fig. 3, is very effective. It is just precisely in such special types that iron shows all its many advantages, both as regards the manufacture, the setting out, the bevelling, and the elegance, lightness, and delicacy of form. The construction of the type we present in Figs. 1, 2, 3, 4, 5, 6, and 7 is of the simplest. A double stringboard, taking the form indicated, is bound together by sheet-iron risers, fitted with angle irons and Z irons, as per Fig. 4. Open scroll work at each end lightens the structure as a whole, while a carpet of 70 to 75 centimètres width, laid down in the centre, is secured by stair rods, held by eyes, as seen in Fig. 6. Fig. 5 is a section of the riser.

* From "Nouvelles Annales de la Construction."

One of the rings of the 8 is carried by a small central column, the bearing strain on which is distributed by four brackets. This small column may be converted into a lamppost, a bracket burner with globes, or any other decorative mode of illumination. The upper portion is supported either by carriages (as we shall describe in the sequel when treating of the landings) or by brackets, or by a second column placed in the axis of the ring of 8. This staircase can also be constructed with four columns placed at the points of intersection, formed on the plan by the stringboards. Circular staircases may be adopted also in the case of large houses let out in flats; but in these we must provide for a well-hole of considerable dimensions and large landings. The length of the steps would here vary from 1½ to 1⅔ mètres. The instance we give in Figs. 11, 12, and 13 is that of a stair contained in a cage built of iron of 15 centimètres thickness, coating included, as housing becomes impossible in a thin partition. Each flight rests upon five 11-millimètre iron-plate brackets built into the masonry, bolted between the double metallic uprights of the iron casing and connected with the stringboard by means of stout iron squares. To bind the risers there is a false stringboard of 5 millimètre iron plate running round the circumference of the cage. This staircase is adapted to receive a lift. The well-hole measures 1 mètre 90 centimètres inside the flight. A lift cage of 1½ mètres diameter can very well be made to work in it, keeping it sufficiently away from the edge of the stairs to avoid the guillotine action which would take place if the lift passed too close to the outer string. To effect this we must adapt the flight by raising it, or must fit the well-hole with a metallic netting which gives it very much the appearance of a cage. These means attain the object in view, but the result leaves much to be desired.

Stairs with a Single Central Stringboard without Well-hole.—This solution is rendered necessary when we are required to build a staircase with the utmost possible length of steps. The stringboards are superposed in the same plane in all the flights, one above the other, while the handrails run into each stringboard of the next flight. These staircases are made in unbroken flights when the landings are not one above the other, and with intermediate resting-places if the landings are in superposition. These staircases are mainly employed in the construction of barracks, colleges, &c.

Stairs Broken into Landings (Figs. 15 to 22).—These are composed of straight portions according to the walls of the cage and separated by resting-places (Fig. 22) either at the angles or for intermediate places of access. Figs. 14 and 15 represent a servants' staircase, 85 centimètres wide, which presents a combination of the broken and the winding stairs.

Semi-circular Staircases.—These are most frequently found in warehouses and small private dwellings. They are contained in a rectangular cage in a hemicycle. The step varies from 1 mètre to 1 mètre and 30 centimètres in length, and the well-hole measures 35 to 80 centimètres. As a minimum of dimensions, we may refer to a staircase in a house for letting, built according to the following measurements:—

Width of cage	2	mètres,	30	centim.
Length of cage	3	„	30	„
Breadth of tread (foothold)	0	„	23	„
Length of tread	1	„	2	„

The height of the steps are 17 centimètres on the ground floor and 16 centimètres in the upper stories. The ground floor is 3 mètres and 40 centimètres high, and the upper stories 2 mètres and 90 centimètres, measured from flooring to flooring. However, we say it again, these dimensions are hardly sufficient, and if adopted it must be on compulsion to meet the exigencies of plans and of the configuration of the ground. If the well-hole be large enough, say 75 centimètres at the least, the steps may be balanced in a radius, that is to say—their prolongations may be made to converge towards the centre; but to render the transition from the head to the straight, three to six more winders may be introduced, according to the importance of a staircase; the remainder of the steps being parallel to one another. If, owing to the exiguity of the space reserved for the staircase, the well-hole be reduced to 35 centimètres measurement, all the steps must be dancing steps or winders.

Staircase with Double Revolution.—The staircase with a double revolution, introduced in many buildings, be it square, rectangular, or round, has a central flight of large breadth, and two lateral flights of smaller dimensions, the relative proportion being as 1½ to 2. This type, in more restricted proportions, is employed in many important warehouses, and is well adapted both for a sober style of decoration and for elaborate ornamentation.

Horseshoe Staircases.—This form is chiefly used for outside stairs. Regarded as an element for monumental structures, its effectiveness is very grand. The staircase in the Palace of Fontainebleau is a magnificent illustration of this type. If made of iron, it is specially suited for porticoes with double balustrades. Columns or pillars used for stone staircases are replaced, when the staircase is made of iron, by columns and brackets ornamented to match the taste and style of the building itself for which the staircase is intended.

False Stringboards.—False stringboards are partial stringboards, fitted to the straight part of bays along the line of a staircase; and in such case they are provided with balusters and handrails along the width of said bays or recesses. As stated above, a false stringboard may be made to run round the whole circumference of the cage.

Consolidation of a Stone Staircase (Figs. 21, 22, 23.)—Consolidated staircases are built of volvic stone—a volcanic lava. The straight steps are simply framed into the wall, 10 centimètres deep. Brackets of 40 millimètre square iron carry a double T-iron of 100, that runs at 10 centimètres distance from the extremities of the steps.

Handrails.—The handrail of a staircase must never fall short of 90 centimètres in height in the landing, measured vertically from the nosing to the top of the handrail. The height commonly adopted varies from 90 centimètres to 1 mètre. The distances between the balusters should measure 13 to 14 centimètres in the clear, or, say, 16 centimètres from centre to centre. In ornamental handrails made of wrought-iron, the openings, measured at the sides, should not fall short of 15 centimètres, particularly at the bottom. In schools, colleges, educational institutions, and generally in stairs used by children, it is customary to put knobs made of copper or any other metal at one mètre intervals upon the handrails, so as to provide an obstacle to the indulgence of sliding down along the handrail. There is a question which, though foreign to the purpose of this article, would seem to merit attention on the part of builders. It is the incidence of lights on a baluster handrail. Let us suppose a burner fixed at *a* in Fig. 13, the shadows would fall across the steps along the lines *x y*. Steps polished with wax are apt to be confounded one with the other as we go downstairs, presenting but very slight differences in tone and shade, especially if the stair is built of fine quality timber, and the consequence is that we are apt to mistake the shadow cast by the baluster for the limit of the tread, thus running the risk of taking a false step. This defective arrangement has come under our observation on many staircases, and we believe it can be avoided in a variety of ways. Thus, for instance, if the light be suspended beneath each of the landings, the lines of shadow will be very short, intersecting the step more diagonally.

Method of Setting out Stringboards (Fig. 16).—After chalking out the plan, settling the balancing of winders and dancing steps, let the height of ascent be divided according to the number of steps arranged for, and number these divisions 1, 2, 3, 4, &c. Then, with a pair of compasses, or, better still, with a steel tape, take the breadths of the treads at the straight of the stringboard, similarly to be marked 1, 2, 3, &c. Carry these to the base line, raising them perpendicular to said line. The intersections of the lines bearing the same number will give the angles of each step. Then trace a pattern for a wooden or stone step, and, with compasses opened to the extent of 13 to 15 centimètres, trace small arcs on the most advanced portion of the pattern, the tangential points of which, united between them, will form a broken line, which may be rendered more even by converting it into a continuous curve, which will be the under part of the stringboard (Fig. 16).

THE SANITARY CONGRESS AT BOLTON.

THE recent Congress, held at Bolton, under the auspices of the Sanitary Institute, which closed on Saturday night, passed off successfully, and was well attended. In completion of our report of last week, it may be mentioned that at the closing meeting of Section 1, dealing with Sanitary Science and Preventive Medicine, a resolution was adopted declaring that there are many other medical essays on sanitary subjects, at present in the possession of the Privy Council, the publication of which in an accessible form by the Sanitary Institute would aid the progress of sanitary reform. After the reading of Professor Hayter Lewis's suggestive address to Section II., "Engineering and Architecture," on the planning and arrangement of new towns and suburban districts, reported by us last week, p. 463, several papers were read, the first being by Mr. J. J. Bradshaw, F.R.I.B.A., Bolton, on "Sanitary Apparatus of Convenience in Factories." Efficient ventilation by fans, sound flooring, sanitary water-closets, and an efficient water supply were strongly advocated. A discussion followed, taken part in by Professor Robinson, Mr. Leach (chairman of the Bolton School Board), Mr. Rogers Field, and Mr. Norbury, various suggestions being made for satisfactory ventilation. Mr. Darley, of Leeds, pointed out that the difficulty in suitable ventilation was in the prevention of draughts, seeing that people invariably closed the inlets to prevent draughts and keep up the temperature.

GRAVITATION SUPPLIES OF WATER FOR VILLAGES.

A paper was contributed by Mr. S. Harding Terry, Local Government Board inspector, on "Village Water Supply," in which he advocated the adoption of the gravitation water schemes in districts which were least likely to be affected by drought. In such cases a small water rate, not exceeding 2d. or 3d. per week per house, would be sufficient to meet the cost of providing the works. A paper on "Artesian Wells and Water Supply," by Mr. Robert Sutcliffe, was also read. There were, said the writer, many dangers to be encountered in the construction of those wells, the prevention of the water from contamination with other matters being highly important. He advocated a combination of digging and boring as affording a much safer means of obtaining a water supply than either system separately, and an efficient mode if the bore-pipes were properly constructed, and attached by air-tight connections to the suction of the pumps.

RIVER POLLUTION.

Major Lamrock Flower, secretary to the River Lea Conservancy Board, read a paper on the "Fouling of Streams," regarding the subject from three points of view—the causes of the fouling of streams, the effects thereof, and remedial measures. The removal of sewage by water carriage, born of the introduction of the water-closet, which contrivance, some said, was the invention of the devil, lay at the root of much fouling of streams. He suggested as remedial measures new legislation, with the motto "Thou shalt not," and a shorter course of procedure in punishing offenders. He thought the country should be mapped out in watershed areas, and each put under the charge of an experienced man. The fouling of streams ought to be made a penal offence.—A discussion followed, in which the establishment of sewage farms found favour.

HOUSE DRAINS.

At the adjourned meeting of this Section II., held on Friday, under the presidency of Professor T. Hayter Lewis, F.R.I.B.A., Mr. Reginald E. Middleton read a paper on the question of "House Drainage," in which he advocated ventilating house drains by carrying a pipe from the sewer trap direct to a point above the roof of every house. Complications both in apparatus and in the drains and ventilating

and inspection chambers were most desirable, and economy without the loss of efficiency should be studied. Mr. John Honeyman, F.R.I.B.A., of Glasgow, read an exhaustive paper on "The Size of House Drains, and the Use and Misuse of Traps." He held that unventilated sewers were the root of epidemic diseases, and that to effect the destruction of disease germs, it was obvious they should allow a much larger volume of fresh air to pass through drains than had hitherto been customary. His experience pointed to this: that the best chance of safety lay in so contriving house drains and plumber work that there should not be one single receptacle where stagnation was possible throughout their entire system. Besides plenty of air and good scour, it was essential that if the contents of house drains were to be harmless, they should be regularly cleaned. There was no reason why they should not have drain-sweeps as well as chimney-sweeps.

COTTAGE CONSTRUCTION.

Mr. J. Corbett, sanitary engineer, Manchester, read a paper on "Health, Comfort, and Economy in Cottage Construction." After considering what were the chief requirements of health and comfort in cottages, the paper entered into structural details, and contained recommendations compatible with health and comfort. Mr. Corbett suggested overhanging eaves to protect external walling, also suitable corbellings, arches, &c., instead of fancifully coloured brickwork, a 9in. by 7in. flue for cottages along with a vent flue, coloured tiling for the flooring of kitchens, and hard brick instead of stone window sills. With regard to carpentry, the speaker advocated a plank flooring. The question of substituting the plastering of walls for a thin facing of cement was touched upon, as was also the introduction of a glazed earthenware washing sink for the ordinary stone slopestone.

SMOKE ABATEMENT.

Papers on "Smoke Abatement" were read by Messrs. Herbert Fletcher, of Bolton, D. J. Russel Duncan, secretary of the National Smoke Abatement Institution, and Orland D. Orvis, and on the proposition of Mr. Leach, seconded by Mr. Scott, it was resolved "That the Council of the Sanitary Institute be requested to enter upon an examination into the best method of consuming smoke, and issue the results to their inquiry."

WATER ANALYSIS AND SEWAGE TREATMENT.

Section III., "Chemistry and Geology," was opened on Friday, under the presidency of Dr. August Dupré, F.R.S., who delivered an address dealing with water analysis and the treatment of sewage. The mere working out of an analysis was, he said, comparatively speaking, a simple matter; it was the interpretation of the results obtained that tried the knowledge and experience of the analyst. Many attempts had been made to overcome the difficulty by laying down certain general standards to judge by, waters being divided into good, bad, and indifferent. All such standards were fallacious, and served only as crutches for the ignorant to lean upon. The chemist who thoroughly knew his work did not require them, and those who required them were not fit to undertake water analysis at all. As long as we were dealing with compounds or with non-living organic matters, however injurious they might be, it was possible to state a quantity below which if taken they would not prove injurious; the moment, however, we were dealing with living organisms capable of self-multiplication, that ceased to be the case, for what might be an infinitesimal quantity in the water might become a dangerous quantity in the body of the consumer. What kind of guide, then, did he recommend in analysing water? It was the conformity of the water to or its divergence from the general character of the waters and the district from which it came, or of the geological formation from which it sprang. In other words, district standards and not general standards should be used. From a sanitary point of view the production of sewage, usually so-called—*i.e.*, the water carriage of our house refuse—was a mistake. However, for good or evil, the plan had been adopted, and we must endeavour to dispose of it satisfactorily. The first point that should be clearly understood was, that sewage was a nuisance to be got rid of, and not a thing to make a profit from. The next point was that the sewage of every place should be dealt with separately, for no general scheme would do equally well for all. Whatever scheme was adopted—except the destruction of the sewage material by fire—our treatment of sewage should be such as to avoid the killing of the living organisms, or the hampering them in their action. The treatment of sewage ought to begin in the sewers. Sewers were laid so as to bring the sewage in the shortest possible time from the source of production to the general outfall; but even in towns of moderate size the time which elapsed during the passage of the sewage between the two points was sufficient to render it offensive, at least in summer time; while in large towns the sewage had time to become very highly offensive. While an attempt was made to remedy that, the use of powerful antiseptic disinfectants should be avoided, in order that the action of the beneficial organisms might not be checked. Further, on the score of expense it was practically impossible to really disinfect infectious matter when once it had found its way into the sewers. All that could be done was to deodorise the sewage, and that could be done without interfering with the immediate or subsequent action of the organisms on which we depended for the final destruction of the sewage. The best material for that purpose was, in his opinion, a solution of permanganate of potassium prepared on the spot from crude manganate by the addition of acids or suitable salts. We thus also checked putrefaction and did away with what seemed to be the chief agent in carrying disease germs into our streets and houses—namely, the rising and bursting of gas bubbles from the sewage. When thus treated sewage would arrive at the outfall in a practically inodorous condition, or nearly so, according to the amount of manganate used, and would be fit for any kind of treatment we might wish to adopt. Lime was frequently used in the treatment of sewage, but that material had a tendency to produce in course of time putrefactive changes. Of other methods of dealing with sewage the next best was filtration, and the next was the system of discharging the sewage into a river, and, provided the river was large enough, a community might be justified in adopting that plan where any other would entail on them very great cost.

WATER SUPPLY.

Mr. Percy F. Frankland read a paper on "Bacteriology in Relation to Water Supply," in which he urged that experiments showed no reliance could be placed on the spontaneous destruction of organisms which had found their way into drinking-water, while Dr. Louis Parkes, in a paper on "Water Analysis," declared that with our present knowledge we were unable to ascertain whether water was potent for evil or harmless except by actually drinking the water. Mr. C. de Rance read some notes on "Water Supply in Lancashire."

THE AIR OF BUILDINGS AND SEWERS.

Dr. J. S. Haldane, in a paper on "The Air of Buildings and Sewers," in which he described numerous experiments, somewhat startling in their results, which he has made in conjunction with Prof. Carnelley, of Dundee, said carbonic acid was no measure of the number of micro-organisms in the air of a room. Sewer gas was one of the most free from micro-organisms, and in that respect was twice as pure as the outside air in towns, in summer at any rate. The connection of sewer air with typhoid fever rested, not on satisfactory evidence, but largely on *à priori* reasoning. His observations on the impurities of sewer air would have no weight against any satisfactory evidence showing the connection between sewer air and fevers, but he thought they had greater weight against the *à priori* reasoning on which the sewer-air theory largely depended. He was not arguing that emanations from drains were harmless. The organic and other substances contained in such air might, from their unpleasant smell or otherwise, have a very serious effect on health. In any case the attention given to the means of preventing such contamination was well worth the trouble. But in the present negative state of our knowledge on the subject we should cease to attribute blindly to sewage emanations cases of disease of which we did not know the cause, and patiently seek for convincing evidence as to the real causes, whether those lie in sewage emanations or floor-damping materials, or in the subsoil, or in the water supply, or elsewhere.

A conference of medical officers of health was also held on Friday under the chairmanship of Prof. W. H. Corfield, who directed attention to the sanitation of houses, and the inadequacy of the measures recently brought before Parliament professing to deal with the question. It was decided to make a conference of medical health officers a permanent feature of the Congress.

Addresses were given on Saturday evening to the working classes, when Major Lamrock Fowler spoke on cleanliness; Mr. A. Wynter Blyth, medical officer of health for Paddington, on self-help; and Mr. H. Law on thrift.

VISIT OF THE SOCIETY OF ARCHITECTS TO YORK.

DURING next week this society will hold a series of meetings in York, and make excursions in the neighbourhood in connection with the York Architectural Association. The meetings will be held at the Church Institute. Detailed notices of the visits, &c., will be posted on the notice board of the Church Institute. All information may be obtained from Mr. Edgar Farman, hon. sec., or Mr. G. A. T. Middleton, secretary Society of Architects, or Mr. George Benson, A.R.I.B.A., hon. sec. York Architectural Association, 25, Blake-street, York.

PROGRAMME.

Monday, Oct. 3rd.—Gentlemen from the South travel down by the 10.35 a.m. train from King's Cross. 3.30 p.m.—Reception at the Church Institute and conducted walk round York. 7.30 p.m.—Discussion: "The Architects and Engineers' Bill," paper by Mr. Hugh Roumieu Gough, F.R.I.B.A., Vice-President Society of Architects. Mr. W. Hepper, President of the York Architectural Association, in the chair.

Tuesday, Oct. 4th.—Visit: Selby, Beverley, and Hull, train leaves York 8 40 a.m. 7.30 p.m.—Discussion: "Yorkshire Architectural Art," paper by Mr. W. Hepper, President Y.A.A. Mr. Hugh Roumieu Gough, F.R.I.B.A., Vice-President Society Architects, in the chair.

Wednesday, Oct. 5th.—Visit: Kirkstall Abbey and Adel Church; train leaves York 9.7 a.m. 7.30 p.m.—Conversazione by the York Architectural Association in the Water-colour Galleries of the Yorkshire Fine Art Institution.

Thursday, Oct. 6th.—Visit to Ripon Minster and Fountains Abbey; train leaves York 7.30 a.m. 7.30 p.m.—Discussion: "Architects' Charges," paper by Mr. Edgar Farman, Mr. A. Pollard, Past President Y.A.A., in the chair.

Friday, Oct. 7th.—Visits: 9.0 a.m., St. Mary's Abbey School for the Blind and Manor House; 11.0 a.m., York Minster and Minster Library; 3.30 p.m., Heslington Hall. 7.30 p.m.—Discussion, "Yorkshire Building Stones." Mr. W. H. Seth-Smith, Vice-President Society of Architects, in the chair.

ENCAUSTIC TILES.

MESSRS. MALKIN, EDGE, AND CO., Burslem, Staffordshire, have opened an office and show rooms at No. 29, Sandringham Buildings, Charing Cross-road, W.C., for their patent encaustic tiles, so favourably known to architects and the public. The new show rooms are conducted and carried on solely by the firm, under the management of Mr. James Cope, whose experience and knowledge of the business are a guarantee of efficiency. The new show rooms contain a large variety of tiles, made in every style suitable for floors, halls, wall linings, dadoes, hearths, firegrates, and other decorative purposes. We would draw the reader's attention to the excellent quality and make of the tiles manufactured by Messrs. Malkin, Edge, and Co., their nice and varied colours and arrangements of tint. We noticed some very effective tile dadoes, one an upright panel in shades of blue and buff. The panel itself was of dark maroon colour embossed with a folial pattern; round it was a light blue border with margins of darker shades of warm colour, upon a ground of buff tiles. The glazed tiles in browns, reds, and greys are very suitable for wall decoration. For hearths and grate-cheeks a large assortment of patterns are on view, including majolica tiles, incised and embossed in browns, greens, and greys. Strong features of the exhibition are the specimens of art-painted tiles suitable for wall decoration and fireplaces. One of these is a

tile panel entitled "Le Cabaret de la Fleur-de-Lys," painted with much skill and delicacy, well adapted for the decoration of a buffet or restaurant, and we understand this class of art work is to receive considerable attention in the future. If the subjects are well chosen and tastefully painted, avoiding the use of bright and showy colours, we believe art-painted tiles will be a welcome accessory in public buildings and domestic apartments. Some of the emblems and devices painted in monochrome are worth attention, especially a small well-painted landscape on one tile. Besides painted and embossed tiles for jambs and wall decoration, there are several patterns intended for flower-boxes, and a variety of tinted glazed tiles. The arrangements of tiles for floors are exceptionally good.

BOOKS RECEIVED.

Durrant's Handbook for Essex (Chelmsford: E. Durrant, 90, High-street; London: Simpkin and Marshall) is a new guide to that county, compiled in a readable style by Mr. Miller Christy, an authority on antiquarian subjects relating to Herts, Essex, and East Anglia. In the introductory chapter, Mr. Christy describes the peculiarities of his native county, referring to the fact that there are practically no waste lands, the whole area, with very slight exceptions, being productive and fertile. In historic and antiquarian interest Essex yields to few counties, being scored over with Roman roads, and containing no fewer than five Roman stations, while the later records are full of incident. The geology of the county receives exhaustive notice, and the ancient camps, the remarkably fine series of Tudor and 18th-century mansions, and the remains of the 47 religious houses which existed prior to the Dissolution, are the subjects of other notices. Owing to the complete absence of building stone, the churches are admittedly rather poor. They are of all periods, the best being the Early Norman church of Watham Holy Cross, and next it in interest the Perpendicular churches of Thaxted, Saffron Walden, Dedham, Coggeshall, and Dunmow. Reference is made to the octagonal tower of Hockley Church, and to the six examples of round towers; but we observe Mr. Christy neglects to note the almost unique (and unpleasing) example of a triangular tower at All Saints, Maldon, to which the only parallel that occurs to us is Tresham's well-known Lodge at Rushden, Northamptonshire. The towns and villages are succinctly described in alphabetical order, and while the earlier works of Morant, Cromwell, and White have evidently been consulted, the errors of omission and commission have been, so far as we have tested the statements, rectified, and the material is presented in readable, concise fashion. The little book is illustrated by an excellent map of the county brought down to date, the Great Eastern Railway extensions from Shenfield and Maldon to Southend and Burnham, and the Tilbury Co.'s direct route between Barking and Pitsea, both now in progress, being shown as opened, and by a reliable plan of Colchester.——*Land and Houses*, by JOHN PARNELL (London: Effingham Wilson and Co., Royal Exchange), is a new edition of a useful and concise handbook for intending investors in freehold and leasehold ground-rents, houses, and land. The cautions as to what to look for and to avoid will afford many useful hints to would-be purchasers, and at the end of the book are tables showing the rates of interest on purchase money, and the number of years' purchase equivalent to such amount.——*Gasworks Statistics* and *Waterworks Statistics* (Scientific Publishing Co., 22, Buckingham-street, Strand) are new and enlarged issues of Mr. C. W. HASTINGS'S carefully-compiled particulars as to English gas and water undertakings.——From the same publishers we have also received the *Gas and Water Companies' Directory*, a useful book of reference, also by Mr. C. W. HASTINGS, and *Rating Gas and Water Undertakings*, by WILLIAM GRIFFITH, B.A., Barrister-at-Law, which sets forth in a clear manner the principles on which rating is based, and the complicated Acts and judicial decisions by which the practice is regulated, and goes on to detail the procedure by which valuations are enforced. Such a handbook is calculated to be of service to both rating authorities in reducing friction, and minimising appeals and litigation by showing the basis on which claims should rest.——*Midland Churches* (12, Southampton-street, Strand) is a sixpenny reprint from *Church Bells* of twenty-eight full-page woodcuts and descriptions of notable churches in the Midland Counties. The letterpress seems reliable, and is compiled from an ecclesiastical, rather than architectural, standpoint; the illustrations suffer from failure in sympathy on the part of draughtsman or engraver with the details of Gothic work.——*Benham and Froud's Catalogue and Price List* (Chandos-street, W.C.) of their braziery goods, art metal and woodwork, and general metal work is well illustrated, and will be found useful to the architect and builder as well as generally to those furnishing.——*The Trade Signs of Essex*, by MILLER CHRISTY (Chelmsford: E. Durrant and Co., 90, High-street, and London: Griffith, Farran, and Co.), is a popularly written and illustrated account of the origin and meaning of the publichouse and other signs now or formerly found in the county. The author classifies the signs of the 1,355 inns and publichouses now existing in Essex, and shows that these, with those which have disappeared during the past two and a half centuries, include 693 distinct varieties. Of these heraldry accounts for the origin of a very large number, and the chapter on heraldic signs will be found by many one of the most interesting in a well-written book. Mammalian signs follow, and comprise more than one-third of the total signs, although there were but few over a hundred varieties. Birds are responsible for eighteen distinct signs, insects for two, and fish for but one. Signs of human and astronomical origin account for nearly all the other varieties. The illustrations are culled from many sources, and include some good examples of wrought-ironwork, notably the brackets of the Leather Bottle at Pleshey, near Great Waltham, the spaces in which are filled with well-designed scrollwork, dated 1778; the scrolls surrounding the sign of the Rising Sun, at Castle Hedingham, and the Boot, at Bardfield, are also good examples. Mr. Christy has delved into almost virgin soil, the only other work of any value on the subject being Larwood and Hotten's "History of Signboards," written twenty years ago, and treating mainly on London signs, and he has dealt with his materials in an interesting and readable manner.

STORM-WATER CONDUITS.

THE size of sewers or conduits to carry off water from a given area so quickly as to avoid disastrous flooding is one of the questions to which the attention of engineers has to be drawn when providing a system of sewerage for districts. The local conditions often make the formulæ used for determining size worthless. The area to be drained, the inclination of the sewer, the rainfall during storms, and the soil, whether permeable or otherwise, are important factors. Weisbach's formula for discharge, assuming the sewer to run three-fourths full when discharging one cubic foot per second per acre, has been adopted in proportioning the sewers of the City of St. Louis. This formula, adopted by R. Moore, is that the diameter of sewer in feet $= \left(\frac{A^2}{10{\cdot}33\ s}\right)^{\frac{1}{5}} A$, denoting area drained in acres, and s = grade of sewer in feet per hundred. The Kutter formula gives a better discharge, and tables have been given in a paper by R.E. McMath in the Transactions of the American Society of Civil Engineers. It has been found that where overcharging existed it was due often to insufficiency at some other part of the sewer. The effect of two sewers meeting is often to destroy the velocity below the junction. The tables furnished by the author are of interest, as they show the different discharges by these formulæ. The St. Louis rule makes smaller allowance for discharge than the Burkli-Zeigler formula for areas less than 60 acres, and less than the new rule of St. Louis up to 80 acres. The formulæ generally used are not satisfactory. Considerable differences are shown in the tables of Mr. McMath. The tables and diagrams of capacities of sewers are of value, and the deductions of the writer seem to be based on experience. We may mention that the proportion of rainfall that reaches the sewers, after allowance for evaporation and absorption, is for St. Louis three-fourths of the rainfall, though in any given locality the judgment of the engineer must be taken. The surface, whether paved or not, and the porosity of the soil, the number of buildings on the area, are important elements.

THE ORIGIN OF CHRISTIAN CHURCH ARCHITECTURE.

THE generally accepted view as to the origin of the form of Christian Church architecture is that until the conversion of Constantine, the Christians were not allowed to erect special buildings for their worship, and were therefore obliged to meet in private houses or in the catacombs; and that although they might sometimes by special favour obtain the use of some building of no external appearance, they were not allowed either in extent or decoration to attempt any rivalry with the temples of the pagans. But, it is further said, when Christianity became publicly recognised, the Emperor made over to them some of the old pagan basilicas, which they immediately occupied as churches, and they afterwards erected new buildings, which they called by the same name, Basilicas, in imitation of these pagan structures, which thus became the original models of Christian churches. These views do not rest upon any direct statements of ancient authority, but it appears were first promulgated by the earliest modern writer on architecture, subsequent to the revival of letters,—Leon Battista Alberti, of Florence, in his work "De Re Ædificatoria," A.D. 1485, echoed by Ciampini in his "Vetera Monimenta," A.D. 1690; and they have been repeated in almost every English treatise on the subject, including Mr. Burges' paper read before the Institute of British Architects in June, 1853, the "Dictionary of Christian Antiquities," and the new edition of the "Encyclopædia Britannica" (s. V. "Basilica"), without the slightest hint of question or dispute, except in the Architectural Publication Society's "Dictionary of Architecture," although a long controversy upon the subject has been carried on in Germany for nearly forty years, beginning with a learned treatise by Zestermann, entitled "Die Antiken und die Christlichen Basiliken" (The Antique and the Christian Basilicas), published at Leipzig in 1847. The present Professor of Fine Art in the University of Edinburgh, however, calls the statement very seriously in question in his new work, entitled "From Schola to Cathedral,"* and supports his views by historical references and arguments of such a nature as to deserve careful and respectful consideration.

Mr. Baldwin Brown holds that although the pagan basilica may account for several features of the Christian meeting-place, it by no means accounts for all. He observes that in the fourth century, when Christianity was first fully and openly tolerated by the edicts of Constantine, we find its meeting places represented by imposing buildings of distinct plan, and with an elaborate system of appropriate decoration, which presuppose many tentative efforts during the preceding centuries. There are, however, neither any actual remains of Christian buildings or formal descriptions of them in any writings of the period, and in the absence of such memorials their probable form is to be gathered from indirect allusions, and from the general position of the early Christian communities in the Roman world, and their outward features of resemblance to other religious associations or clubs, both Jewish and pagan.

The very earliest meeting place of the Christians was the "upper chamber," mentioned in the beginning of the Acts of the Apostles, where the whole community of 120 persons gathered together, and performed their first acts of church government. Not long afterwards we read that they met daily "in Solomon's porch" of the Temple of Jerusalem. As they spread through Asia Minor and Greece they at first availed themselves of Jewish synagogues, the Christian meeting-place being expressly called a synagogue in the Epistle of St. James (ch. ii. 2, marg.), and probably for the greater part of the first century the Chris-

* From Schola to Cathedral: a Study of Early Christian Architecture and its Relation to the Life of the Church. By G. BALDWIN BROWN, M.A. Edinburgh, 1886.

tians presented the outward aspect simply of a sect of the Jews. Such separate meeting-places as they had were—if not public halls, hired for temporary use like "the school of one Tyrannus" at Ephesus — large apartments within the private residences of wealthy adherents. The meeting-place at Troas, where Eutychus fell from an upper chamber on the third loft, was of such a nature; in the city of Rome the meeting-place was in the house of Aquila and Priscilla; at Colosse in the house of Nymphas; Philemon held a church in his house; and at Rome, St. Paul preached in his own hired house. This practice by no means passed away with the first ages; but continued until Christianity was established. In this matter the Christians followed the example of the heathen religious colleges, respecting which Tacitus ("Annals" i. c. 73) records that they held meetings "from house to house"; and an inscription quoted by Orelli-Henzen tells of a "college" in the house of Sergia Paullina. In the early Christian romance known as "The Recognitions of Clement," reference is made (iv. 6; x. 71) to such a hall in the house of one Maro, said to have been afterwards Bishop of Tripolis, which was used by St. Peter; and of the gift of another to the church by Theophilus, afterwards Bishop of Antioch. Mr. Brown conjectures that it was a maxim of church polity to secure men of wealth and station for bishops, whose houses might afford advantageous positions for extension of the operations of the church, and that these ancient houses were a little later easily transformed into monasteries. "The arrangement of the Mediæval monastery," he says, "recalls that of the ancient houses. The cloistered court is the *peristyle*; the church, the refectory, the chapter-house, and other apartments round it correspond to the *æci* of classical times, and the resemblance may be due to this derivation." These apartments were richly decorated, and such decorations may have had a powerful influence in inducing the Christians to apply similar ornamentation to the walls of their churches. An anti-Christian dialogue, called "Philopatris," formerly ascribed to the poet Lucian, describes a Christian gathering in "a handsome room with a gilded ceiling up a long winding staircase," and an ancient document known as "Gesta Purgationis Œciliani") printed in the appendix to St. Augustine's works (Vol. IX. p. 794, Migne), gives a graphic picture of the Christians assemled in such a place on the occasion of a persecuting State inquisition, with a list of the furniture and some mention of subsidiary rooms in the same building used by them.

But besides these ordinary apartments in private dwellings, there were in some large mansions—especially in the imperial palaces—*private basilicas* of great magnificence, both as to proportions and decorations, differing, however (though with many common features), in several important respects from the great public basilicas. These apartments are mentioned and described by Vitruvius. That in the palace of Domitian is referred to by Plutarch as an example of architectural splendour, and it so happens that is the only private basilica of which any portions are still remaining. The end is occupied by a semicircular tribunal, in the construction of which the same considerations operated as in the construction of Christian churches—namely, the necessity for focussing the interior by means of one all-dominating feature. "Just as the crowds that waited upon the nod of Cæsar, when they entered the hall of judgment turned their eyes at once to the tribunal where he sat enthroned, so the innumerable multitude which thronged the churches were conscious from the first moment they entered the building that the altar, and those about it, formed the one centre of interest for all." Such was not, however, the case with the larger public basilicas, hitherto supposed the originals of our churches, where both, according to Vitruvius and Plutarch, the apse or tribunal was separated by columns and a gallery from the main building for the express purpose of quiet and privacy.

But, although there were Christians in Cæsar's household from the earliest times, who would have been familiar with these magnificent private halls, and who might possibly have used them for meeting places, Mr. Brown thinks their use was hardly common enough to have had much direct influence on the form of the churches, and he looks, therefore, to other buildings more generally used as the true originals. These were (1) the lodge-rooms, "scholæ" of religious associations; (2) the "cellæ" of the cemeteries. The number of associations was one of the most striking features of social life during the first centuries of the Christian era. There were then, as now, trade and dramatic guilds, athletic, burial, and dining-clubs, literary and financial societies, and, with the exception of scientific associations, there was scarcely an object for which men now combine for which they did not combine then. Almost all of them had more or less of a religious element, like our own mediæval trade-guilds; but in a very large number religion was the basis and bond of union.

Hence, the formation of the early believers into societies was by no means an isolated phenomenon. To outside observers they were in the same category as associations already existing. They had the same names for their meetings, some of the same names for their officers; and their basis of association, like the others, was a common religion. The number of such associations was so great that they literally honeycombed the Roman Empire, and they were regarded with favour or disfavour by governments, according to the supposed predominance in them of religion, charity, or politics. Their technical names were, in Greek, ἑταιρεῖαι ("hetæriæ"), and in Latin, "collegia," "sodalitates," or "sodalicia." "Nowhere," says Mr. Brown, "would the early Christians have found ideas and habits with which they had more in common than with these societies. . . What wonder, then, if they came to conform themselves in large measure to the practice of these *sodalicia*, and so gave cause to the Roman authorities to apply the same laws to both." These societies had, as one of their institutions, a lodge, or meeting-room, called "schola,"* where they held their gatherings, and assembled for common meals, to which each member brought his share of provisions. On the Capitoline plan of Rome there are indicated several small oblong buildings, and there are remains of others near the forum at Pompeii which have an apse or semicircular formation at the end farthest from the entrance which were probably the *scholæ*, or meeting places, just mentioned. The words of St. Paul seem to imply the possession by the Corinthians of a similar place of meeting, where a meal was eaten in common, and the memorial bread and wine was passed round. These associations and places of meeting existed among Jews as well as pagans, and it is not likely that the heathen would perceive much outward difference between their own societies and those of the Jews and Christians. Tertullian (*Apol.* c. 39) says that the funds voluntarily subscribed at the meetings of Christians were spent "to support and bury poor people"; and the investigations of the last twenty years have made it certain that the early Christians copied most especially the procedure of the funeral colleges, under cover of which they had the best chance of escaping attack. No object was held more sacred than the performance of sepulchral rites, and however much the Government or the populace might be subject to fits of suspicion or fury against other societies, the burial clubs were always treated with great tenderness and respect. "It is evident to me," writes De Rossi, the great modern explorer of primitive Christian monuments and inscriptions, "that the Christians made use of the funeral colleges, and that the emperors who were well disposed to them, or, at any rate, not persecutors, availed themselves of the pretext to tolerate the assemblies of the faithful, and to permit the Church to establish itself little by little as a corporation in the bosom of the Empire." The Christians held their cemeteries under a title like that of other burial associations, and the *area* of them presented mostly the same external appearance, containing gardens, houses for the caretakers and *fossores* or sextons, *cellæ*, or monumental buildings above ground, and covered entrances to the subterranean catacombs. Whatever opinion may be held as to the general right of Christians, previous to the famous Milan edict of Constantine and Licinius (A.D. 313) to hold other kinds of property in common, there is no doubt that they might acquire common property in cemeteries; and also, generally speaking, perform what ceremonies they liked therein in the upper air. So much is plainly implied in an edict of Valerian (A.D. 357), forbidding for the first time Christian assemblies and visits to cemeteries, but which was set aside three years later by a more tolerant edict of Gallienus (A.D. 360). Thus the Christian cemeteries became the surest and safest rallying places of the infant church; they also received a peculiar consecration as resting places of the remains of venerated saints and martyrs. Following the practice of other burial associations, it became a custom for the whole body of the faithful to assemble at these sacred spots for periodical funeral feasts in memory of the departed. Early and direct evidence of this custom is found in the "Acts of Martyrdom" of St. Polycarp (A.D. 155), and remaining inscriptions show that the cellæ and area were not unfrequently presented to the Christian communities by believers for church uses. In times of danger the meetings would be removed to the crypts below the cemeteries where the bodies of the martyrs lay at rest, and the holy ceremonies could be performed with the sarcophagus itself for an altar. The literature of the period is full of notices of these cemetery meetings, and they became so popular at last that Jerome boasts, "the city is moved from its seat, while the torrent of the populace sweeping past the ruined shrines (of idolatry) pours forth to the martyrs' tombs." These burial places having been necessarily outside the cities accounts for the fact that many of the mightiest Christian fanes are outside the walls of *ancient* cities—as, for example, St. Peter's, on the Vatican, St. Paul's, on the road to Ostia, and many others. As the throngs increased who visited these spots, the small *exedræ*, or chapels, grew into enormous churches, but always with the same dominating feature of the apse or chancel for the clergy, containing the martyr's tomb, with the holy table or altar in the chord of the apse, or well in view, and facing the congregation placed in front.

Thus Mr. Brown maintains that the Christian architecture had, as it were, several root-fibres traceable to non-Christian origins, which united to form the historical church. These were: the Jewish synagogue; the halls of private houses, including the *private basilicas* or halls of audience of Roman princes and nobles; and the *scholæ*, or lodge-rooms, of Roman associations or clubs, which gave the Christians just what they needed for simple utility, and wherein the Christian altar occupied the place of the pagan, and the church officers those of the club presidents. But the highest development, which went beyond mere utility and became the expression of Christian joy and triumph, were the *cellæ*, called by Eusebius, "Trophies of the Martyrs," erected over their tombs. These were the true sources of the expressive art language of Christian architecture in form and decoration which subsequent ages have so elaborately worked out in the varieties of church architecture in Christendom.

In the latter part of his book Mr. Brown traces the architectural forms of churches from these originals, through the Domed, Byzantine, and Mediæval styles, and of their modifications by Teutonic influences; and gives cogent reasons why the ordinary theory of the origin of Christian churches from the public pagan basilicas can no longer be held tenable.

W. H. R.

* The word survives in the Italian "scuola"—a lodge or meeting-room.

NOTES ON ETRUSCAN ARCHITECTURE.

IT is somewhat surprising that, considering the position once held by Etruscan architecture in the world, so little of it should remain to make its mark upon modern times. The Etruscans, who made their appearance in Italy after the Pelasgi, the first known builders of whom there is any trace, hailed from the north, according to report, at a date varying from 1050 to 1300 B.C. Whether Germany was their home, as some think, is immaterial; it being much more to the point that the chief settlements in Italy occupied a rather larger area than the present province of Tuscany. The Etruscans were a flourishing and energetic people, who lost no time or opportunity

of extending and consolidating their possessions. It was, therefore, to be expected that they would leave behind them, more or less, traces of their presence, and accordingly we find them not in any profusion, and principally taking the form of religious worship and respect to the dead. Both these influences were strong with many of the ancient nations, and the result amongst the Etruscans was that their architectural remains are chiefly in the form of temples and sepulchres; though their history is very vague, we are enabled to draw upon the descriptions of Vitruvius and other old writers. Nevertheless, this class of remains is not common, the probable reason being that there was a deficiency of compact stone, so that the builders of that race had to fall back upon the plastic clay, of which there was great abundance. That architecture had assumed a definite type, even at that early age, may be gathered from the fact that Vitruvius speaks of a Tuscan order, although he does not seem to be aware of what were the principles of that order. He also mentions capitals and decorations in terracotta of architraves in wood. Pliny, too, alludes to Tuscan architecture, laying down a canon, that in the construction of a temple the breadth should be three times the height of the columns; and this we find to be the proportions generally in most of the temples in Sicily, and also in some of those in Greece. Later historians all agree that the Etruscans possessed a bold and determined form of architecture, Dionysius especially mentioning that they built walls of great strength and in the fashion of towers and fortresses, from which they obtained the names of Tyrrheni or Turreni. It is not likely, therefore, that Etruscan architecture, having once gained a character of its own, should have remained stationary, but rather that it kept on improving and suggesting varied forms of ornamentation.

One of the salient features was the *atrium*, from whence, it is said, that the Venetian town of Adria, an undoubted Etruscan settlement, took its name. The Etruscans are stated by Diodorus Siculus to have first introduced vaulting, though he has only tradition to back him up in his assertion. Nevertheless, he is borne out by the fact that notable examples of that are seen in the undoubtedly Etruscan towns of Perugia and Volterra, and also in the Cloaca Maxima of Rome. This grand arched tunnel extends underground for 800ft., built of blocks of reddish tufa; and although it is traditionally attributed to Tarquinius Superbus, the late Mr. Fergusson considered that it was by far beyond the means and requirements of a city of the size that Rome then was. Archæologists, in general, have, therefore, have assigned it to Pelasgic or Etruscan times, and there can be little doubt but that, taken into consideration with the arch, the cloaca belongs to the latter. The chief characteristics, then, of the Etruscan builders were, in a word, a marked broadness or strength, accompanied, as a rule, by sparse ornamentation; and they doubtless imparted to the Romans the secrets of the arch and vaulting.

Taking, first of all, the religious edifices, we find that the Etruscan temple was quadrilateral in shape, divided transversely into two portions, the anterior or *pronaum*, entered by a flight of steps and through a portico, the posterior subdivided into three chambers, of which the middle was considerably the largest. As a rule, the Etruscan columns were exceedingly plain in their capitals and vases, an example of which is shown in what is known as the Column of Cucumella, which resembles the Doric order. Occasionally, however, we find them with volutes and leaves, but of a different type from Ionic or Corinthian.

In the construction of their sepulchres the Etruscans followed a regular ritual, and from the more numerous opportunities of examination, it would seem as though the cross was the motive throughout. Etruscan tombs are divided into those constructed in a primitive age, somewhat resembling the tombs of the East; hypogees, which show Italo-Greek influence; and others, which others believe to show Roman influence. Many are underground, excavated in rock, as at Vulci; others are built above the surface; some are plain, others richly adorned with columns and cornices, as at Castel d'Asso and Norchia. The Etruscan tombs have been divided into—

1. Subterraneous in level plains:
   (*a*) With subterraneous chamber and tumulus. Ex. Tarquin's Tomb.
   (*b*) Without tumulus, but with subterraneous room and vestibule. Ex. Tombs of Vulci.
2. Excavated in hilly and rocky country:
   (*a*) With doors, vestibule, and chamber. Ex. Tombs of Tuscanella.
   (*b*) With façade and sham door, with moulded jambs. Ex. Norchia and Castel d'Asso.

There is a good example of a warrior's tomb at Cervetri, painted with arms and shields; also the tomb of the Due Sedie, from the seats placed between the three doors. Many tombs were surmounted by a pyramid based upon a parallelopiped, crowned with a heavy cornice, as at Castel d'Asso. A sham ornamented door was the only thing that enlivened the blind wall. It seems rather curious, however, if, according to the Etruscan belief, the dead is *en rapport* with the living, any hole would have done, and, in fact, many tombs are found so, as at Castel d'Asso, Toscanella, Vulci, and Sorana. One of the finest tombs in the country is that of the *Tomba supraposti* at Tarquinia, near Corneto. It is dug out of tufa, with a roof like a canopy, and hangings; the light enters by a rectangular aperture at the base, and inside are some remarkable sculptures. Other interesting tombs are the Volunni at Perugia, at Orvieto (singular paintings), of Marzobotto and Villa Nova, near Bologna, and the tombs at Albano, which have been the subject of a great deal of discussion. Also very interesting in an architectural point of view is that discovered at Norchia, the capitals of the columns being of the order called Tuscan by Vitruvius. Sardinia possesses singular buildings, believed to be of Etruscan origin, or some say by the Phœnicians or Carthaginians. They are called *Nuraghe*, but Signor Crispo, the archæologist, questions their being sepulchral, considering them rather as habitations of the nobles. The etymologist bears this out, *Nur* meaning fire (habitations) in Oriental language, and *hag* or *hagst* great. Others maintain that they were fire altars, similar to the *talegot* of the Balearic Islands. Externally, they are of a fortress-like character, with a cone of masonry standing up from an equally massive base, spreading out horizontally, and with a most minute door spreading at the base of the cone. In the interior are two or three cruciform chambers, out of all proportion to the massiveness of the masonry. In some cases solid furniture and idols have been found here; but the whole thing is wrapped up in great mystery.

As to the Etruscan civil architecture, the Arch of Augustus at Perugia is most probably Etruscan, though some, looking at the inscription COLON-VIB, consider it as Roman, of the time of Augustus. Perhaps it belongs to two different eras—that the arched portion of it is Etruscan, albeit the ornaments and pilasters with Ionic capitals are Roman. It is doubtful whether the Amphitheatre of Sutri is Etruscan or not, though all agree as to the gateway of the ancient inclosure of Volterra, with its three coarse heads, notwithstanding that some consider that the gates were placed there posteriorly to the entrance. Although it is not of æsthetic beauty, the nineteen cunei which form the arch are wonderfully harmonious and well put together. The Cloaca Maxima is a splendid example of Etruscan architectural skill; so is also the temple at Rome erroneously called Vesta, which has three concentric arches, the travertine cunei standing forth without cement. We may mention, also, the ruins at Fiesole, Arezzo, Faleria, and the fountains in Tusculum.

FURNITURE BEADS AND MOULDINGS.

I DO not intend in the present article to enter into the architectural character or geometrical principles of mouldings; it is with the manner in which they are fitted and applied I wish principally to speak. I will take beads first, and may here mention that in cabinet-work the term bead is employed differently from in building construction, being given to the astragal, the bead, and the torus, the definitions generally used being raised or sunk beads—beads forming parts of mouldings I omit for the present. The following are amongst the most frequent forms that occur: Scratch beads, loose beads for inside work; beads single and double, on doors working together and on edges; and reedings, a series of two or more worked together.

Simple loose beads are always applied from the inside to secure some portion of the work, such as a panel in a door frame, or a back, or for transparent glass or other accessory fitting. Their thickness is rarely more than from $\frac{1}{4}$in. to $\frac{3}{8}$in., their width is from $\frac{1}{2}$in. upwards, depending, of course, upon the nature of your work, thickness of framing, panel, &c., and also whether they are to stand up or down. As a rule, $\frac{1}{2}$in. panels in 1in. framing will take a $\frac{3}{8}$in. bore bead. The beads can stand up if the inside fittings will not interfere with them when the door is closed. You can easily see which plan to adopt by placing the door frame upon the work without the panels and noticing the position of the inside.

These beads are best made in lengths of from 3ft. to 4ft. If required for smaller work, you can make each length work a side and top or bottom, and cut it afterwards. It is advisable to use a piece of wood wide enough to make several, as this is handier to work; both edges having been shot and rounded over, gauge the bead off the requisite width from both sides and edges, and it will break off clean. Now shoot the underneath edge of these square, mitre them lightly to the work, and secure them by brads, placed at intervals of about 6in. apart.

Single Beads are used for edges, fronts, faces, &c., from $\frac{1}{8}$in. to $\frac{3}{8}$in. wide; those of $\frac{1}{4}$in. and $\frac{3}{16}$in. are the sizes most used. There is nothing special in working them; planes are made for this purpose. It is, however, advisable to have the surface finished beforehand, scraped, and papered; it does not then have to be touched afterwards, and there is no danger of flatting the bead.

Double Beads are sometimes used as mouldings and applied to work, but more often they are worked on it either lengthwise, crosswise, or diagonally; a series of three are occasionally used, but two of about $\frac{1}{4}$in. ($\frac{1}{4}$in. each) most frequently; they are termed *reeding* or *reeded beads*. When working these you will require a straightedge to form a guide for the plane. After finishing the surface it should be set out as the reeds are to be worked, care being taken to do so exactly, and to set the plane on the work, and the straightedge true to it. Now secure it firmly; this is best done by handscrews, which should be so arranged as to be clear when working. You will find it advantageous to use a moderately wide and not too thick straightedge, say about 3in. to 4in. wide and $\frac{3}{8}$in. thick.

In working crosswise or diagonally great care is requisite. Shaped beads of this kind are worked with circular bead routers, which act in the same manner as a spoke-shave.

Projecting Beads.—I intend speaking of these where fitted distinctly, and not where they form part of another moulding. These generally occur in one of the following varieties: On the face of anything, in which case they are applied from the front, and are held principally from the back; to the top, as in a frieze secured by the upper surface; to the bottom, a reversal of the preceding, but one that in many cases makes a great difference structurally; and to the sides: these are adopted where work of the same nature meets, as in doors at the joints of their edges, a bead being fitted to one which, when shut, closes over the other.

I will take the first case, and assume that we have to fix a bead to a piece of work so arranged that it can only be applied from the face, that it is of an ordinary nature, and that the bead is, say, $\frac{3}{8}$in. thick. After preparing the wood and rounding its edges, the bead should be gauged and sawn off; allow a trifle for working in doing this. I may add that it is best to finish it before fitting on, as it is impossible to do it so well afterwards without injury to the ground work, and it is handier when in a large piece (previous to cutting) to work.

After cutting, level the back with a plane and tooth it. You will find this rather an awkward operation; but if you run a hollow in a piece of wood sufficient to take the bead

reversed, and allow it to fit well, it will steady it whilst working. The surface of the work should now be taken down to receive it. If possible, mark this with the gauge—that is, let the gauge mark be the one for the bead to fit and rabbet beneath to a depth of $\frac{1}{16}$in. or so. Now cut the bead to the front, glue it well, and press it firmly, so that the back edge is down to the work and the upper portion to the gauged part. After allowing this to set, the remainder may be mitred round in the same manner, care being taken not to force the first off in fitting.

In the *second* example, where held by the top, the wood must be got out the *full* width of the work—it is, in fact, preferable to allow rather more. The bead is now worked as usual on the edge and the remainder planed true; the amount of the projection is now lightly marked on it by one or two fine points at intervals with a striker, or by a gauge mark. The surface is then toothed, and also the one to which it is intended to fit it. After glueing, set it to the marks and handscrew down, taking care that in applying the latter you do not draw the work out of position.

The projecting inside edge can be levelled when dry. When beads of this nature are shaped, it is advisable to get them out rather wider than when straight. They can be most accurately marked from the work, which will of course be finished, with the exception of the mouldings. The wood being temporarily and placed in the work and fixed, the inner lines or marks can be made by running a compass round, and if the bead is worked true to this, inaccuracy is impossible.

With beads fitted to the bottom, simply a reversal of the preceding, the same directions apply; but examples occur where it is better to differ from this. As a general, though not invariable, rule, these beads are applied to work standing upon something else—that is, the bead is used in small work at the various parts to break the joint, as it is termed, and there are other structural reasons which I shall afterwards refer to. Now, it is preferable in the majority of cases, instead of fitting the beads to the upper portion of the work, and this to the lower, to fit the beads to the lower and the upper to them. This is a very important principle, and one which embodies a great saving of time, it is better so far as strength is concerned, and facilitates working in more than one respect.

I will give one illustration, and others will suggest themselves to you. Take a small cabinet or box forming the upper part of a piece of furniture like a fancy table, &c., to which it is fitted, and having perhaps a pair of small doors in front. The beads should be set on the lower part of the work so that they will show evenly when the top part is in position and closed, the points are marked as usual, and the beads well glued down to the surface.

Beads fitted to the Stiles of Doors, or Parting Beads.—After the doors are hinged and fitted, the bead is applied to the right-hand one, the edge being previously rabbeted out to about half the bead width to receive it. The bead is now glued to this rabbet, and when dry fitted to the other, the under surface being taken out sufficient for it to shut upon the other door level.

In turned work, beads, both raised and sunk or scratch, are frequently employed. The former are the only ones to which I need refer. In work in which the various parts are traced, the manner of putting together is generally by pins fitted to holes or mortises. Take, for example, towel airers, some kinds of table stretchers, and spindles placed between an upper and a lower rail. The construction in all is the same. The exact length of these parts should, before turning, be marked from these marks, the pins are turned the requisite size, and also *raised beads* against them. These beads in putting together will form at each joint a *shoulder*, which is, in fact, analogous to the square one employed in an ordinary tenon.

T. H. S.

(*To be continued.*)

An exhibition of home arts was opened at Kirkby Lonsdale on Friday. The exhibits consist chiefly of handicraft articles made in Westmoreland villages, including clay modelling and carving in wood and stone.

WAYSIDE NOTES.

THE King of the Belgians is about to have a "lodge" built near Brussels, which is to be after the manner of some building that can be seen from the railway between Dover and London. Whilst performing this journey — presumably during Jubilee week — His Majesty observed a house, villa, or cottage that must have greatly taken his fancy, since we learn that he was seized with a desire to reproduce the design in his own country. With this object, it is reported, large shipments of English building materials are being made to Belgium.

Who is to be the architect of the new building is not stated. Perhaps His Majesty made inquiries as to who was the designer of the edifice he so much admired, with the result that he one day called in the neighbourhood of the Strand, Adelphi, Bedford-row, or Spring-gardens, and gladdened the heart of some London architect! Or, on the other hand, he may have commissioned his own architectural adviser to visit, and make sketches of, the fascinating house. Where is the building, I wonder? Can it be one of the fanciful mansions on the pleasant slopes of Camden-hill at Chislehurst; or is it some humble, moss-covered, oak-and-tile cottage of the Weald of Kent?

Touching mosses and lichens, I notice that the Aylesbury Dairy Company, Limited, advertise for sale some weather-stained slabs of Horsham stone, taken from old roofs. I fear that the company's customer will not be an architect, unless, indeed, such a one might be engaged in repairing a score or more of old roofs of a similar nature. The idea of putting these lichen-covered slabs on a new building is rather too much of a good thing. As regards the cost, never having purchased any of Nature's own colours, I cannot say whether the price asked—£300 for 30,000 superficial feet of golden russet and warm brown and orange—is reasonable or not.

Mem.: We might have more of this stone roofing attempted now than we see. It is true that when used for large roofs it is expensive, because of the extra strength required in roof-trusses and timbering; but it is a mistake, rather, to employ it in too wholesale a manner. A little bay or porch may be covered with stone slabs, even when the main roof is tiled, and the effect is often very charming. There is an example of such a treatment in a little house in Collingham-gardens, W., designed, I believe, by Mr. Ernest George.

There is to be published shortly an illustrated description of Long Melford Church — the elaborate flint-panelled Suffolk building. From an æsthetic point of view, as I have before observed, this church must be considered as hardly so good in external effect as the large amount of labour bestowed upon it would lead one to expect. Such excessive elaboration is not to be commended in modern imitations of the style. If I may be allowed to repeat what I have already said, I would say that "Little and good" should be the motto of the flint-panellist.

It is rather curious to reflect that the best age of "split and squared" flintwork in England was contemporary with the date of the general employment of flint-lock muskets. "Knapping" being then one of the arts of war, the adepts must have turned their attention to the arts of peace, and thus left, for our enjoyment and delight, such magnificent specimens of flint-cutting as are to be found in Norwich and Yarmouth, where we find buildings containing squared flintwork so beautifully executed that it is difficult to insert the point of a knife between the joints.

Mem.: In selecting flints for panel work, care should be taken to have as great a variety of tints as possible. Such appears to have been invariably the practice of the old builders in their happiest efforts. Choose flints from chalk and gravel, from seashore and inland districts, and avoid a preponderance of the heavy-looking black kind. Nothing looks so repelling and harsh as a uniform wall of dead-black flint-work, and, moreover, by using such flints sparingly you save money, as they are the hardest to split.

The *Citizen* says that Austin Garden, Austin Friars, E.C., is about to be closed, and a large block of offices erected on the site. The old monastery of Austin Friars, of which this garden is one of the last remnants, appears to have been a very fine work of architecture. The old structure was erected in 1354 by the successor of the founder of the institution, Humphrey Bohun, Earl of Hereford and Essex. In 1362 the elaborate spire was overthrown in a gale of wind. It was afterwards rebuilt, but in the course of time was pulled down, and the whole place fell into decay. For some centuries the church has been in the possession of the Dutch. Says the *Citizen*:—"The church remains in the hands of the Dutch, and now the garden is about to be covered by buildings, so the temple may soon be in the hands of the money-changers."

From the above it would appear that they have their troubles in the City as we have in the West. Whilst we are engaged in lamenting the possible desecration of St. Martin's-in-the Fields or St. Mary-le-Strand, our neighbours are fearing for the safety of their old churches. But, whereas our cry is mostly "Wolf!" the City people have often genuine cause for alarm that one of their few historical or Mediæval buildings may be swept away.

I observe that the lightning-riven spire of the Endell-street church has entirely disappeared, and an extensive scaffolding has risen in its place. With our modern fevered haste in building, however, it will probably not be long before another spire is grafted on to the old tower stump. It is *just* possible that the new spire will not be left without an ample lightning conductor with all the improvements suggested in recent discussions.

The Sanitary Institute having completed its labours in Congress, we ought to be considerably wiser than heretofore on health matters. Unfortunately the subjects discussed seem to have been rather diffuse. We scarcely need to learn from such a society how to lay out streets with regard to their appearance. It may perhaps be argued that sanitary science is so very wide-reaching that it is really all-embracing. But there is nothing like concentration nowadays when there is so much to be done on all hands; and it is probable that had the Institute confined itself to the discussion of, say, the Great Drainage Question and the relative value of the water-carriage, dry-earth, and filtration methods of disposing of sewage, it would have been of more practical assistance in increasing the sum of human happiness.

"Accidental death" and "Manslaughter." Such are the respective verdicts of the juries engaged upon the two great inquests. In the one case some hundred or more of persons were burnt, suffocated, or crushed to death; whilst in the other about twenty-five people were killed by the shock of railway collision. One "accident" happened through the attempt to obtain increased accommodation in a theatre gallery without providing a sufficient stairway or proper means of exit; the other mishap occurred through an oversight on the part of the driver of a locomotive, or his fireman. I congratulate the individuals concerned in the former disaster on their escape from all responsibility. And I sincerely hope that the driver of the ill-fated train and his fireman will be mercifully dealt with by the Judge whose duty it may be to try their case.

Goth.

The English Government has granted £500 towards the memorial to be erected in the new Brussels cemetery to the memory of the British officers and men who fell during the Waterloo campaign, on condition that the balance of the sum required be raised by public subscription. The design for the memorial by the Comte Jacques de Lalaing has been approved.

The French Stonehenge, Carnac, in Brittany, is to be purchased and preserved by the State. Most of it has been already purchased bit by bit, but the owners of the remainder having asked exorbitant terms, they are to be expropriated by the usual judicial valuation.



A SHEET OF OLD WALL TILES

DRAWN BY

GEORGE WASHINGTON BROWNE

ARCHITECT























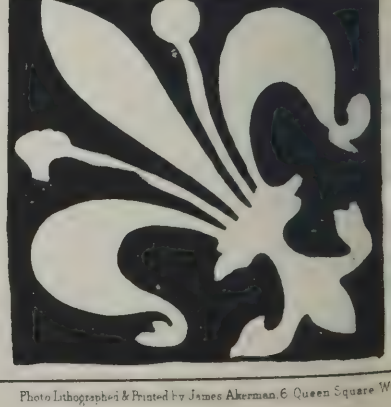


Photo Lithographed & Printed by James Akerman, 6 Queen Square W.

E BARBE

Fig 2

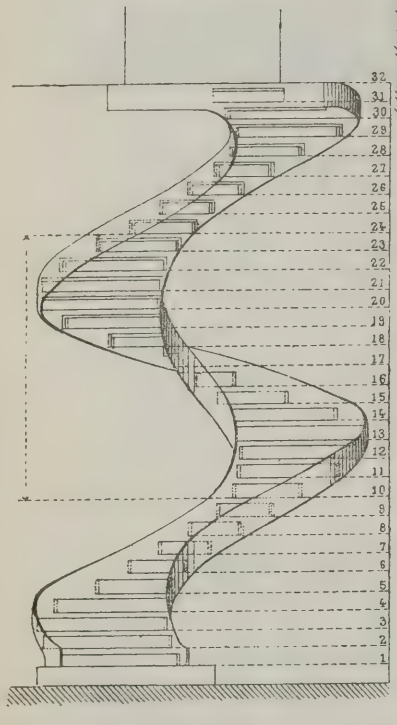


Fig 1

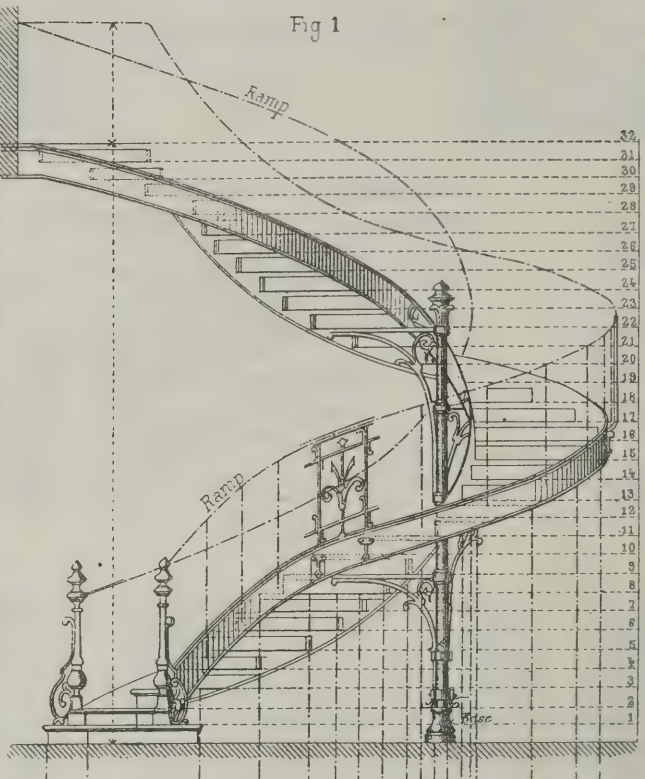


Fig 11

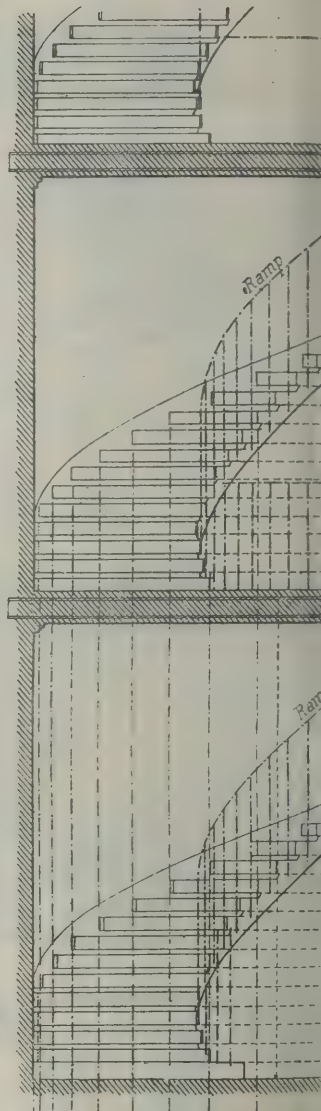


Fig 8

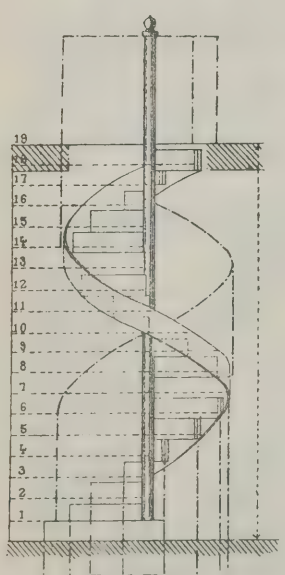


Fig 3 Plan

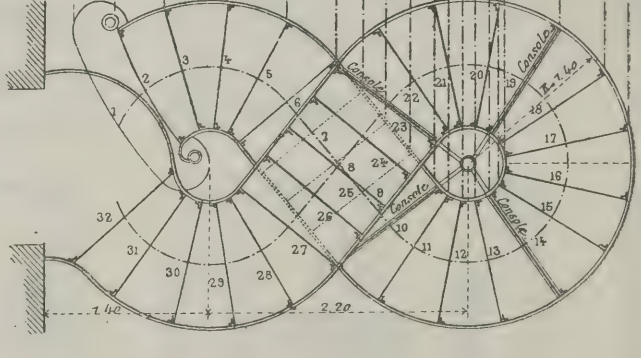


Fig 4

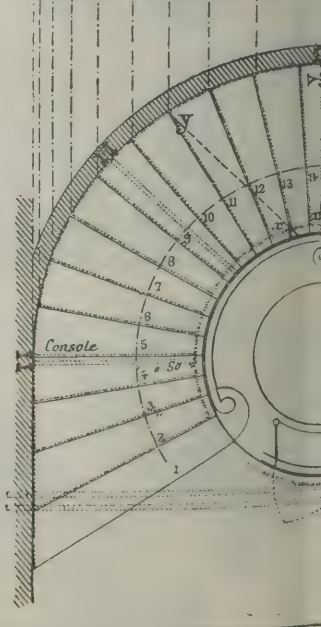


Fig 5

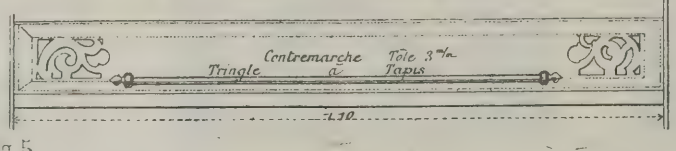


Fig 9 Plan

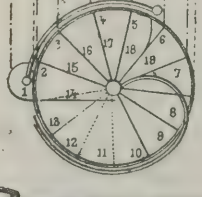


Fig 10

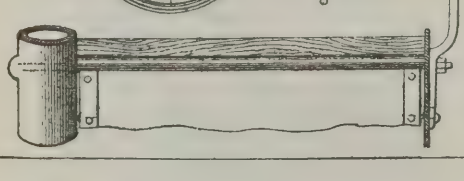


Fig 6

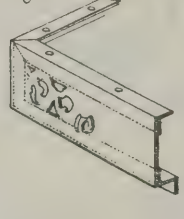
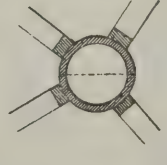


Fig 7



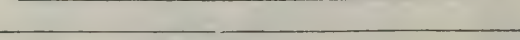
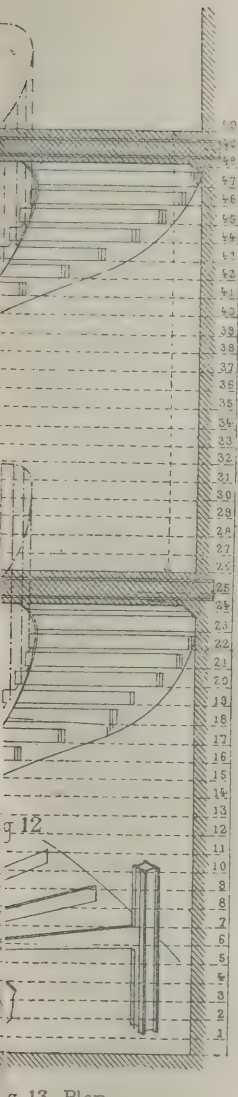
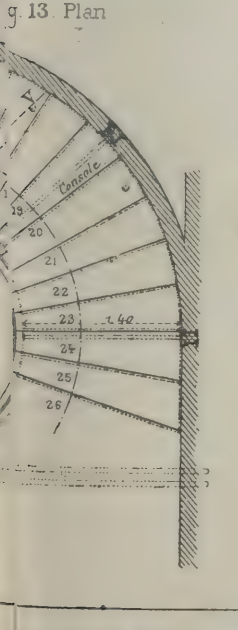


Fig. 14. Elevation



g. 12



g. 13. Plan

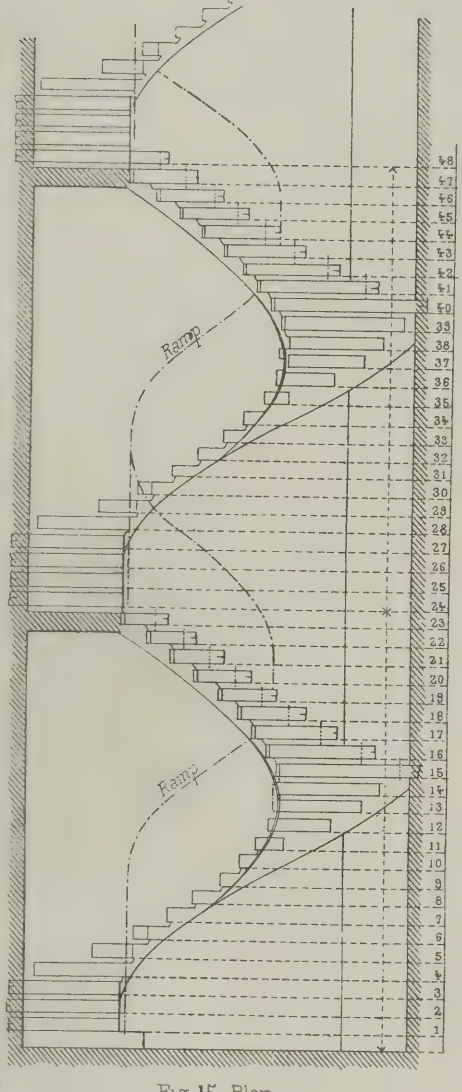


Fig 15 Plan.

Fig 17. Elevation.

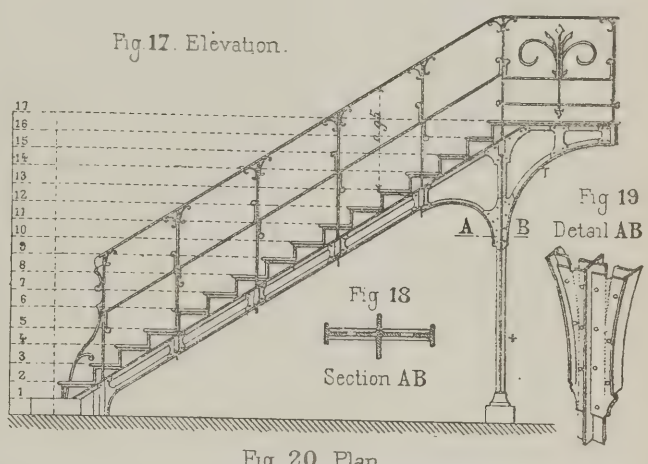
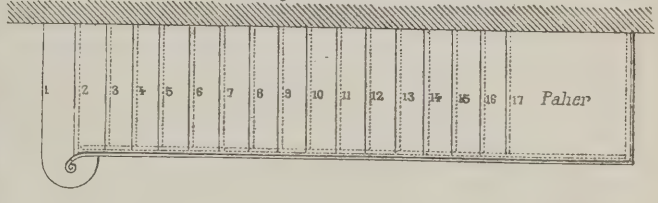


Fig 18

Section AB

Fig 19
Detail AB

Fig. 20 Plan



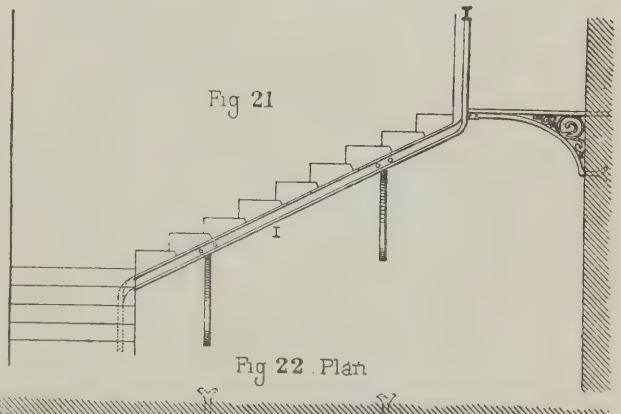


Fig 21

Fig 22 Plan

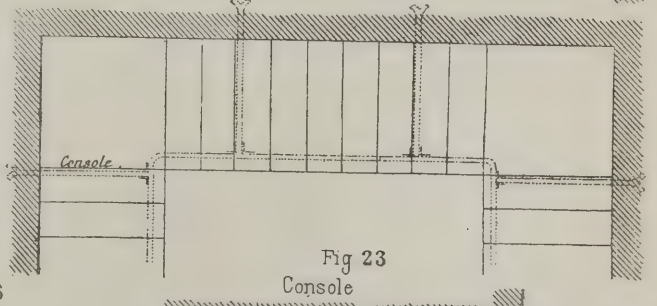
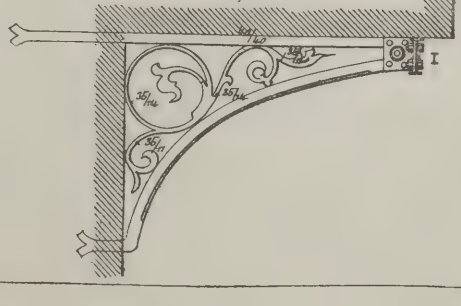


Fig 23
Console



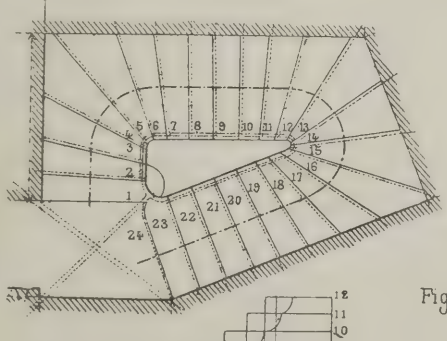
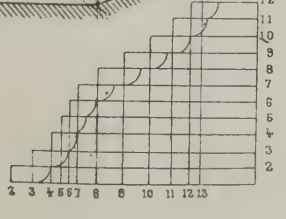


Fig 16



TWO VILLAS AT WESTCOMBE PARK FOR Mr DONNELLY. E. D. HOYLAND. ARCHt







Admodum Reverendis, Amplissimis, Clarissimisq Viris, Curatoribus ex Authoritate Senatus delegatis ad extruenda Quinquaginta illa Templa quæ Hortante et Auspicante ANNA felicis Piæq memoriæ Reginâ Londini instaurari cæperunt, Prospectum hunc Templi S.tæ Mariæ in Vico dicto The Strand.

Debito Obsequio D.D.

Jacobus Gibbs Architectus

Jo: Harris Sculpsit

S. MARY LE STRAND NOW BEING DISMANTLED.



GREAT CHALFIELD MANOR HOUSE.



"PHOTO-TINT," by James Akerman, 6 Queen Square London, W.C. LACOCK ABBEY CLOISTERS



STEEPLE ASHTON CHURCH.



GEORGE INN NORTON St PHILIP SOMERSET.



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

AN · ENTRANCE · GATEWAY AND BRIDGE · G · W · WARD · ARCHT.

CONTENTS.

e Building Handicrafts.—I. 495
ilding Law Administration 496
r Working Men and what They May do 497
ilding Materials.—IV. 497
n Staircases 500
nitary Congress at Bolton 501
sit of the Society of Architects to York 502
caustic Tiles 502
oks Received 503
rm-Water Conduits. 503
e Origin of Christian Church Architecture 503
tes on Etruscan Architecture 504
rniture Beads and Mouldings 505
yside Notes 506
r Lithographic Illustrations 527
mpetitions 528
hools of Art... 528
ilding Intelligence 529
chitectural and Archæological Societies 530
rrespondence 530
tercommunication 532
ir Office Table 533
ater Supply and Sanitary Matters 534
ctings for the Ensuing Week 534
nders 534

ILLUSTRATIONS.

CHITECTURAL PHOTOGRAPHS.—CHURCH OF ST. MARY-LE-STRAND.—TWO VILLAS AT WESTCOMBE PARK.—PLETE LODGE, DEVON.—AN ENTRANCE GATEWAY AND BRIDGE.—A SHEET OF OLD WALL TILES.

UR LITHOGRAPHIC ILLUSTRATIONS

AN EXHIBITION OF ARCHITECTURAL PHOTOGRAPHS.

)-DAY an exhibition opens at the Royal rchitectural Museum, Tufton-street, Westinster, of architectural photographs taken r the most part during the annual excursion the London Architectural Association last gust, by Mr. John L. Robinson, A.R.H.A., chitect, of Dublin, and we herewith produce ur of the series. The view of Great Chalfield nor is taken from the churchyard adjoining e front garden of the house. The gable to e fore part of the picture, with the beautiful micircular oriel bay window, has no buildings hind it. Our view (published August 19th th plans of the house) was taken from the ther side of the same front, and a reference ll enable the reader to realise very clearly w the gables and roof compose as a whole in mpany with the central structure which iginally formed the banqueting hall. eeple Aston Church, shown to the right to-day's lithographed "photo-tint," is imposing building, and the tower ds considerably to its importance. Mr. enry Clutton's new chancel no doubt is er-"spiked" with finials; but, nevertheless, is in scale with the church, and groups well th it in a general view. Photographs 21 and give the building from other points, and clude a general interior. We regret there is detail print of the figure wall corbels in the les; these, if crude, were eminently bold d telling. Modern carving generally fails the want of such qualities. In the north rch, which resembles the southern one, on a rble inscribed tablet over the doorway occurs unusual use of the Pauline injunction, b. xiii. v. 4, and is said to have been erected the admonition of a squire of former days the then rector. Lacock Abbey, as all dents of English architecture should know, a remarkable building—a mixture of nearly ry style, but devoid of all attempt at comition in its main outline—a mere medley of eral periods, and the result of none exactly particular. 61 shows the Jacobean tower the garden front, with its interesting details cially to lovers of what has been described the Free Classic style. The cloisters, which m three sides of a quadrangle in the centre the existing buildings, are herewith illustted, showing the florid and refined 15th-tury groining, with its numberless carved ses, most of which are coloured. The ernal treatment of the buttresses rising from tl weathering in a diagonally set pier and shing with the parapet, are eminently racteristic. Photo. 61 illustrates the quad. O last illustration shows a rear view of the George Inn, at Norton St. Philip, taken in the backyard, and giving the stair turret and cusped-headed original windows. A front view of the tavern appeared in our pages on August 19th last, with some notes on p. 280. In the exhibition of Mr. Robinson's photographs, other views appear, Nos. 4 and 5, the first of these being a most charming study, with an old waggon and horses in the foreground, making truly an artist's picture. Following now the order in which the prints are displayed, we note in Nos. 1 and 2 some good views of Bath Abbey, showing its oblong planned central tower, heavy angle turrets and lace-like open battlements. The peep over the river is an over-exposed plate—which is to be regretted, as Bath Abbey, whatever its faults in detail, groups strikingly well in the distance. No. 37, taken from the piazza of the grand Pump Room, is an exquisite view of the western façade. Wellow Church figures well in Nos. 7 and 8 of the large prints, the interior, illustrating the richly-carved beams of the nave roof, being particularly good. No. 44 is a view from the street, and the two following ones show the old house in the village where the party had tea, and saw the Jacobean panelling and chimney pieces, one of which is recorded in detail (46). Norton St. Philip Church and the Entrance Gateway to Corsham Court figure also on group No. 2. Corsham Church is admirably rendered, both inside and out, by quite a series of pictures, No. 9, giving Mr. G. E. Street's new tower and spire, being, perhaps, the best, and the Court House, the Mansion of Lord Methuen, furnishes a fine print, No. 12. Of the Hungerford almshouses, at Corsham, to which we already have directed attention, when giving a sketch of the roadside front in the BUILDING NEWS for Aug. 19th last, Mr. Robinson has prepared several "prospects," Nos. 54 to 59, including a luncheon group of the excursionists at the rear of the community hall. We consider the most successful and artistic photograph in the entire exhibition to be No. 19 giving the old bridge at Bradford-on-Avon. Nos. 17 and 18 are other views of the bridge, and the Saxon chapel comes out in No. 74, while the church in Nos. 75 and 76 is faithfully represented. The village scene in Steeple Aston round the Market Cross and lock-up house, with the gipsy carts and Methodist chapel behind the group, and the church tower in the distance, is an impromptu study of more than casual interest (No. 24). Cold Aston church figures on photo. 25, No. 26 giving the far-famed and rich wall pulpit from the same building. The delightful old Court House at the same place is well represented by the larger prints, 27 and 28, and No. 104 is a study of its entrance. St. Catherine's Manor well befits plate 29. The next group of photographs includes some valuable ones of Gloucester Cathedral, which Mr. Robinson took on his journey to Bath (Nos. 33, 34, 35, and 36), while group No. 9 represents others obtained after the excursion at Salisbury, Nos. 30, 31, and 32, with Lake House, near Salisbury, 111, and 105, 106, 107, and 108 giving other buildings in the city, with two views of Stonehenge, Nos. 112 and 113. Westwood Church, with its fine western tower and eastern chapel on the north side, is worthy of impressions Nos. 78, 79, and 80, and the great church of Winchester's Bishop at Edington is cleverly shown in photographs 85 to 91. "The discovery of the White Horse," at Westbury, "that phenomenon of Nature," as Mr. Robinson called it, is a character study on the Downs, showing how some people can disport themselves at the close of a hard day's work (No. 93). The tomb in Westbury Church and Hamswell Manor house, the home of Dick Whittington, the Lord Mayor, follow, and then come a good series from Marshfield, No. 85 to 103. The altar tomb to the "Saintly Murray," known as the "good," with his recumbent figure in fairly complete preservation, records to posterity an incident from the Marsh (No. 100). The almshouses and the "Catherine Wheel" are others from the same place. Nos. 114, the entrance to the Grand Pump Room Hotel, and 115, "The Adieux," also at Bath, conclude the series. The exhibition will close on October 7th, and is now open to the public free of charge.

ST. MARY-LE-STRAND, LONDON.

THIS well-known church is now under repair. The engraving reproduced illustrates the design as it left the hands of its architect, James Gibbs, the date assigned to the print by the authorities of the British Museum being 1717. It was probably published before the church was completed, because it shows the figure of Queen Anne over the portico, and the statues in the niches on the south front, neither of these details actually having been carried out, and omits the boundary railing, suggesting only a dwarf wall. The plate was issued possibly for the architect's patrons, and also for the use of the Commissioners, who built the church on land granted by Act of Parliament out of the coal and wine dues money, as one of the fifty churches then inaugurated in London. The plates in Gibbs's "Book of Architecture," published in 1727, a second edition of the same work appearing in 1739, are smaller than the view which we reproduce, and comprise six sheets, giving elevations and plans of the building, besides a general perspective view. This last is identical with that herewith, in so far as the fabric is concerned, but fresh figures are introduced, Jo. Harris in both cases being the engraver, though the other plates are the work of H. Hulfberg and E. Kirkall. Gibbs but very briefly describes this church, which he says was the first public building designed by him on his return from Italy in 1710, after a stay of ten years, and at which time he was 36 years of age. John Erskine, Earl of Mar, attracted by Gibbs's early promise when in Holland (during the years 1694 to 1700), gave him considerable favours, generously assisting the young Scotchman with money and recommendations, by which means he reached Rome, where the famous architect of the future studied under Garroli—a sculptor and architect of popularity and distinction. The time of the student's return was eminently propitious, and Lord Mar, as a favourite of the Queen and member of the Government, soon befriended him, by introducing the architect to the Commissioners already mentioned. King's College, Cambridge, was also one of his first undertakings, and St. Martin's-in-the-Fields speedily followed, the foundation-stone being laid in 1721. This church cost £32,000, and was built at the expense of the parish. The Commissioners, inspired by a desire to emulate the then known proposals of St. Martin's, spared no cost to beautify their neighbouring church of St. Mary's, and render the structure worthy of the prominent site granted by special Act for its erection. Gibbs made a more capacious design, with a square tower, and having a nave 67ft. long by 49ft. broad; but it was laid aside, he tells us, because its plan exceeded the dimensions of the ground allowed by Parliament. The present church has a nave 64ft. long by 38ft. wide, and beyond this is the apsidal-ended chancel. At first it was not intended to build a steeple to the church, "a small campanile or turret for a bell" being designed in its place over the west front. At a distance of 80ft. from this façade there was to have been a huge column 250ft. high (*i.e.*, 105ft. higher than the Nelson Column in Trafalgar Square) in honour of Queen Anne, and on the top of it was to be placed a statue of Her Majesty. Gibbs informs us that his design for this column had been approved by the Commissioners, and a great quantity of stone was brought to the place for laying the foundations; but the Queen died before the structure was advanced beyond this point, and flattery being no longer necessary the church had its steeple. When Gibbs received the order for this the walls of the church were 20ft. above the ground level. He found any alteration of the already too restricted plan of the church impossible from east to west, and so, in order to give bulk and importance to the elevation of his tower, he made it wider from north to south, which gives it an oblong plan with a measurement of only 14ft. from east to west. Had it not been for this incident the tower would have been square. "The church consists," writes Gibbs, "of two orders of architecture, in the upper of which the lights are placed; the wall of the lower, being solid to keep out the noises from the street, is adorned with niches." No statues, however, were placed in them, and a vase instead of the figure of the Queen crowns the circular porch at the western end. We are indebted for the loan of Harris's engraving to Mr. R. J. Withers, the architect who refitted the church and enlivened the interior with colour for the late Dr. Evans some ten years ago. Mr. Albert

Vickers is the architect now engaged in connection with the repair of the church, but no funds seem available for the purpose, and as yet there has not been a meeting of the parishioners to consider what is to be done. The Metropolitan Board of Works have obliged the churchwardens to dismantle the church. Mr. Wm. Butterfield and other authorities contend that it is not dangerous, but the architect in charge says that the building is seriously so. Tons of iron, it is affirmed, were built in the church by Gibbs, and, having rusted, the fabric is greatly shattered. The future alone can show what will be done with it.

VILLA AT WESTCOMBE PARK.

THE houses to which we give illustration to-day have, with several others, been recently erected on the above estate. They are built of red brick and Corsehill stone dressings up to the first floor, and above that are hung with Broseley tiles and rough cast. They are a marked improvement to the general run of houses on the estate. The grounds behind the houses fall 60ft. below the level of the road, and there is a good view across the river. They have been designed for Mr. Donnelly by Mr. E. Douglas-Hoyland, of 45, Fenchurch-street, and Mazehill, S.E.

LODGE AT FLETE, DEVON.

THIS drawing, from the Royal Academy Exhibition, represents a picturesque lodge, now in course of erection for Mr. H. B. Mildmay, in local walling stone and granite dressings, Mr. Pearse, of Modbury, being the builder, and Mr. John D. Sedding, F.R.I.B.A., the architect.

AN ENTRANCE GATEWAY AND BRIDGE.

THIS is a picturesque subject for architectural effect, and Mr. G. W. Ward, the architect, has not failed to seize the opportunity afforded him. His drawing was well hung in the Royal Academy Exhibition; but he has sent us no detailed particulars of his building by way of description.

A BOOK OF MEASURED DETAILS.

ONE of our lithographic illustrations to-day, representing some old mural tiles, is taken (by permission) from Mr. George Washington Browne's new book of architectural sketches, formed chiefly of the Pugin Studentship drawings with which he won that prize in 1878.* Though coming thus nearly ten years after the date of their award, Mr. Browne's drawings need no apology on this account, and many lovers of historical and architectural remains will be glad to obtain a copy of his very creditable studies and measured details. A goodly number of the subjects delineated in his volume are, as might be expected from an Edinburgh student, from Scotland, including St. Andrew's and Glasgow Cathedrals, Arbroath Abbey, with those of Melrose, Dryburgh, Dunfermline, Paisley, and Jedburgh, all of which abbeys are, more or less, represented; also a set of measured drawings is given of New Abbey, or Sweetheart, in Kirkcudbrightshire. The English specimens are varied by such as Ford's Hospital, Coventry, and Ockwells Manor at Bray, two familiar instances of half-timber work; Bishop Cantilupe's shrine at Hereford, from whence also are the Butcher's Hall and Aubrey's Almshouses; Salisbury, Shrewsbury, and Worcester are likewise represented, and the church of St. Mary, Felmersham, Beds, occupies several sheets with its pure and beautiful Early English architecture. The west front of this church is a singularly interesting composition, and the later rood screen with the loft over between the nave and the choir deserves notice for rich detail. The plates, of which there are 75, are folio in size, and all are well printed, the pencil studies being reproduced by the Litchdruck process, and the pen drawings by photo-lithography. From these remarks it will at once be gathered that Mr. Browne's collection is fairly well representative, and certainly the book deserves a place beside Mr. Galsworthy Davies's big volume of "Architectural Studies," the late Wm. Burges's truly practical folio of "Architectural Drawings," and the sketch-book of the Architectural Association. The sheet of encaustic tiles here reproduced includes examples from Tintern, Gloucester Cathedral, and St. Cross, near Winchester. These all have their designs executed in the common yellow on a red ground, and they are very varied in their patterns, which, for the most part, are spiritedly drawn. Passing over the ecclesiastical subjects, for lack of space to mention them at greater length now, we may in conclusion of this notice briefly refer to some of the drawings of Domestic work which enrich the pages of the book before us. Rowallan Castle, of which we recently gave some drawings (in the BUILDING NEWS for April 15, 1887), furnishes the first of these, giving a general sketch of the entrance, staircase, and towers, some details of a stone doorway in the courtyard, and a quaintly-framed old wooden door from the entrance hall, with shell panel above and moulded stiles and rails. In Mr. William Small's book on "Scottish Woodwork" similar joinery of this kind is represented, showing a type of detail in many respects peculiar to the North of the Tweed. Mr. Browne gives figured dimensions, which always enhance the value of a sketch, and his marginal sections are handy for reference. His drawings of the Porch at Benfleet, if we remember rightly, have appeared before in the A.A. Sketch-book. They are too mechanical to be artistic, and the same remark equally applies to the sheets of Ockwells Manor-house, near Bray, Berks, though the plan of the building is welcome, as also are the sections. The sketch of Grey Friars Hospital, Coventry, is truthful and spirited, drawn in pencil, like the studies of Falkland Palace, the ancient home of the Earls of Fife, with its great circular towers flanking the entrance to the courtyard. All that now remains is the south block, which seemingly was the work of either James III. or James IV. Glamis Castle is prettily sketched in plate 31, and is an eminently picturesque specimen of Scottish architecture. The scraps of wrought-iron work which figure on plate 42 give nothing very fresh or suggestive, but they serve to fill a sheet. Midmar Castle, Aberdeenshire, furnishes much that is of interest from an uncommonly quaint and massive building. Newark has been already mentioned. The front facing the river is a well-balanced composition replete with severity thoughtfully displayed. Paisley deserves a more thorough set of illustrations than are here given to it, but the church has been lately measured up by Mr. T. R. Kitswell, whose able drawings we hope before long to publish. Some old houses in the Abbey Precincts, Paisley, are typical specimens of Scotch work, and fill the following plate together with a Northumbrian stone house from Hexham. The Mediæval figure (taken apparently from Lonsdale and Tarver's book on "Costume") does not enhance the value of the elevations of the 15th-century house in Butcher's-row, Shrewsbury, drawn on plate 68, else the sheet is a model of neatness, while the details which follow are really useful "drafts." We can verify the accuracy of the sketch (75) of the Council Hall, Worcester; and with this illustration Mr. Browne's book closes, the subjects being topographically arranged. More studies like this of Domestic work less known to the ordinary student would have greatly added to the worth of this volume; while the plates devoted to Westminster Abbey, Salisbury, and other familiar works, already well illustrated, could easily have been spared to make room for such examples.

* Pugin Studentship Drawings. By GEO. WASHINGTON BROWNE, Architect. Edinburgh: David Douglas, 1887.

The schools attached to St. Mary's Roman Catholic Church, Formby, Lancashire, have recently been enlarged, and two additional classrooms have been built in the same style as the existing buildings. Crosby light pink bricks have been used for the general walling, with Edwards's Ruabon red and blue bricks in strings, arches, buttress, weatherings, &c. The interior is plastered throughout with a cemented dado. The roof principals are exposed, stained, and varnished. The work has been carried out by Mr. Edward Blackburn, builder, of King's-road, Bootle, from plans and under the superintendence of the architect, Mr. Frederick H. Peate, of Liverpool.

Works in connection with the sewering of Lymington were commenced on Monday, and are to be completed by June, 1888. They are being carried out for the town council from plans by Mr. James Lemon, M.I.C.E., of Southampton, at a cost of about £12,000. Mr. T. P. Hall, of Southsea, is the contractor.

COMPETITIONS.

KNARESBOROUGH. — The committee appointed to carry on the proposed improvements in the Castle yard and banks of Knaresborough have had seven designs and estimates of cost sent in, and recommended the adoption of one which it transpired was furnished by Mr. Hargreaves, of Abbey Plain, Knaresborough, and awarded him the first prize of £5. It has since been resolved to carry out the improvements as indicated on Mr. Hargreaves's plan, under his superintendence.

SCHOOLS OF ART.

LIVERPOOL.—The annual distribution of prizes and certificates gained last session by the students at the Liverpool Science and Art Classes took place on Friday evening in the Free Public Library. Mr. E. K. Muspratt, chairman of the classes, presided. The annual report stated that during the session teaching was conducted in evening classes in eleven schools in different parts of the city. In science there were 441 entries for study, 324 entries for the Government examinations, and 255 successes, the total percentage of successes being 78·7. In art there were 115 entries for study and 79 for examination. There were 34 successes, including 10 marked excellent, a decrease all round. The decrease in the number of students was due to the increase in the number of art schools in the city, and the decrease in successes was undoubtedly owing to the examinations being of a more stringent character than formerly. Mr. G. Fosbery Lister, engineer-in-chief to the Mersey Docks and Harbour Board, delivered an address, in which he dwelt on the importance and advantages of scientific education.

CHIPS.

There were 137 candidates for the appointment of borough surveyor for Tiverton, Devon, at a salary of £225 a year, with office, &c. Eight were invited to attend before the committee of selection and town council, and of these Mr. John Siddall, surveyor to the urban sanitary authority of Brownhills, Staffordshire, was appointed.

Long Melford Church, Suffolk, is the subject which will furnish a very complete monograph in illustration of Perpendicular architecture about to be published by Mr. E. Lauriston Conder, with an etching from the hand of Mr. J. D. Batten. There are to be 16 plates, the single-page sheets measuring 15in. by 10in., and all are photo-lithographed from the author's own pen-and-ink drawings. We have from time to time given illustrations of this well-known church, and shortly propose to give the new reredos lately erected under the direction of Mr. J. Medland, the architect, by Messrs. Farmer and Brindley.

Ystrad Jubilee Bridge, at Llanfair Caereinion, is now open for traffic. It is a substantial structure, and has been erected by Mr. James James, Cross-lane, under the supervision of Mr. W. N. Swetenham, county surveyor.

A fountain of Peterhead granite has just been completed by Messrs. John Fraser and Son, Aberdeen, to the order of Provost Donald, of Dunfermline, who has made a gift of it to that town. The fountain is square on plan, and stands on an octagon foundation of Aberdeen granite. There are four drinking basins, with smaller basins below. The upper part of finial consists of a bronze lion rampant, bearing in front a bronze shield with the Dunfermline arms. The entire height of the fountain is 17ft.

The Jubilee clock-tower at North Tawton, built from designs by Mr. R. Medley Fulford, F.S.A., of Exeter, was inaugurated on Friday. It stands in the centre of the town, opposite the Market, and is constructed of brick and stone. It rests on a granite foundation, and around the base there are seats, over which there is a tiled roof. Above is the clock-chamber, which has a steep tiled roof the whole surmounted by a vane and gilt crown. Mr. Ellis, of North Tawton, was the builder.

Memorial stones of new Primitive Methodist Sunday Schools at the rear of the chapel in George-street, Crewe, were laid on Monday week. The schools will accommodate 600 children, will be Gothic in style, and cost £2,000. Mr. T. M. Lockwood, of Chester, is the architect.

The free library at Newport, Mon., has just been enriched by the presentation of 1,000 volumes from the library of late Mr. J. Edward Lee, F.S.A. of Newport and Torquay, a well known archæologist. The gift comes from Mr. Lee's heir as a memorial.

Building Intelligence.

Bicton.—A new church at Bicton, near rewsbury, built from plans by Mr. Oswell, of latter town, at a cost of £3,400, was consecrated last week. The church is built to ommodate 250 persons, and is of the 14th-tury style. It consists of nave 54ft. by 21ft., th aisle 12ft. wide, and chancel 25ft. by t., vestry on north side of chancel 13ft. by t., and organ chamber, on south side, 14ft. 14ft. The building is altogether without stering, the walls inside being faced with d Hill stone in random courses, and relieved th dressings of Shelvoke stone, and the caps d shafts of the arcade are of Grinshill stone. nels in the east wall are formed of marble bs bearing the Lord's Prayer, the Ten Commndments, and the Creed. Messrs. J. and E. ad, of Plymouth, supplied the marble. Red d, stained and varnished, forms the seats of nave and aisle, the chancel stalls being of . The floor under the seats is of blocks of od in herring-bone pattern. Messrs. Carter, nson, and Co. supplied the encaustic tiles ich pave the floor of the chancel. At the th-east angle is a tower 75ft. high, with ner turret carrying a flagstaff. There are r bells—the one being from the old church, d two new ones, cast and hung by Messrs. n Warner and Sons, of Cripplegate. Messrs. es and Willis have carried out the lighting angements by brass hanging lamps and ckets, fitted with the Hesperus burners and inguishers. The lectern was made by Mr. omans, the foreman of the carpenters, and ssrs. J. and G. Groves, of Shrewsbury, were builders; Mr. H. L. Whittingham being rk of the works.

Birmingham.—The Highgate Branch of the mingham General Dispensary (the design which was selected in a limited competition) has been recently completed and opened the work of the charity. The materials d are red-pressed bricks, with Kenilworth ne dressings, and red tiles on the roofs. The lding consists of a large waiting-hall, with od block floor, to accommodate about 150 ients, with two consulting rooms, and dispensary in direct communication, an rating-room placed near by, and a resice for two doctors, with the usual outldings, &c. The waiting-hall is heated with h-pressure small-bore pipes by Mr. J. Jack, of Newcastle-under-Lyme, and ventilated the tower and ridge ventilators. The general tractors are Messrs. Horsley Brothers. The ole has been carried out from the designs under the direct superintendence of the hitects, Messrs. Dempster and Heaton, of svenor Chambers, Birmingham.

Dewsbury.—The eastern extension of the lish church will be reopened to-day (Friday), ring been completed by Messrs. J. and W. nland, of Bradford, from plans originally de by the late Mr. G. E. Street, and carried under the supervision of his son, Mr. A. E. eet, and Mr. A. H. Kirk, of Dewsbury, as ct architects. The extension, the cost of ich has been about £12,000, comprises ncel, north and south transepts, morning pel on the north of the chancel, organ mber on the south, clergy vestry, choristers' try, and porches. The nave, a structure uilt on 13th-century foundations in 1761, ains for the present untouched. The inor of the new chancel was illustrated in Building News for June 17th of the sent year from a drawing by Mr. A. E. eet, hung at the recent Academy Exhibition.

Glasgow.—At Friday's meeting of the sgow Dean of Guild Court, Lord Dean of ld Blackie submitted a summary of the r's transactions of the Court. During the lve months ending 31st August last the mber of linings granted was 238, being an ess of 38 beyond the previous year. The ess was wholly due to an increased number plicable to churches, halls, and schools, warcses, stores, &c., and to alterations and addics. Thirty-nine of the linings comprised 8 houses and 79 shops, as compared with 2 houses and 52 shops in the previous year. aggregate value of the property included he 238 linings was estimated at £424,730, as pared with £394,540 in the preceding year. On the other hand, dwelling-houses and shops had decreased from £208,050 in the preceding year to £174,450. Comparing the amount of business transacted in the Court five years ago, he said that in 1883 dwelling-houses figured to the amount of only £88,650, and had risen in 1887 to £174,450; warehouses, stores, and workshops, which in 1883 stood at £291,461, were in the past year registered at only £73,100. Churches, halls, and schools had during the same period risen from £35,500 to £63,200, and alterations and additions had decreased from £71,670 to £58,930. These figures did not seem to indicate any marked revival in the local building trades, but possibly, looking to the fact of the area of the municipality being a fixed quantity, and now presenting a comparatively limited space for the erection of new buildings, the figures he had quoted might be susceptible of a more encouraging interpretation than he had felt at liberty to put upon them. In the subsequent business before the Court, leave was granted to the governor of the Glasgow Technical College to erect new, and make alterations on existing, buildings in Cathedral and North Hanover streets.

Isleworth.—The Jubilee Hall proposed to be erected on the vacant piece of land at the back of the institute and public library in South-street, Isleworth, is to form an adjunct to the library. The ground floor is the institute proper, comprising large committee-room, to be also used for auctions, &c. (for which purpose a separate entrance has been provided), and smoking or games room communicating with the gentlemen's lavatory. Cloak-room accommodation for the separate sexes of both performers and audience are also provided on this floor. The public hall is situate on the first floor, and will seat about 400 persons, and is designed to serve the purpose of small theatrical entertainments as well as concerts, &c. The arched ribs, besides their important functions, are part of the roof construction, serve to break up the monotony of a plane ceiling, and also prevent an echo which generally results from plain boarded ceilings. The hall is to be warmed by means of Shorland's patent Manchester grates, which form the fireplaces for the rooms below, and also warm the fresh air before delivery into hall. The exits and entrances are all excellently placed, giving three independent exits, all opening independently to the streets, so that the building could be speedily vacated on a possible alarm of fire. The stairs are proposed to be of clean pitch-pine as being better adapted to withstand wear, and also safer in case of fire, than stone stairs. A fire hydrant is provided outside the building. The lowest tender was £2,353; but this amount being considered more than is likely to be subscribed at present, the committee are considering the advisability of reducing the cost. Mr. Stephen Woodbridge, jun., of 210, High-street, Brentford, is the architect for the new building.

Liverpool.—The Hahnemann Hospital in Hope-street, erected at the cost of Mr. H. Tate, was formally opened on Friday. Messrs. F. and G. Holme, of Crosshall-street, Liverpool, are the architects of the hospital, which cost £13,000, and accommodates 50 beds at present, but is capable of being enlarged on the south and west sides. The basement is arranged as a dispensary. The wards have a southern aspect. The male and female wards on the first and second floors are 69ft. by 24ft., and have each a convalescent room at the east end, with a bay window. A smaller ward is provided on the first floor, and two isolated infectious wards are on the second floor. There are also separation wards and five private wards, with convalescent rooms on the third floor. Service rooms are placed next the wards, and nurses' rooms, with inspection openings commanding all the beds. The latrines and bathrooms are cut off from wards by an air space and double doors; they have a separate system of warming and ventilation; are lined throughout with glazed tiles, and have polished cement floors. Nurses' bedrooms and dining-rooms, an operating room, and servants' bedrooms occupy the remainder of the upper floor. On the ground floor are the kitchens, sculleries, larders, stores, servants' hall, pantry, and service room. The boardroom, boys' room, and entrance hall are to the front. The house surgeon's rooms, matron's rooms, are located in the north wing. The exterior of the main front is faced with red Ruabon brick, with white stone from the Storeton quarries for dressings, and ridges, hips, and finials of terracotta. The soil drain pipes will be flushed out by means of a large self-flushing tank (Messrs. Doulton's, of London, patent) placed at a point where the soil pipes from closets join the drain. The ventilation and warming are arranged on the "self-acting suction power" principle. The contractors-in-chief are Messrs. Holme and Green, Benson-street, Liverpool. The other contractors included: American elevator, as patients' lift, the American Elevator Company, London; dinner and coal lifts, Messrs. Waygood and Co.; sanitary goods, Messrs. Doulton and Co., Soho-street, and London; terracotta, J. C. Edwards, Ruabon; ventilation, the Æolus Waterspray Company, London.—St. Mary's Church for the Blind, in Hardman-street, will be reopened on Sunday after redecoration. The first improvement which has been made is the new chancel. Formerly there was a three-light window occupied by one figure of the Saviour. This figure has been retained, and instead of the solid ceiling which covered in the sanctuary there are now three large panels of stained glass. The decorations include three zones, the first of which is a richly-coloured cornice, terminated by a course of white mouldings, which separate it from the middle, consisting of painted and panelled walls of deep gold colour and rich red—the gold-coloured panels being draped with floriated crosses and relieved with gold. Below this comes the final division, consisting of a dado of fine marbles, the dividing lines of which are of Turchino, a deep blue-grey marble coming from the Pyrenees. Between these grey boundaries are panels of Mexican onyx. The base of the dado is of Rosso variato, from Greece. In the centre of the chancel are three panels of Venetian mosaic on gold grounds, setting forth the Annunciation of the Virgin, and these are surrounded by a framework of Mexican onyx. The pavement of the chancel is fully in keeping with the other parts. On the right are sedilia of severely Classic form, and in alabaster slightly relieved with gold, and on the opposite side is an alabaster credence. The whole of these decorations have been carried out by Messrs. George Trollope and Sons, from the designs and under the superintendence of Mr. G. T. Robinson, their art director.

London, W.C.—A new residential college and school building at the Middlesex Hospital have been erected, having a front in Cleveland-street and at the rear of the hospital. The garden frontage, which forms the principal elevation, consists of a red brick building, six stories in height, and relieved by bay windows, constructed of buff-coloured terracotta. The style of architecture is an adaptation of Late Elizabethan, with Classic mouldings. The College will accommodate thirty students, each of whom has a separate apartment. In addition, there are on the ground floor a dining hall, a common reading room, and a study. The sanitary arrangements are all contained in a tower running the whole height of the building, separated from the main block by a passage freely ventilated on either side. Adjoining the College an addition has been made to the medical school buildings. The new building consists of four stories. In the basement are a large luncheon room and excellent lavatories; on the ground floor are students' reading room, lecture theatre, dean's room, and cloak room. On the first floor is the library, which occupies nearly the entire area of the building, and above this the upper floor is devoted to a laboratory and class room. The whole of these buildings have been erected by Messrs. Holland and Hannen, from designs prepared by Mr. Keith D. Young, architect to the hospital.

Moffat.—The new parish church of Moffat was opened on Friday last. It is in the Early English style, and is of red sandstone from Corncockle, near Lockerbie. It occupies a site to the south-east of the old church. The internal roof is waggon-shaped. The principal external feature is a western tower, about 22ft. square, rising to a height of 90ft., and having broad buttresses on each angle. The church is seated for about 1,150 persons. Behind the church are a hall, accommodating 350 persons, sessions house, and offices, and near by is a new manse, built in the Domestic Gothic style. The

works have been carried out from the plans of Mr. John Starforth, architect, Edinburgh. The total cost has been between £13,000 and £14,000.

CHIPS.

A Jubilee fountain in the churchyard of St. Giles's, Cripplegate, was unveiled last week. It is built to represent Old Cripplegate, and the materials employed are grey and red Aberdeen granite, with Kentish rag buttresses and a frontage of Portland stone. On the face of the fountain is a bronze medallion representation of Her Majesty, executed by Mr. Adams, of Chelsea. Messrs. Woodthorpe and Hammond, of Coleman-street-buildings, were the architects, and Messrs. Dove the builders.

A new organ built by Messrs. Brindley and Foster, of Sheffield, was inaugurated in South Leith parish church on Friday. It cost, with structural alterations to fabric, about £1,000, is built on the pneumatic tubular principle, and is contained in a pitch-pine case, with decorated pipes.

The Home Secretary has appointed Mr. D. Cubitt Nicholls and Mr. Shirley F. Murphy to hold an inquiry into the sanitary condition of Bethnal-green. The inquiry is the result of an appeal from the Mansion House Council on the dwellings of the people.

The large window in the south transept of Hereford Cathedral is about to be filled with stained glass as a memorial to the late Lord Saye and Sele, for many years archdeacon of Hereford.

A new bridge has been constructed on the main road near Holmsley Station, in the New Forest, in place of one destroyed by floods in December. The structure has been erected at a cost of £350 by the county. Mr. Pickthall, of Southampton, was the architect.

Extensive additions are about to be made at the General Post Office, Small-street, Bristol. The buildings, when completed, will be more than double the present area. The new front will be similar to the present one, but the dressings will be executed in Portland instead of Bath stone. The Board of Works have accepted the tender of Mr. A. J. Beaven, of Bedminster, although not the lowest by some £500 or £600. The work will be commenced immediately, and will take two years to complete.

A stately throne, designed for the nave, and presented to Lichfield Cathedral by the clergy of Derbyshire as a parting gift to the diocese and the Bishop on leaving his lordship's jurisdiction, has been formally handed over to the Dean and Chapter.

The Ministère des Beaux Arts has appropriated 100,000f. for the further restoration of the Church of St. Pierre at Caen, and the municipal authorities of Caen have also voted 108,000f. for the same purpose. Since the partial destruction of the Palais de Justice, Paris, in 1871, more than 80,000f. have been expended on works that conflagration rendered necessary at the Sainte Chapelle, adjoining the Palais. A grant of 50,000f., to be expended in 1888, will complete the work.

The restoration of the magnificent 15th-century reredos in Winchester Cathedral is making good progress from Mr. J. D. Sedding's plans. The repairs to the stonework in the central portion are now complete, but the vacant niches have yet to be filled with statues. The restoration of the north and south wings has just been commenced, Mr. Hodges being the mason and Mr. Whitley the carver intrusted with these sections of the work.

On Wednesday week Mr. J. T. Harrison, on behalf of the Local Government Board, conducted an inquiry at Wednesbury as to an application by the Corporation for permission to borrow £10,000 additional in respect of the sewerage undertaking, and £2,500 additional for the public park, raising the expenditure for the latter to £7,500, and that for the former to £45,000. It was understood that a favourable report would be forwarded to the Local Government Board.

Mrs. Gibbs, of Tyntesfield, who died on Thursday night, aged 68 years, was, with her late husband, the munificent founder of Keble College, its Chapel and Library, Oxford, erected from Mr. William Butterfield's designs in 1873-9, of a church and rectory at Exeter, built at a cost of £30,000, and of many other ornate buildings.

The town commissioners of Leek considered last week a letter received from Messrs. Sugden and Son, of that town, calling attention to the dangerous condition of the approaches to the large room at the town hall. The stage staircase was said to be worse than that from the gallery at Exeter Theatre, consisting of 31 steps in one continuous flight and without a landing. The commissioners have referred the letter to a committee.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.—The members of the north-western district of this association, which covers Lancashire and Cheshire, and has its headquarters in Liverpool, paid a visit to Bolton on Saturday. The party, including representatives from Liverpool, Birkenhead, Wallasey, Wirral, Great Crosby, Blackpool, Swinton, Pendlebury, Hyde, Openshaw, Barton-upon-Irwell, and Newton Heath, drove to the School Hill Yard, where the disinfecting operations by means of Lyon's steam disinfector, were inspected. From here the company proceeded to the Burnden and Hacken Sewage Works, where Mr. J. Stewart, the superintendent, explained the *modus operandi* in detail. Next the Borough Hospital, for the treatment of infectious diseases, was visited, and subsequently the party drove to the Wellington yard depôt of the Corporation, a visit also being paid to the Healtheries Exhibition in connection with the Sanitary Congress.

CHIPS.

At the quarterly court of the Worshipful Company of Plumbers, Mr. F. Machin was elected Master, in succession to Alderman Stuart Knill. Mr. W. H. Bishop was elected Prime Warden, and Mr. C. Hudson, Renter Warden.

A pair of silver candlesticks have been placed on the altar at Salisbury Cathedral. Each candlestick is 32in. high, with a diameter at the base of 10in., and stands upon three lions. The lower part is moulded to one-fourth of the entire height, when it takes a hexagonal form, each face of the hexagon forming a canopied niche—the niches being filled with small figures of twelve angels bearing lettered scrolls. The shaft terminates in a corona ornamented with leaves and scroll work. The candlesticks have lengthy inscriptions in Latin, on the bases, and have been made by Messrs. Singer and Sons, of Frome, from designs approved by Mr. A. W. Blomfield, M.A. We illustrated them in our issue of the 12th ult.

On Saturday, the 24th inst., the foundation stone of a new Wesleyan chapel at Riggfoot, Tindal Spelter Works, Cumberland, were laid. The plan has been prepared by Mr. Wm. Marshall, architect, Naworth, Brampton. The building is 60ft. by 30ft., and has a vestry and entrance porch. It is Early English in character, and is built with stone from local quarries, and lined with bricks, and with cavity between. All the fittings are to be made of pitch pine, and accommodation made for 250. The total cost of the building is to be £500.

The wood block flooring at the Bradford General Post-Office, which we illustrated last week, was executed by Messrs. M. C. Duffy and Son, Limited.

Mr. H. Bassant, parquet floor manufacturer, has removed from Wells-mews, Oxford-street, to new and commodious premises at 89, Charlotte-street, Fitzroy-square, where, in the course of a few days, a show room will be open for the inspection by architects and others of all the latest designs in parquet and other flooring.

The Arts Committee of the Liverpool Corporation have selected and recommended for purchase for the permanent collection at the Walker Art Gallery the picture called "An Encore Too Much," painted by Francis Barraud, No. 1122 in the current Autumn Exhibition. The picture, which is of cabinet size, represents the greenroom of a circus tent, where a little acrobat has fainted through overtasking his strength in response to an encore. The clown, another performer, and a young girl attired for the arena, are trying to revive him.

The foundation stone of the Municipal Buildings at Sunderland was laid yesterday (Thursday). The buildings are being erected in Fawcett-street from designs by Mr. Brightwen Binyon, F.S.A., of Ipswich, selected in competition.

The rebuilding of the London and North Western Company's station at Dewsbury has been commenced this week. The contract has been taken at about £20,000 by Mr. Nowell, builder, of Preston.

Mr. George Cunliffe, architect, of Bolton, died on Sunday at his residence, Arnside, near Bolton, at the age of 51 years. The deceased gentleman, who had retired from his profession for about six years through paralysis, was the designer of some important buildings in Bolton, including Mawdsley-street Chapel, Trinity Church Schools, the Mechanics' Institute, Manchester and Salford Branch Bank, Victoria Chapel, and numerous mills and residences.

A row of almshouses are about to be built at Arundel from designs by Mr. E. Watkins, of New Bridge-street, E.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions our correspondents. All communications should drawn up as briefly as possible, as there are ma claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and communications respecting illustrations or literary matt should be addressed to the EDITOR of the BUILDI NEWS, 332, STRAND, W.C., and not to members of t staff by name. Delay is not unfrequently otherwi caused. All Drawings and other communications sent at contributors' risks, and the Editor will n undertake to pay for, or be liable for, unsought contrib tions.

Cheques and Post-office Orders to be made payable J. PASSMORE EDWARDS.

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The charge for advertisements for "Situations Vacant or "Situations Wanted" is ONE SHILLING for TWENT FOUR WORDS, and Sixpence for every eight words aft *All Situation Advertisements must be prepaid.*

Advertisements for the current week must reach t office not later than 3 p.m. on Thursday. Front pa advertisements and alterations in serial advertisemen must reach the office by Tuesday Morning to secure ins tion.

NOTICE.

Bound volumes should be ordered early (price Twel Shillings each), as only a limited number are do up. A few bound volumes of Vols. XXXIX., X XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLI L., and LI. may still be had, price Twelve Shillings; the other bound volumes are out of print. Most of t back numbers of former volumes are, however, to had singly. Subscribers requiring any back numbe to complete volume just ended should order at once, many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. eac Reading cases 2s. each.

RECEIVED.—J. L. H.—C. B.—B. B.—R. R.—A. C. Co. B. T. and B. Co.—H. U.—A. B. P.—V. Bros.—H. and —J. K. and Co.—Rev. G. R. H.—H. and T.—A. and Co.

LEARNER, Bengal. (We have sent your communicatio *re* Campin's "Materials and Construction," to M Campin, and he writes:—"I am sorry your corr spondent has been troubled by the typographical ina curacies in my work. I was under the impressi that all these had been corrected in the seco edition. In the example cited, $M = 2M'' = \frac{s.b.}{6}$ $= \frac{4 \times 11 \times 8 \times 8}{6} = 469$in.-tons. The area of triang $a\,o\,c = \frac{s.d}{4}$; its mean leverage about the neutral ax $= \frac{2}{3}\left(\frac{d}{2}\right) = \frac{d}{3}$; then the strength varying directly the breadth (b) the moment of resistance of half t beam $= b \times \frac{s\,d}{4} \times \frac{d}{3} = \frac{s.b.d^3}{12}$; and of the whole bea the moment of resistance is equal to twice this, $\frac{s\,b\,d^2}{6}$. There is no need to reproduce the figure, as yo correspondent has it in my book. I hope your corr spondent will not be perplexed with further errors.")

Correspondence.

THE A.A. DECORATION AND ORNAMEN CLASS.

To the Editor of the BUILDING NEWS.

SIR,—Will you kindly allow us to call atte tion through your journal to the *elementa* class for the study of decoration and ornamen which will be commenced this session und the guidance of Mr. Cole A. Adams? The fir meeting will be held at No. 9, Conduit-stree on Thursday, October 13, at 6.30 p.m., wh the course of study to be pursued will be e plained. Students wishing to join should se in their names at once to the secretary, M Walter H. Hewish, 14, Holden-terrace, Gro venor Gardens, S.W. The fees and rules w

similar to the other elementary classes.—
e are, &c.,
THOS. EDWARD PRYCE }
FREDERIC R. FARROW } Hon. Secs.
Architectural Association, 9, Conduit-street,

[The response ought to be a hearty one. No
tter teacher could be found, and students
ould not miss the opportunity.—ED. "B.N."]

ATER CONSUMERS TAKE NOTICE!

SIR,—Will you kindly oblige this council by
ving publicity, through your widely-read
lumns, to the fact that during the recent
ssion one very useful little Bill has been
ccessfully pushed through the needful
rliamentary forms and became an Act in
ly last? It is entitled, "An Act to limit the
wers of the water companies to cut off the
nants' water supply where the rate is paid by
e landlord." The Bill was introduced by Mr.
rrest Fulton, and to that gentleman great
edit is due for the tact and perseverance with
hich it was pressed through the various stages.
ie practical effect of this piece of legislation,
hich cannot be too widely made known, is
at it restrains the water companies from
tting off any water supply where the owner
d not the occupier is liable for the rate, and
here a dispute may have arisen as to the pay-
ent of the rate. It further enforces a penalty
£5 per day upon any company until such
pplies shall have been restored.
While writing permit me to add that, in view
the serious scarlet-fever epidemic, the council
ve prepared a small leaflet to parents as to
at to do when children are first attacked.
ese leaflets, by the kind permission of the
airman of the School Board, we are circu-
ing throughout the metropolis. Anyone
shing to have copies may have them free by
iting to this office.—I am, &c.,
JOHN HAMER, Hon. sec.
ie Mansion House Council on the Dwellings
of the People, 31, Imperial-buildings, Lud-
gate-circus, E.C., Sept. 28.

MASONS' FOREMEN.

SIR,—"Banker Hand's" letter in this week's
ue opens an interesting and, so far as I am
are of up to now, the quite unanswered
estion—How is it that builders' foremen are
rly always carpenters and joiners by trade?
It is quite the exception to the rule to find a
neral foreman who is by trade a mason.
iting with some experience as a general
eman (it so happens that by trade I am
ther a mason nor carpenter, so I speak with-
t prejudice), I endorse the well-known
tement that nearly all the best foremen in
e country were brought up at the bench.
I certainly cannot agree with "Banker
nd's" remark that, in an ordinary mason's
p there are always one or two men capable
discharging a foreman's duty. Quite on
e contrary, my experience is that the average
intelligence amongst banker-masons is ex-
dingly low in comparison to that of joiners,
d that where one joiner in twenty perhaps is
pable of setting out a mason's job for him,
re is not one mason in five hundred suffi-
ntly well-informed to give a carpenter prac-
tal instructions about his particular work.
Further, there are few masons who can set
a plain bit of tracery even; until his job is
rked out for him, a working mason is as
lpless as a child.
The incapability to grasp a job from begin-
ng to end, so lamentably general amongst
rkers in stone, has certainly no parallel
aongst joiners, and hence I conclude, as I
gan, by asking, How is it that, although
asons and joiners work side by side, the latter
ssess so much more intelligence than the
rmer?—I am, &c., GENERAL FOREMAN.

EXETER THEATRE FIRE.

IR,—I feel it necessary to reiterate briefly,
t if a theatre, concert hall, or any structure
is required to be made really fireproof, and if
th additional reasonable cost and the time is
allowed, all of a theatre, except, perhaps, the
stage—of which I will not be so sure, as I have
not been behind the scenes to know the re-
quirements—but the roof, all permanent floor-
ing, ceilings, staircases, dadoes, partitions, doors,
window frames, columns, girders, arches, &c.,
can and should be made fireproof, the iron
being protected by incombustible materials
where necessary. But to do all this effectually
requires more time than is generally allowed,
for such work cannot be rushed up, as such
buildings usually are, so it seems to resolve
itself to this: lack of time and money have pre-
vented the architects and builders doing their
duties so well; and this the public should
know, and relieve the former from some of the
blame cast upon them.
I consider stud lath and plaster walls or
partitions should not be used in any building
to be fireproof, and avoided much as possible
in all permanent structures for there being
but little connection or tie to the walls, in a
fire they become dangerous and leave a mere
shell of outer walls; whilst, if a brick-thick
wall, or half-brick only, on an iron girder, if
need be, properly protected from action of fire,
and iron hoop bond in the wall properly
hooked, it ties all well together, for it is well-
known, by firemen especially, many lives are
lost through walls falling into the street,
which can in future be prevented if required.
Notwithstanding much that has been urged
of late, I saw about a score bundles of laths in
the entrance hall of a theatre where work
was going on in England, and since the terrible
Opera Comique fire took place in Paris, which
alone should be a caution against using fir lath
on wood studs and ceiling joists, or at all
whilst there are iron laths. I have read of a
new American sheathing substitute, I suppose of
iron.—I am, &c.,
Broxbourne, Sept. 28. JAS. PULHAM.

FIRE!

SIR,—The utter destruction of buildings by
fire is so common, in spite of energetic effort
and best appliances, that we are in danger of
an optimist persuasion that the evil is irreme-
diable and cease attempting anything further.
But it seems to me there are clearly one or two
directions in which experiment should be made.
In the first place, to greatly increase the
volume and power of the water discharged.
The present small nozzle to hose is utterly in-
effective. The thin stream of water flowing
therefrom "playing" (rightly so-called) on the
devouring element has no power to strike the
surfaces ignited, for it is at once evaporated by
the great heat, and possibly decomposed, so that
its oxygen feeds the flames. It strikes me that
the stream should be (to be useful) four times
as great, and that the nozzle, hose, and engines
must be increased in size proportionately; of
course, there would be more difficulty in
managing such, but this must be got over.
Manifestly, there is no use in going on as now;
every day we see the utter inefficiency of the
means at present used. The fire is never "got
under" until it has "burnt itself out."
Another and even more important improve-
ment it seems to me would be to stifle the fire at
its first outbreak by using in solution anti-
igneous salts. I would propose to carry on the
engine, or in an attendant cart, a strong solu-
tion of common salt or soda—tungstate of soda,
perhaps—to mix with the water used. A dis-
charge of this for a few minutes might prove
fully effective, and for one pound thus spent
five hundred be saved. Such things would be
worthy of trial; something surely can be done.
—I am, &c., M.

SHORT LENGTHS OF PAPERHANGINGS.

SIR,—Some time ago I had some rooms
papered. The walls were measured and an
order for the quantity required sent to a maker.
As it did not cover the walls, I was certain that
there were not a dozen yards to the piece, and
wrote to that effect to the maker. I give his
reply as copied from his letter. I always under-
stood that paper was sold by pieces of a dozen
yards each, and I ordered accordingly, as
probably most people would do.
"SIR,—I notice your remarks about the pieces
of flocks not being 12 yards long. There is not
a maker in the three kingdoms who makes
paperhangings 12 yards. I have been in the
trade 18 years, and from that time to now have
never bought one piece 12 yards, and during
the 18 years I have not measured more than
four pieces. For this reason I do not sell them
by the dozen, but by the piece, and each piece
measures 11¼ yards. American lengths are
only eight yards; French lengths are also eight
yards.—Yours truly, ——."
Is this the usual custom in the trade?—I
am, &c., A HOUSEKEEPER.
Manchester, Sept. 26th.

CHIPS.

A system of sea-water supply for road-watering purposes has lately been completed by the Littlehampton local board, at a cost of about £850 from plans prepared by their surveyor, Mr. H. Howard. The contractor for the works was Mr. W. H. Dearle, of Chichester.

The foundation stones of the new Wesleyan chapel at Farndon, near Newark-upon-Trent, were laid on the 15th inst. The building, which will be of red brick, with terra-cotta facings, will accommodate 150 worshippers. The style will be Queen Anne modernised, and the chapel will cost about £300. Mr. Basil E. Baily, of Newark-upon-Trent, is the architect, and Mr. Crossland, of the same town, is the contractor.

A new lodge is about to be built at the entrance to the Bury St. Edmunds Grammar School for the governors. Mr. Frank Whitmore, of Chelmsford, is the architect.

The committee of the Greenock Police Board appointed on officials' salaries have recommended that the salary of the master of works be reduced £100 per annum; that of his assistant £30; and the assessor in the Dean of Guild Court by £55 per annum.

Sir W. Vernon Guise, Bart., who died on Saturday at the age of 71, was one of the first supporters and afterwards served as president and permanent vice-president of the Bristol and Gloucester Archæological Society, and took an active interest in antiquarian and geological pursuits.

A new organ was used for the first time at Tewkesbury Abbey on Monday at the choir festival. The instrument has been recently removed from the Liverpool Exhibition, and presented to the Abbey by the Rev. C. W. Grove, of Tewkesbury. It is termed the "Model Organ," and is an attempt to place in the hands of the player a grand and complete organ reduced to the smallest possible dimensions as regards the number of its slides.

The completion of the western towers of the new nave of Bristol Cathedral will be celebrated in March next by special services for which arrangements are being made. It will mark the realisation of Mr. G. E. Street's entire scheme.

An inquiry was held on Tuesday week at Shoreham, Kent, by Mr. Arnold Taylor, in reference to an application by the Sevenoaks Rural Sanitary Authority for sanction to borrow £1,200 for sewage works in that village.

During the present week M. de Hérédia, Minister of Public Works in France, has been busily occupied, in company with M. Lux, Director-General of the Railways of France; M. Guillain, Director-General of Harbours, Mines, Canals, and Roads, and other officials, in inspecting various engineering works in this country. The programme for the first day, Tuesday, comprised visits to the Metropolitan and District Railways, the Royal Albert Docks, and the Tilbury Docks. On Wednesday they visited the Mersey Tunnel and Liverpool Docks, and in the afternoon proceeded to Edinburgh. They will remain in Scotland till Sunday, visiting the principal docks and harbours at Leith, Glasgow, Greenock, and elsewhere, and return to London on Thursday in next week.

A technical lending and reference library will be opened at Carpenter's Hall, London Wall, on Monday next.

The death is announced from Cheltenham, at the age of 62 years, of the Rev. W. S. Symonds, of Pendock, a well-known archæologist and geologist. He had frequently contributed papers on geological subjects to the British Association, and was the author of many topographical works relating to the district of the Malverns.

Professor Schliemann has received permission from the Greek Government to search for antiquities on the Isle of Kyrita.

Earl Percy laid the dedication stone of the new church of St. John the Baptist at Lower Caversham, near Reading, on Saturday last.

Her Majesty has granted a civil list pension of £130 per annum to Sir John Steell, R.S.A., in recognition of his eminence as a sculptor.

The new Macfarlane Museum, at Bridge-of-Allan, was formally opened on Monday. The building is in the Early French Gothic style of the 13th century. The large hall is about 90ft. by 50ft., with a gallery round three sides. Off this hall is a room, about 40ft. by 30ft., divided from the hall by an arcade.

Intercommunication.

QUESTIONS.

[9413.]—**Concrete Floors.** — Can anyone kindly inform me what thickness of cement concrete, and what foundation would be required for it, to carry rully traffic three tons each ?—ENQUIRER.

[9414.]—**Bird's-eye Perspective.** — Would any reader kindly give full instructions for drawing bird's-eye view perspectives ? Am at home with other perspectives. —TOPSMAN.

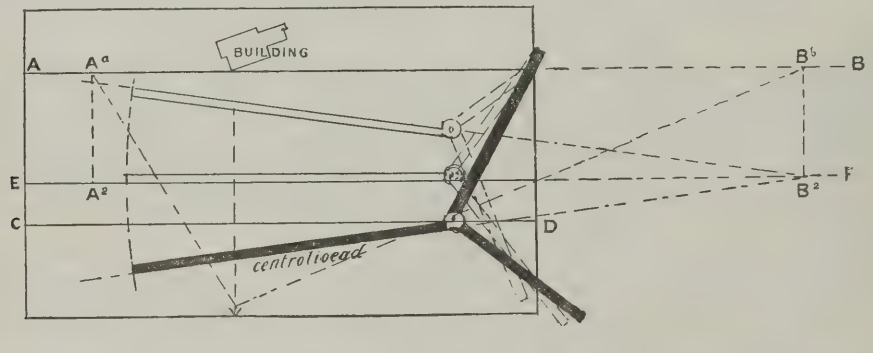
[9415.]—**Mun. and San. Engineers' Exam.**— I should be glad if any reader will oblige me with a list of the best books for passing the above examination.— ÆOLUS.

[9416.]—**Steam Ovens.** — I have surplus steam power, in a large establishment. How can I employ it for bread-baking in existing ovens? It is required to do away with as many separate fires as possible.— F. G. E.

[9417.] — **Book-Keeping.** — Would some reader kindly say whether there is a good work published on book-keeping for builders ? If so, by whom ? I understand that the one by Bevis, reviewed in the "B. N." a few years since, is out of print.—BUILDER.

REPLIES.

[9390.]—**Perspective.** — There is a complicated method of setting the centrolinead in several books on the subject, but "C. H. F." will find the following method very easy. After you have fixed your paper on your board, and your plan above, draw your picture plane line A B. Then from your point of sight V draw the lines V B^b and V A^a parallel to the two sides of the building which you wish to show in your picture. Then draw your line C D as your picture line below, and another line 5′ 6″ or thereby above it as the eye-line E F. Drop the points A^a and B^b down to this line E F, as shown by



dotted line. Draw two lines from the point thus obtained on the side you wish to use the centrolinead (as one side will fall on your drawing-board, and you can use a common straight-edge), one above the eye-line and another below. You then set your centrolinead to work on these two lines ; also, it should work to the eye-line. The way is as follows :—After putting the studs (two large pins or needles will do as well) in your board, about the place they are shown in the sketch, you work up and down the centrolinead against them ; set it to one of the lines you have drawn from the vanishing-point by unscrewing the screws and shifting the back legs, then screw them tight again, and work your centrolinead down to the bottom line, pressing firmly against the studs, and see if it will work to the other line. If it does not, you must unscrew the back legs and widen them, or draw them in as you think proper, and try again till you get it to work to the three lines. If it works to the top and bottom one, it is bound to work to the centre one. The use of the centrolinead is when the point B^b or A^a is out of the drawing board ; then the two lines you draw from point B^2 to set your centrolinead to, have to be done carefully with a thread or string, also the line V . B^b can be obtained by fixing a thread to a pin at point V and another at A, running along A B ; hold the other parallel to the side of your building, then where you make the two meet is the point B^b ; next measure the distance from your board to B^b. The same distance will be required to find the point B^2 from the board below. You may get your centrolinead to set in a few seconds, or it may be an hour.—LUX.

[9399, 9401, and 9407.]—**Quantities, &c.**—These three questions are more or less connected, particularly the first and last. As to the first, I have not read Prof. Kerr's paper, for, from what I did read some time ago about the profession and quantities, and quantity surveyors and their accounts, and architect's accounts, I formed the opinion that he was not a good authority on the subject, and rather expected that the R.I.B.A. would read him a lecture than that he would read a paper before that body on the subject unless it was more personal than general. "Surveyor" asks—"Why do many architects object to the quantities forming the basis of the contract" ? To which I reply, Because clients wish to know at least approximately what they have to pay, and don't wish to pay for a general measurement at the completion of the work in addition to the quantities. He also asks, Why is it asserted that "if the quantities form part of the contract, the quantity surveyor is absolved from all liability from errors"—which no one asserts that understands the matter, for, of course, he would be liable to whoever paid him and was injured by his negligence or incompetence ; but practically he would not be liable, for the client would not easily discover the error, and if he did, could not prove loss in paying for work done. There is no doubt that the surveyor is liable to the contractor, if he pays him for the quantities, for any loss from his negligence or incompetency in preparing them ; but is it not generally as "Surveyor" assumes, the builder says nothing about it.—G. H. G.

[9400.]—**Acoustics.**—Try the effect of copper wire stretched across the church above the pulpit, a foot or two higher than the preacher's head. A sounding board may be found better.—G. H. G.

[9401.]—**An Architect in a Fix.**—"A. B. C.'s" position will depend on the agreement whether he was to build one or two pairs. There is nothing to prevent a client building the second pair of houses like the first without employing the architect—that is to say, if there is no special agreement between them.—G. H. G.

[9403.]—**Half-Timbered Work.**—Keene's cement makes a good finishing coat, also smooth for painting on ; or Portland and sand mixed is often used.—T. HUDSON.

[9404.]—**Royal Engineers Department Exam.** —I should recommend Tarn's "Science of Building," Rivington's "Building Construction," Seddon's "Builder's Work" (Rivington), Hurst's "Handbook" (Spon), and Laxton's "Pric -book."—G. H. G.

[9406.]—**Painting Hot-Water Pipes.**—Wolston's Torbay purple-brown iron paint would stand well on hot-water pipes exposed to view ; but be careful to see that the paint is supplied by original manufacturers, as adulterated imitations are made.—ARCHITECT.

[9407.] — **Specification not Agreeing with Quantities.**—The contractor can be asked to perform work described in the specification though not in the quantities.—ARCHITECT.

[9408.]—**Architectural Perspectives.**—If the curves cannot be sketched in by hand, the French curves may be used. I am not aware that draughtsmen use jagged or indented straight-edges for the sake of picturesque effect. It is much better to effect these irregularities by hand. In drawing arches in perspective, if they are large, points in the curve may be found by drawing the enclosing rectangles in perspective, and lines drawn from the centres to the angles will intersect parallel lines drawn to the points of distance, giving points on the curves.—G. H. G.

[9408.]—**Architectural Perspectives.**—In drawing arches, curves, &c., it is more usual to use a compass than French curves, which I think "Learner" will find are not much employed (as a rule) in architectural work, the only difficulty being to find the centres required. The rough jagged lines he will find are done by hand and not by an indented straight-edge. This method, of course, requires practice, as "Learner" will see.—T. HUDSON.

[9409.]—**Warehouses.**—Shops with dwelling-rooms come within the dwelling-house class. The "warehouse class comprises all warehouses, manufactories, breweries, and distilleries," but it is doubtful whether strictly a shop may not be included under the warehouse class. One magistrate ruled that it was difficult to draw the line. Many shops are warehouses also. Mansard roof with pitch of over 47° is clearly not allowed under Sect. XI 2 of the Act, where it distinctly says that "the plane the surface of the roof of a warehouse or other buildin used either wholly or in part for purposes of trade, sh not incline from the external or party walls at a great angle than 47 degrees with the horizon."—G. H. G.

[9412.]—**Eyesight.**—In reply to "Vedra's" questi in last week's BUILDING NEWS *re* the above, I wou advise him, when working by an artificial light, to have placed well behind him, so that the rays from the lamp whatever it may be shall be thrown off the paper he us away from him. In the usual way the light is placed front of the worker, thus causing the rays to be throw off the paper full into his eyes, this being the reason much strain to his eyes. A good oil-lamp I find is mu preferable to gas. Do not take to spectacles without t advice of a thoroughly good oculist, for though this m cost rather more in the outset, it is by far the most ine pensive method in the long run. I have suffered fro defective sight for the past six years now, and had I on consulted an oculist of good standing in the first plac should have saved myself considerable trouble and e pense. Last year I was in London, and consulted L Lang, of Wimpole-street, when I was advised that t only thing to be done was to stop work directly I felt a strain, and also to have my gas or lamp behind me wh at work at night. Of course, he prescribed glasses, but am glad to say I rarely have occasion to use them no my sight being so much better. A green shade over t eyes is perfectly useless, as it does not protect the ey from the light at all. I may add I always take eve opportunity to bathe my eyes with clear cold water. If can give any further advice suggested by my own expe ence to "Vedra," either through these columns, or to hi through the post, I shall only be too happy to do so. J. H. W.

CHIPS.

A very large clock has just been erected up the church tower of Sileby, Leicestershire, John Smith and Sons, Midland Clock Worl Derby, which strikes upon a 21cwt. bell, plays t Westminster quarters upon four bells, and sho time upon two dials, each 6ft. across. The mov ment is fitted with all the latest improvemen and designed generally after the lines laid down Lord Grimthorpe. The same firm have also j completed a large clock at Kingsbury Chur Somerset, which shows time on two 6ft. dials.

The Dewsbury School Board accepted on Tu day the tender of Messrs. Chadwick and So Staincliffe, who are at present building the to hall at Dewsbury, for the masonry, joinery, a ironwork in connection with the Queen Victo Jubilee Schools, which are to be erected on the s of the George and Dragon, Town End, Dewsbu at a cost of £6,000, exclusive of the land. O thirty firms tendered for the work. Mr. J. L. F of Dewsbury, is the architect.

The foundation-stone of a new Baptist cha was laid in Fore-street, Teignmouth on Tuesd The chapel will be Gothic in style, of red bri with Bath-stone dressings, and will measure 75 by 27ft. There will be two galleries, and seati accommodation will be provided for about 3 persons. The buiding is to be erected from the signs of Messrs. J. W. Rowell and Sons, of Newt Abbot, and the builder is Mr. C. Francis, wh contract price is £710.

The 17th-century rood screen in Plymsto Church was unveiled on Wednesday, after resto tion by Mr. Harry Hems, under the supervision Mr. R. Medley Fulford, A.R.I.B.A., of Exet All the missing portions, doors, mullions, uprigh have been made good in English oak ; the structu has been raised upon a solid block of oak, runni the entire width of the church. Every piece of t old carving, cresting, &c., has been replaced, whil the new work has been made to harmonise with t old by staining the new oak to a dark hue.

During the recent visit of inspection to Devo port Dockyard and the neighbouring establis ments and forts, the Lords of the Admiral accompanied by Colonel Percy Smith (director works), Mr. Fishendon (superintendent ci engineer), and Mr. Richardson (clerk of work inspected the new gun drill battery on the top Longroom Hill. Mr. Jonathan Marshall, the oc tractor, met the party. On the completion of the n battery, which will cost about £4,000, the existi battery will be utilised as a drill and lecture roo From this lecture room a flight of steps will lead to the building, which is of pitch-pine ; it is abo 160ft. by 40ft. A conning tower rises in the cen of the roof.

Plans are being prepared by Dr. Rowand And son, of Edinburgh, for a building to house panorama representing "The Battle of Bannoc burn," about to be erected in Sauchiehall-stre Glasgow.

An inquiry was held at Tonbridge on Wedn day week before Mr. Arnold Taylor, an inspec from the Local Government Board, with referen to an application from the urban authority sanction to borrow £7,500 for widening approaches to the Great Bridge, now being rebu by the county magistrates from plans by Mr. Ru at a cost of £3,000.

Our Office Table.

THE forty-sixth session of the Architectural ssociation will be opened on Friday evening in xt week with a *conversazione*, to be held at the estminster Town Hall. Following the pre-dent of last year there will be no prize dis-ibution nor presidential address, but drawings ecuted by the travelling students and in the rious classes will be exhibited in the suite of oms on the first floor. A military band will ay at intervals in the large hall, and two ncerts will be given in the council chamber. ie programme for the session is as follows :— iday, Oct. 21, address from the president, hn Slater, B.A.; Nov. 4, "Architectural odelling," J. C. L. Sparkes; Nov. 18, "Per-ective Drawing and the Apparent Form of ojects," F. T. Baggallay; Dec. 2, "Our retching Club Scheme," H. D. Appleton; Dec. , a Paper by T. G. Jackson, M.A., F.S.A.; n. 2, 1888, "Hydraulics for Architects," Prof. . Cawthorne Unwin; Jan. 20, "The Use d Abuse of Materials," Somers Clarke, F.S.A.; b. 3, "Mahomedan Architecture," R. Phené iers, F.S.A.; Feb. 17, "A Botanical Con-ibution to Architecture," W. H. Bidlake; arch 2, "Old House Work," F. M. Simpson; arch 16, "Brasses," A. Oliver; April "Members' Soirée," April 20, "Greek uildings," F. R. Farrow; May 4, "Cornices d String Courses," H. H. Statham; May 18, A Travelling Student's Notes in Belgium," H. Hart.

UNDER the suggestive title of "Education, ultivation, and Examination," Professor T. ger Smith, F.R.I.B.A., will deliver a public troductory lecture in connection with his sses of architecture and construction at niversity College, Gower-street, W.C., on ednesday evening next at 7.30 p.m. The cture will, of course, be treated mainly as bears on the subject of architecture; will be illustrated, and the attendance intending students and their friends is in-ted. Professor Smith's classes this year will divided into three separate courses, each nsisting of thirty lectures—A, treating upon rchitecture as a Fine Art," will begin tober 11; B, "Architecture as a Science," October 12; and C, "The Modern Practice Architecture," intended to meet the require-nts of the Institute examination, on tober 13. Among the classes on allied bjects at University College are those on rchæology, given by Professor Sir C. T. New-n, of which the first term, commencing on tober 7, will deal with Greek inscriptions, d the second with Greek myths as repre-nted in vase paintings and other works of art; Hygiene, by Professor Corfield; on the trength of Materials, by Professor Kennedy; hose on Chemistry in relation to Engineering d Architecture, by Professor Graham; and hose on Land Surveying and Levelling, by Professor Vernon Harcourt.

THE foundation stone of the new Engineering ollege in connection with Liverpool University ollege, will be laid to-morrow (Saturday) by arl Derby. The new college is being built at the cost of Sir A. B. Walker on the Brown-ow-hill side of the existing buildings, from ans by Mr. Alfred Waterhouse, R.A. In the ening the prizes gained last session in the ollege will be distributed by Lord Derby, and a address will afterwards be given by the rofessor of engineering, Mr. H. S. Hele Shaw, M.Inst.C.E. A course of twenty lectures is to given at the University by Professor Conway, A., on "The History, Arts, and Antiquities of Phœnicia and its Dependencies."

THE Art Gallery formed last year by the City Corporation, by bringing together in the old City of London Court, to the right of the Guild-hall entrance, all the pictures and statues in their possession, continues to receive additions, and promises to become in the future a valuable collection. The gallery, which is open free every day, now contains rather more than a hundred works of art. On Monday there were added to the collection two large water-colour studies, each about 10ft. in height, being the original drawings from which the tapestries recently obtained from the Windsor Tapestry Works for the Mansion House were copied. One represents a joust on London Bridge between David Lindsay, Earl of Crawford, and Lord John de Welles, ambassador of King Richard II. of Scotland, in 1390; and the other the City Champion receiving from the Lord Mayor the City's banner, at St. Paul's Cathedral, in the reign of Henry III. Among the examples of oil-colours lately added are "The Poacher," by E. Bird, R.A., presented to the gallery by Mr. Rome, a member of the Corporation; and "Cymon and Iphigenia," presented by Alderman Sir F. W. Truscott.

THE first of a further course of lectures and demonstrations for the instruction of sanitary inspectors was given at the Parkes Museum of Hygiene, Margaret-street, Oxford-street, W., on Tuesday evening, by Dr. H. E. Armstrong, who took as his subject, "The General History, Principles, and Methods of Hygiene," and the second of the course will be delivered to-night (Friday) at 8 p.m., the topic being "Ventilation and the Measurements of Cubic Space." The lectures will be continued on Tuesdays and Fridays at the same hour, 8 p.m., for six weeks longer, the lecturers being Dr. Armstrong, Dr. Louis E. Parkes, Professor Robinson, Mr. J. Gordon, Professor W. H. Corfield, Mr. C. E. Cassell, Mr. J. F. J. Sykes, Dr. Charles Kelly, and Mr. A. Wynter Blyth.

PROFESSOR TYNDALL, in closing the discussion in the *Times* on lightning conductors, to which we referred last week, remarks that were moisture the only thing needful in the earth connection of lightning conductors, no easier plan for reaching it could be devised than that which Lord Grimthorpe has proposed, but his electric doorway or electrode is too small. Dr. Tyndall would not be content with much less than a square yard of sheet copper for the earth plate, and this might be a square or a rectangle, provided the area be preserved. Faraday proposed a rectangular plate 4ft. by 2ft. He adds that architects and builders would do well to study the "Report of the Lightning Rod Conference," as, while the Report itself is brief and apposite, the appendices (for the statements in which the Conference decline responsibility) are very weighty. It might, he suggests, be desirable for the information of the general public to publish the Report separately.

MESSRS. JAMES MILNE AND SON, Abbey-hill, Edinburgh, showed at their works on Tuesday night a new system for illuminating large open spaces, such as yards, workshops, and sheds, by means of an apparatus termed "the hydro-photogene"—an invention patented by Mr. William Wells, chemical manufacturer, Leith. The light produced resembles that known as the "Lucigen," and the method of obtaining it is somewhat similar. It possesses an advantage over the "Lucigen," inasmuch as no engine, pump, or machinery is required in its production. The apparatus consists of a drum or cistern containing oil, which is forced upwards through a narrow pipe by water pressure from below. Only a small quantity of oil, sufficient to feed a burner, is allowed to pass into the combustion chamber, which, being heated by the flame itself, converts the oil into an inflammable vapour. This vapour then rushes into the burner orifice, drawing a current of air with it in the same way as the Bunsen burner. The air then mixes with the vapour, and a white light is the result. A small damper plays an important part in the operation, stopping the current of air and vapour, and admitting a proper mixture of both into the combustion chamber. It is proposed by the inventor that the apparatus should be connected with a convenient water pipe to obtain the necessary pressure; but where such an arrangement is not available a small hand-pump is fitted in connection with the drum, and by this means water is forced in. The oil used is the cheapest residue obtained from ironworks, which costs 1d. per gallon, one of which supplies the burner for two hours, giving at the same time a light said to be equal to 2,000 candles.

A LARGE tapestry wall hanging representing a fight between Greeks and Trojans has been acquired for South Kensington Museum by purchase from the representatives of the late M. Achille Jubinal, the well-known writer on early textiles. The tapestry is 21ft. in length by 13ft. in height, and is covered with figures in armour and buildings. The treatment of the design is Flemish, of the school of Jan Van Eyck. The Low Latin inscriptions on the scrolls, and the names indicating different personages, enable us to identify the episode delineated with a passage in the poem by a fourth century writer, Quintus Smyrnæus, descriptive of the opportune aid rendered the besieged Trojans by Penthesilea, Queen of the Amazons. The piece was purchased by M. Jubinal from the chateau of the Chevalier de Bayard, near Grenoble, where it is known to have been hanging in 1807.

A SANITARY Congress is being held this week at Vienna, in the hall of the Horticultural Society on the Ringstrasse, nearly two thousand Austrian and foreign members being present. England is represented by delegates from the Universities of Cambridge and Glasgow, and from numerous colleges and institutions, as well as by sixteen private members. A Sanitary Exhibition has been organised in connection with the Congress at the University. On Tuesday a lively discussion was held on the purification of sewage and utilisation of excrementitious products, with special reference to the prevention of river pollution—on which subject Dr. Frankland, F.R.S., presented a paper sketching the history of sanitation in the United Kingdom from 1850 to the present day, and strongly supported the systems of water-carriage sewering and sewage irrigation. The Rivers Pollution Act of 1876 was condemned as an utter failure, and neither cheap, speedy, nor effective. Other papers submitted by Englishmen are: "International Regulations for Epidemics," by Mr. Shirley F. Murphy, in which he recommended that a sanitary authority should be appointed at every port, and that every country should possess a central sanitary office to give immediate notice of all cases of cholera to every Government; another by Professor Corfield on "Rag Importation," one on "English Factory and Workshop Legislation," by Mr. F. Hayes Whymper, of the Home Office; and "Census Returns," by Mr. T. W. Grimshaw, Registrar-General for Ireland. The Congress has been invited to hold its next meeting in London.

MR. B. T. BATSFORD'S new catalogue of new and second-hand books dealing with civil and mechanical engineering, science, trades, and manufacture, is well worth sending for and preserving. The prices—especially of some of the scarcer books—are very moderate, and Mr. Batsford's patrons know that when they do buy a cheap book of him they are sure to find it all there and in good condition, which is not always the case with books offered at apparently low prices.

CHIPS.

A highway bridge of blue brick and stone in seven arches is about to be built at Little Haywood, near Colwich, from plans by Mr. R. Griffiths. Mr. C. J. Nevitt, of Stafford, is the contractor.

St. Paul's Church, Leeds, has been reopened by the Bishop of Ripon after decoration and renovation by Messrs. F. Jackson and Co., from drawings and under the direction of Messrs. Perkins and Bulmer, all of Leeds.

Mr. Thomas Goodwillie, sculptor, Elgin, ex-Dean of Guild, died on Friday, aged 58. Deceased was a native of Fife, and has been upwards of thirty years in Elginshire, carrying on a successful business.

The dedication stone of St. Mark's Mission Hall, Tollington Park, now in course of erection in the Hornsey-road, was laid on Saturday last. The buildings will be Queen Anne in style, and will be built of red bricks, with blue brick plinth and terracotta dressings. The large hall will seat 400 persons, and the smaller one 100 persons. The architect is Mr. W. Jacomb Gibbon, of 36, Great James-street, Bedford-row; the contractors being Messrs. Macfarlane Bros., of Hornsey-road. The work will be completed in December at a cost of some £2,500, exclusive of site and furnishing. The bricks used for the facing are specially made by the Cakemore Brick Company, which firm is also supplying the terracotta and tiles.

Mr. Felix Joseph has just presented to the Local Board of Sandgate, Kent, a number of choice specimens of old Wedgwood ware from his collection, with the view of forming the nucleus of a small art museum in that town.

The new waterworks at Wisham, N.B., were formally inaugurated last week. Additional storage capacity of thirty millions of gallons has been provided at a cost of almost £10,000. Mr. James Tait, the burgh engineer, designed the works.

WATER SUPPLY AND SANITARY MATTERS.

TOTTENHAM.—The Tottenham local board are further extending their waterworks by sinking an artesian well at their Longwater pumping-station. The well is 12ft. in diameter, and is carried down to the chalk; a 24in. boring in the chalk is in progress, and will be extended to a depth of 450ft. from the surface. The new arrangements include two 50 horse-power engines, pumps, boilers, water tower, engine-house, &c. The works are designed and are being carried out by Mr. W. A. H. De Pape, chief waterworks engineer. Mr. W. Brown, of Tottenham, is the contractor for sinking the well; and Messrs. Wilkinson Brothers the contractors for the buildings. The board have recently constructed large reservoirs and a water tower at Mount Pleasant (the highest point in the district), from their waterworks engineer's plans. The works as a whole will cost about £25,000, and when they are completed it is anticipated that Tottenham will possess a system of water supply far superior to that in other London districts. The source is direct from the chalk, and the water stands very high in the monthly official reports of Dr. Frankland to the Registrar-General. A singular feature in connection with the sinking of the well is the variance in actual strata with those shown by the trial boring, in one instance a layer of limestone rock 15ft. thick being met with; the substance having previously been entirely unknown in the district.

CHIPS.

Extensive internal alterations are being made to the old parish church, Tynemouth. The new work consists of the removal of a considerable portion of the galleries, the substitution of hot-water pipes in place of the old system of hot-air flues, and the erection of a pulpit, which is being made from the architect's designs by Messrs. Robson and Sons, of Newcastle-on-Tyne. The contractors for the alterations are Messrs. J. and W. Simpson, of North Shields, and the architect is Mr. Wm. Hope, of Newcastle-on-Tyne.

It has been decided to create in Paris, at the cost of the city, an "Ecole d'Apprentissage des Industries du Livre." The building destined to this service will be erected on the Boulevard d'Italie.

The four panels in the pedestal of the Burns monument at Glasgow have just been filled with sculpture executed by Mr. J. A. Ewing, of that city. The front panel simply bears the name "Robert Burns," and the dates 1759 and 1796; the panel on the left depicts a scene from the "Cottar's Saturday Night," the right panel illustrates the witches' dance in Alloway Kirk, and the fourth panel contains a representation of the vision—Coila crowning the poet with the laurel wreath.

The foundation-stone of a new church, dedicated to St. Hilda, was laid at Darlington last week, by the Bishop of Durham. The building is estimated to cost £5,350.

A new Liberal Club is in course of completion at the corner of Buchanan-street and St. George's-place, Glasgow. It occupies the site of the old Bedford Hotel, which has been altered, enlarged, and re-arranged, from plans by Mr. A. Skirving, West Regent-street, Glasgow.

A new public hall and free library building has just been commenced at Blackford, near Abercairny, from designs by Mr. G. T. Ewing, of Mathill. The large room is 55ft. by 31ft., and all the accommodation is provided on one floor. The memorial stone-laying ceremonies took place on Saturday, when the work was formally commenced.

On Saturday afternoon the memorial-stone of the Speir School, Beith, Ayrshire, was laid with Masonic honours. The school is the gift of the widow of Mr. Robert Speir, of Marshalland, near Beith, and the building is being erected within half a mile of the town. The structure will have a similarity externally to the old University of Glasgow, the architectural features of which belonged to the Scottish 17th-century period. The school will accommodate about 300 scholars, and its erection is to cost £12,000.

Mr. John Sulman, F.R.I.B.A., of Sydney (late of Furnival's-inn, London), has prepared a design for a Centennial Memorial to be erected on the highest point of the peninsula at Port Jackson between the Botanic Gardens and Lady Macquarie's Chair. The scheme embraces the erection of a colossal bronze statue symbolising Australia in the centre of an open court, surrounding which would be a colonnade, in which the history of the first century of the colonies could be recorded in marble. The total cost is from £25,000 to £30,000.

Yesterday, Mr. J. T. Harrison, C.E., an inspector of the Local Government Board, held an inquiry at the Town Hall, Evesham, touching the application of the Town Council for permission to borrow £2,500 for works of street paving. Mr. R. C. Mawson gave details of the scheme.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Engineers. "Stability of Factory Chimneys," by R. J. Hutton. 7.30 p.m.
Society of Architects. Visit to York. Reception and conducted walk through the city, 3.30 p.m. Discussion on "The Architects' and Engineers' Registration Bill," to be opened by H. R. Gough. 7.30 p.m.
Clerk of Works Association. General quarterly meeting, Carpenters' Hall. 8 p.m.

TUESDAY.—Society of Architects at York. Visit to Selby, Beverley, and Hull, 8.40 a.m. train. Discussion on "Yorkshire Architectural Art," 7.30 p.m.

WEDNESDAY.—University College, Gower-street, W.C. "Education, Cultivation, and Examination," a free introductory lecture by Professor T. Roger Smith. 7.30 p.m.
Society of Architects at York. Visit to Kirkstall Abbey and Adel Church, 9.7 a.m. Conversazione of the York Architectural Association.

THURSDAY.—Society of Architects at York. Visit to Ripon and Fountains Abbey, 6.45 a.m. Discussion on "Architects' Charges," 7.30 p.m.

FRIDAY.—Architectural Association. Conversazione at Westminster Town Hall, Evening Dress, 8 p.m. Society of Architects at York. Visits to St. Mary's Abbey and the Minster, 9 a.m., and to Heslington Hall, 3.30 p.m. Discussion on Yorkshire Architectural Art," 7.30 p.m.

ARCHITECTURAL ASSOCIATION,

9, CONDUIT STREET, W.

The OPENING CONVERSAZIONE of the Session 1887-88 will be held on OCTOBER 7, at Westminster Town Hall, at 8 p.m. The FIRST ORDINARY MEETING on OCTOBER 21, when the President will deliver an Address.

The FIRST MEETINGS of the CLASSES as under:—

Oct. 10	..	Graphic Statics Lecture	7.0 p.m.
„ 13	..	Elementary Class of Ornament and Colour Decoration	6.30 p.m.
„ 26	..	Advanced Class of Construction.. ..	7.0 p.m.
„ 27	..	Quantity Class	7.0 p.m.
„ 28	..	Lecture on Construction	6.30 p.m.
„ „	..	Elementary Class of Construction ..	7.45 p.m.
„ „	..	Class of Construction	7.45 p.m.
Nov. 10	..	Ornament and Colour Decoration Class	6.30 p.m.
„ 11	..	Lecture on History of Architecture..	6.30 p.m.
„ „	..	Elementary Class of Design (Section I.)	7.45 p.m.
„ „	..	Class of Design	7.45 p.m.
„ 16	..	Elementary Class of Design (Section II.)	7.0 p.m.

A Syllabus of the Class Work can be obtained from the following Class Secretaries:—

ELEMENTARY CLASS OF CONSTRUCTION:—
H. E. MATTHEWS, 11, Dowgate-hill, E.C.

CLASS OF CONSTRUCTION:—
H. D. GRAVELL, 37, Stormont-road, Lavender-hill, S.W.

ADVANCED CLASS OF CONSTRUCTION:—
G. A. LANSDOWN, 67, New Kent-road, S.E.

QUANTITY SURVEYING CLASS:—
W. J. BAMBER, 1, Tenterden-street, Hanover-square, W.

GRAPHIC STATICS LECTURES:—
F. QUICK, 157, Wool Exchange, E.C.

ELEMENTARY CLASS OF DESIGN (Section I.):—
C. J. WILLET, care of Messrs. Taylor and Locke, St. Michael's House, Basinghall-street, E.C.

ELEMENTARY CLASS OF DESIGN (Section II.):—
W. E. JOHNSON, Fern Villa, St. James'-road, Upper Tooting, S.W.

CLASS OF DESIGN:—
E. H. PARKES, Wittersham Rectory, Ashford.

CLASS OF COLOUR DECORATION:—
E. HERBERT, 11, Mornington-road, N.W.

THOS. EDWARD PRYCE, FREDERIC R. FARROW, } Hon. Secs.

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TENDERS.

*** Correspondents would in all cases oblige by givi the addresses of the parties tendering—at any rate, of t accepted tender: it adds to the value of the information.

ARNOLD.—For paving, curbing, channelling, a culverting in West Pond-lane, Arno'd, for the Arno Local Board of Health. Quantities by Mr. Jackson, Low-pavement, Nottingham, engineer:—

	A.	B.
Haywood, F., Wortley	£1,062 18 0	£266 5
Barry, D., Nottingham	733 11 3	187 3
Hawley, J., Ilkeston	596 16 0	163 5
Vickers, H., Nottingham	596 0 0	185 0
Bradley, J., Lincoln	569 14 0	221 15
Cordon, W., Burton Joyce	547 9 6	146 16
Greeves, J., Front St. Arnold	*518 0 0	*146 0
Morriss, E., Arnold	500 0 0	160 0
Shortland, J., Nottingham	441 19 6	161 16
Engineer's estimate	561 15 6	154 12

A.—Contract No. 1. B.—Contract No. 2. * Accepte

BEDFORD.—For two cottages to be erected in Mi brook-road, for Mr. Wm. Day. Mr. R. Lund, architect Todd, G., (accepted) £254 10 0

BELLAGIO.—For the erection of a bungalow at Fur field Chase, Bellagio, near East Grinstead, Surrey, for M J. H. Mackay. Mr. W. J. Ebbetts, F.R.I.B.A., Sav House, 115, Strand, W.C., architect:—
Baylis, H. £423 0 0

BELLAGIO.—For the erection of bungalows at H Crest, Bellagio, near East Grinstead, Surrey, for M A. Burr. Mr. W. J. Ebbetts, F.R.I.B.A., Savoy Hou 115, Strand, W.C., architect:—

	A.	B.
No. 1 Bungalow	£180 0 0	—
„ 2 „	275 0 0	*£295 0 0
„ 3 „	340 0 0	*360 0 0
„ 4 „	390 0 0	425 0 0
„ 4a „	455 0 0	*475 0 0
„ 5 „	305 0 0	*325 0 0
„ 6 „	300 0 0	315 0 0

Tenders submitted by Mr. H. Baylis, builder, of Hig bury. Those marked with an asterisk being accepted.

BLACKHEATH.—For alterations and additions to Three Tuns, Blackheath, for Mr. F. Walton. Mr. J. Downes, 183, Lewisham High-road, S.E., architect:—
Schofield £750 0 0
Holloway, H. L. 740 0 0
Lorden and Sons (accepted) 650 0 0

BOURNEMOUTH.—For works of road making, for t improvement commissioners:—
White, J. (accepted) £1,430 0 0

BOURNEMOUTH.—For tree and shrub planting, for t improvement commissioners:—
Smith and Co., Worcester (accepted) £101 14 0

BRISTOL.—For additions to leaf room of toba factory at Bedminster, for Messrs. W. D. and H. O. Wi Mr. F. W. Wills, architect:—
Beaven, A. J. (accepted) £811 0 0

BRIDGE OF WEIR, N.B.—For the erection of a n station at Bridge of Weir:—
Smellie, J., Partick, near Glasgow (accepted).

CHESTER-LE-STREET.—For block of offices and cotta near The Hermitage, for Mr. Lindsay Wood. Mr. G. Irwin, Sunderland, quantity surveyor. Mr. H. Gradon, Durham, architect:—

Tremble and Co., Hetton-le-Hole	£1,452 8 0
Haswell and Waugh, Gateshead	1,441 12 4
Atkin and Co., South Shields	1,397 0 0
Gradon and Son, Durham	1,382 3 0
Thompson, W., Chester-le-Street	1,365 0 0
Bell, G. H., Bishop Auckland	1,360 8 0
Kell, J., Birmingham	1,360 0 0
Douglass, G., Sunderland	1,354 0 0
Lodge, W., Plawsworth	1,337 8 0
Thompson and Son, Chester-le-Street	1,334 2 0
Atkinson, W. C., Stockton-on-Tees	1,326 0 0
Robson and Son, Chester-le-Street	1,322 6 0
Sanderson, R., Birmingham	1,320 0 0
Jopling, J., Chester-le-Street	1,305 5 0
Forster, W., Croxdale	1,300 0 0
Akenhead, T., Stamfordham	1,293 8 0
Wood, T., Jarrow-on-Tyne	1,231 13 0
Kilburn, J. G., South Shields	1,217 0 0
Jennings, J., Chester-le Street	1,123 0 0

CHELSEA.—For the erection of two studios at Leonard's terrace, for Messrs. Cooks and Elwor (design No. 2). Mr. W. J. Ebbetts, F.R.I.B.A., Sa House, 115, Strand, W.C., architect:—
Baylis, H. (accepted) £615 0 0

HE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1709.
FRIDAY, OCTOBER 7, 1887.

PROFESSIONAL CUSTOM.

EVERY now and again the architect has to appeal to what is rather ill-defined s the "custom" of the profession. Unfor-unately the custom varies, or may be so nreasonable that when the hapless victim of harp practice makes an appeal to the ribunal of the law he finds out to his dis-nay that the Court is ready to set aside a 'trade custom" if it happens to be un-easonable, and cannot be established upon very clear evidence. So, not many years ago, a late eminent architect found to his cost hat he could not legally retain the drawings nd specifications that had been prepared for a great public building, and that his em-ployers were held to be the owners of them ; while another decision has destroyed the custom which till then had been pleaded, that an architect is entitled to remuneration in the event of the plans being abandoned. And it will be readily seen that "custom" would lead to the perpetuation of a great many follies and a great deal of injustice, if it were at all times held to be unassailable. Law would have made but few advances if custom had ruled instead of reason. Yet, for all this, evidence of usage or custom is admissible, and often goes a very long way in establishing a case upon technical points. Upon this ground there are a number of architects who appeal to custom whenever anything goes wrong, or they fall out with their clients. We have endeavoured before to show that this ground of conviction and solace may often be shaken, and that it is better for the architect to go into the business forearmed and to prepare himself for contingencies that may happen.

One of the instances in which this precau-tion is so necessary is when an architect undertakes to prepare designs and drawings for a number of houses or villas upon the same plan. The circumstances re-lated by a correspondent in a recent issue under the title of "An Architect in a Fix" is not an uncommon experience. A client requests the architect to prepare plans for two pairs of houses at £2,000 each pair. Plans and specifications are accordingly prepared, and tenders obtained ; the house is commenced and proceeds till roof high, when the client intimates to the architect that he will be his own architect for the second pair. The builder is instructed to begin the work, using the plans and specifi-cations prepared by the architect. The employer refuses to pay any commission on the second pair. Now, the instruction was to prepare plans for *two* houses, not one—a point which may be looked at in different ways. It may be said, as the houses were to be alike in all respects, it mattered nothing to the architect whether there was only one or a dozen copied ; in preparing a design for the one he expended so much skill and labour, and no more, and he received the usual com-mission for his labour ; that it would be easy and quite optional for a client after one house has been erected to copy the other from the house already built ; that the architect incurred no responsibility or trouble in respect of the second house, the plans of which had been paid for. On the other hand, it may be said that *two* houses were spoken of ; the architect made his arrangements and calculations accord-ingly, and that it was breaking the agreement —verbal or otherwise—to pay for only one house when two are built. The architect also by this transaction may regard himself as a loser of half the expected commission, and so consider himself an aggrieved individual. No doubt this kind of treatment is unfair, if not exasperating, though on reflection the architect has lost nothing by the transaction, any more than he would have done if the client had ordered the plans only for one house, and someone else had built another house on the same plan and with the same features. We are all aware how a design for one house or pair of villas is repeated on building estates ; it is not uncommon, indeed, to find an architect's design copied exactly or wretchedly travestied on the same estate. But what can be done to stop this kind of prigging ? When a design is paid for by a client there is no law to prevent him or any-body else from erecting any number of houses on the same plan. Where the hard-ship appears is the promise to build a pair, holding out the commission to the architect, and then after one house is far advanced for the client to turn round and tell his architect that he can dispense with his services in building the second on the same plan. But the architect's work is clearly divisible when the same design is to be repeated.

Something can be done to prevent these dis-appointments, and the architect has it in his power to do so. He can always guard against disappointment of this kind by considering what is possible to happen, and make a special provision or agreement to meet it. Probably the chief reason why the agreement is not common amongst architects is because it is not the custom, it does not look "profes-sional" ; but all hesitation would be removed if a form of agreement were generally adopted and signed by employer and architect in the same manner as a contract relating simply to questions of professional usage. What a host of difficulties might not such a form remove ! It would obviate disputes as to what is the customary remuneration, as to the ownership of the plans, as to the authority of the archi-tect, and with respect to questions of cost, preliminary drawings, contingent services, and other questions. A very large field is open to question and cavil by depending solely on custom and usage, though the archi-tect prefers it to restraint ; perhaps the un-popularity of agreements between architects and their employers arises from the notion that the agreement would be too much of a tie. The architect would not be kindly dis-posed to adopt a form prepared by some lay-man, for instance, especially one who has shown rather hostile feelings towards the profession, and we cannot altogether blame him for declining to sign any of the forms that might be submitted to him. A form of agreement to be generally acceptable ought to be prepared with great care and foresight by a body of architects of reputation, and should then be submitted to a body of gentle-men who had experience in building operations. Their joint strictures and emendations might then become the basis for an agreement, such as that which is used for building contracts. There is a common mistake made about the authority of any profession to make laws binding on other people ; architects can make any rules they please as members of any corporation or society to regulate their own proceedings, but they have not the power to make rules to govern those outside their own craft. For this reason it would be useless to attempt to lay down rules or deci-sions of their own about the duties and legal rights of themselves. It is true they can draw up agreements that shall express all they want, and get employers to sign them ; but they would not thereby make them binding on all. An architect may agree him-self not to undertake any design, or prepare drawings and specifications for any building unless he is paid the full commission, whether the employer abandon his intention of build ing or not. He can easily dictate his terms to a client about to erect several houses on the same design, and say that he will under-take them only on the condition that he is paid a commission on all of them, whether he carries them out or not ; he can decline to undertake any work below a certain commission, or to pledge himself to give up the plans to his employer. He may decline to bind himself not to exceed the estimate ; he may, in short, not commit himself to anything he considers injurious to his profession. It is quite optional for anyone to agree upon this procedure, and to be independent of custom altogether. Such rules would not, however, be agreed to by other less independent members of the pro-fession, and they have a right to be con-sulted, and the employer has equal rights to obtain services upon his own terms, and to draw up an agreement incorporating them. In point of fact, there is nothing to bind either party ; each is free to act as he likes. But when there is no agreement, custom is the only guide, and each party is amenable to the decision of the Court.

A number of questions arising in the practice of architects come before the legal tribunals. We have alluded to one of them. A very similar case is where an architect pre-pares plans for a building, and after they are ready for contract the employer does not proceed, or proceeds only to a certain stage, and then stops. What can the architect charge ? Supposing the contract plans are all ready, and the client alters his mind or does not proceed, the architect has a right, according to custom, to charge half the com-mission, or, including obtaining tenders, 3 per cent. Even this custom has been ques-tioned ; and in a published form of agreement the following clause is suggested : "If, after working drawings have been made, the said employer does not proceed, the said architect shall be entitled to a fixed sum to be agreed beforehand, and the plans, &c., shall belong to the said employer ; or, if the said employer proceeds only with a part of the works, the said architect shall be entitled to a propor-tionate part of the remuneration (to be fixed), in addition to a proportionate part of the sum mentioned in this article in respect to work abandoned." We have nothing to object to this arrangement, provided it is agreeable to both parties ; and it would be judicious, we think, for an architect to provide in this manner for services that may be only partly required. Custom and a "reasonable" con-struction put on the facts of the case by a jury are not at all satisfactory, more parti-cularly when the employer abandons his in-tention or only carries the works to a certain stage, and then dismisses the architect. Judges and juries are disposed to look upon the architect's services as running only with the work, that when it stops his charges should stop too ; but is this a fair way of dealing with him ? His plans and specifica-tion are for the work in its entirety, not for any portion, and should his services be sus-pended or stopped during the progress of the building, it is reasonable that he should be able to charge the commission on the com-pleted work. A recent decision, if we re-member rightly, has confirmed this view. The architect's design is fully discoverable after the building is advanced, and it would be unfair towards him if an owner could take advantage of this circumstance and complete the building without the further services of the architect.

Only at certain recognised stages can his work be considered divisible. Thus, after the tenders are sent in, if the cost is found beyond the owner's means, he can refuse to carry out the design, which up to this juncture is expressed only in the drawings and in the architect's brain. It is practi-cally undisclosed, though the architect can charge his commission on the work he has done. It also appears reasonable that when the same plans are prepared for two houses, and only one is executed by the architect,

he should be able to charge at a lower rate on the other when it is built from the same plans as provided for in the Institute schedule of rules; but certain conditions are to be observed in the schedule, the buildings are to be erected at the same time from the same plans, &c., and under one contract. There is only one way to make the owner liable, unless, indeed, there is any evidence from which the Court may infer that two houses were intended. If it can be proved, for example, that the same plans were used in the erection of the second house, a good ground for action may be obtained. Again, if the architect received tenders for both houses he would have a *primâ facie* claim for remuneration. When such proofs are wanting custom alone will determine. Probably one of the strongest objections to special agreements is that an architect would not care to press an unwilling client to sign any undertaking. The younger amongst the profession would possibly find it an impediment to their employment. At first there may be difficulties in the way; but these would disappear when the practice become general. Where authoritative decisions of the law are wanting, there is more reason why understandings of this kind should be made. On the question of ownership of plans this course is recommended. Why should not other points which are still only controlled by custom be also made subject to agreement?

THE BUILDING HANDICRAFTS.—II.

THE plasterer is one of the old and venerated handicrafts. Like the mason, he had a great deal of the artistic part of the architect's design to carry out, and like him also, he has of late years suffered from the introduction of various kinds of wall-linings and embellishments in materials other than plaster. The London plasterers were incorporated into a guild in 1501, and in 1603, in the reign of James I., it was enacted that no plasterer should exercise the art of a painter in the City or suburbs; but an apprentice was exempted, from which we infer that at that date the plasterer often undertook to do painting. Later, in 1694, it was enacted that those practising the art without being members of the guild could be fined. From various accounts it is certain that the old plasterer was more of the artist than his modern descendant, and his work consisted chiefly in the decorative work of walls and ceilings. Especially in the ceilings of the Tudor and Stuart periods does the art of the ancient plasterer become an important element in the internal architecture. The modern plasterer's work is of a purely mechanical nature—he is not instructed in the art by the Italian masters and hand-workers in stucco, like his forefathers were, who were engaged by Gibbs, Chambers, Adam Brothers, and other eminent architects. Few who pass the Strand know what a masterly example of the art of the plasterer of the 18th century is to be seen in the interior of Gibbs's fine church now being "restored"; the apsidal semi-dome, and the flat elliptical vault in one span, exhibit some excellent foliage in the redundant style of Le Pautre, all worked entirely by hand. We can show little modern decorative plasterwork like it. The cause of the decline in this art, as in that of the carpenter, carver, and mason, is the introduction of mechanical appliances. No sooner was the art of casting in plaster introduced than a change began, and the fine school of ornamental modelling quickly died out. The Plasterers' Company, by their yearly prizes for designs and models, are doing a good work; but plastering of the ornamental kind is now intrusted to a few well-known firms of repute, who employ artists of their own, and who work in fibrous plaster or carton-pierre, and turn out decorative plaster work of a superior kind, wanting, however, in some of the qualities which give the old plasterers' work its undisputed charm. It is the handwork and individuality of character which strike us in the old Elizabethan or Jacobean ceiling, an art which would not pay in modern buildings in which cheapness of production is the only aim. Decorative plastering is almost a defunct art amongst the trade. The mechanical process of plastering walls and ceilings has little to raise the operative to the rank of artist. Recent substitutes, in the form of "Linerusta Walton wall decoration," faience "appliqué," and several kinds of wall hangings have no doubt transferred much to other hands. There is one branch, that of rough casting, as seen in the old houses in Kent, and employed decoratively on half-timbered houses, that has been lately developed, and the "wattle and plaster" business has made a new start. A field for art might be made by ornamental plaster surfaces, such as are common in Spain. The decoration of the Moors consisted of fine plaster carved into mouldings and diapers of elaborate design. In this class of work would be found certainly an opportunity for the artist in plaster.

Some time ago there was a scarcity of plasterers, and the Builders' Association issued a circular to master plasterers urging them to take on apprentices. The abolition of "hawk boys" has been the gain of the London plasterer, though his position is not what it might be. Efficient men are not numerous; but the cause will be found to be the prevalence of the system of "labour only" or task work. The builder finds this system the cheapest; the work is let to the lowest bidder. How can good work be turned out under this system? The London plasterers are scarcely alive to the danger of work done under these conditions, which ought to be left only to the few who care to do work under them; but taskwork has been injuring other trades in the same manner. There is yet a hope of improvement in spite of the changes that have taken place. When every plasterer has been taught to model, we may have a class of men worthy of those artists in plaster whose works grace the interiors of the 16th and 18th centuries.

Two other classes of operatives have contributed more to modern architecture: we mean the engineer and the plumber. The engineer has done something to develop the resources of the art by developing the intractable material, iron, though we must wait patiently before the results are seen. Up to the present time iron construction has been rather the stumbling-block than the aid of the artist. There is much yet to be done before the architect can use it freely and artistically, and except in artistic wrought metal-work no school has pre-existed; still, there is hope and a great future for iron in architecture, of which stage we have scarcely reached the threshold. Not till the engineer is educated in art and the architect in iron construction will progress be made. Lord Hartington's address the other day to members of the Iron and Steel Institute at Chatsworth is worth bearing in mind: we must not only develop our resources, but boldly deal with modern inventions. The plumber has made rapid strides in education, and the registration of the plumbing craft is already a significant sign of a new order of things. Of all the old crafts, his is the only one which has advanced from the sheer pressure of circumstances.

Under the generic term of "decoration" we may include various handicrafts, like those of the painter ceramist, glass-painter, mosaicist, and carver, whose separate existence as professional contracting artists was unknown in the old days. Are these contributing their quota to modern architecture, or are they simply earning livelihoods as professional artists or "sub-contractors"? On the whole, the building operative is no longer in the position to influence style as he did once when he was a master of material, and could design as well as work in it. With the revolution created in many trades by the introduction of machinery, the operatives have lost interest in art labour, and have become mere mechanical experts. They work away from the building, not in it, through the intervention of a superior, not independently. Was a few idealists wish to see a return to the old plan by which every working artist had his share in the construction and design. We may not hope for that, indeed, it seems impossible under the changed order—the reconstitution of the trades; but we may look forward to a time when for the present disorganised condition of the trades will be substituted a body of skilled operatives to whose hands can be intrusted the general design and directions of the architect. Comparing modern with the ancient organisation of operatives, we note an important difference.

At the beginning of the 12th century we find the freemasons were an important body, and were exercising a potent influence on the change of architecture that took place. Other trades were then organised; each had its master, yeat-master, and other officers, and was recruited from apprentices who had served their time in the trade. These trades were competent to make improvements as time went on. If in one church they found any feature defective or wanting in dimensions and details, it was noted, so when the next church was built the fault was rectified. New forms of arrangement of plan, of arches and vaulting, of masonry were developed by this process of improving on what had been done before. The trades or ecclesiastical functionaries would discover any errors in plan, the master masons in details of construction, and as the works progressed these alterations and modifications could be introduced with little or no trouble. Each craft had its share in the improvement. Drawings to small scale would not be required to instruct the workman about matters which could be pointed out, and if such were needed they would be sketched on the works to a full size. These gradual modifications and improvements, carried on through generations, and by different minds and classes, developed the art in a much more natural manner than if one individual were engaged to design a new church de novo without previous experience, and by the lights which only traditional types could furnish him. In short, improvements were not due to one or two eminent professional artists; but to a succession of artists working each in his own materials through a number of years uniting in great works of architecture.

These ideas of progressive art, though not new, may appear revolutionary to the conventional architect's notion of treating design and execution as distinct and separate functions. We will not allude to the work of eminent laymen, such as Mr. Ruskin or of Mr. Morris, both of whom have laboured to show the working artists their share; but we may, in conclusion, quote the following very pregnant sentence from a recent paper by a well-known architect this year: "Old architecture was craftsmanship or it was nothing. The thews and sinews of old designs were in the trades. Old architecture was not like modern architecture, the creation of the architect's office—it was the creation of the workshop: the workshop was its home, the tradesman's bench was its cradle, tradition was its foster-mother." So says one of our rising architects, who points out that the vast majority of our parish churches were both designed and built by skilled workmen.

If workmen in England were encouraged as they are in France, we should have to record more rapid progress. As all know who

ainted with building operations in
ne, the various trades are carried on by
ntists, or specialist contractors, who are
operatives. Each workman under this
em can lend great aid to the architect in
rying out his design; he can point out how
where a particular material can be
ployed; he takes an individual interest
his labour, for his desire is to please the
itect who appoints him; he has no inducee
to run up the cost, for he can execute
work at a less profit than the general
tractor. The architect in this manner
rounds himself a number of artist-operatives
work with him; he can select his own
n, those who understand his style and
s, and who take a personal interest in
For many years these operatives may
s for one or two architects. The system
working is therefore quite different
that in this country. There is another
nt that ought to be mentioned in con-
ion with workmanship abroad. Prizes
given for executed work. The Société
rale des Architectes award prizes to all
sons who have executed work of merit,
with this object a committee of inquiry
pointed to ask all architects to send in
names of all workmen who are deserving
ward. Architects and manufacturers
re recipients of prizes and medals for
ed work. The English operative has
this interest taken in him, perhaps partly
ng to his own indifference and want of
. Contrasting the cost of English and
gn labour, we know perfectly well why to
glish contractors obtain foreign labour.
ders, masons, carpenters who take large
s tell us that the rate of wages per hour
ractically more for an English workman
a foreigner; in one case we know of a
-known mason and carver in the West of
land who some time ago paid 1s. 6d. per
, besides lodgings and other extras, to
ainer, for work which afterwards he
ed a Prussian workman to do for him
t half that rate. During the progress of
Law Courts, the employment of foreign
ur was, we believe, a necessity, and few
r contractors will hesitate to employ
gn labour. America, Germany, France,
and, Belgium, and other countries have
extensive factories competing with our
in the cost of production, and in future the
try that can produce the cheapest and
will be the leading one. We have here
dition for the poisonous statement to
, 'How is machinery likely to benefit
working artisan?' We see him outstripped
e race by foreign machine-turned-out
s.

e tendency is still to reduce the
of labour in producing, the effect of
h is to undermine the labour of men
work with their brains as well as
, though the case is different with
who are not specialists and contractors.
nglish kinds of artistic production are
ond their heads, and no machine has ever
able or is likely to accomplish purely in-
ual or artistic work. But we are now
ing of a large class of operatives and
rkmen, including modellers, carvers,
ural workers, and designers and painters
ass, and engaged in the production of
ssels. Other countries are taking away
We rather say, commanding our staple
rades. If, as some assert, the goods
anufactured in this country are diminish-
our work is indeed a sorry one, for we
the other fact before us that the popu-
of the country is increasing. If true, the
nd for labour is on the decrease, we are
ubled to the conclusion of a still further
owing process to avoid the miseries
a large surplus of unemployed labour
to create. There are a number of
ons who augur ill for the future of in-
in this country, who say that we shall
e to pass through a commercial crisis of
still greater severity than we have yet done. There is only one hope for the mechanical labourer and operative artist, and that is to make himself an expert at his work for after all the best must qualify the condition of cheapness, and thereby throw cheap inferiority on one side. There are, too, unworked fields for labour which may be thought of. Here is another opening. The substitution of mechanical for human labour is what most concerns the workman of to-day. How is he to keep his position and raise his work to the level of an art? The more he can do this, the greater chance he has in the struggle.

ROYAL INSTITUTE OF PAINTERS IN WATER COLOURS

IN the galleries of the Royal Institute of Painters in Water Colours an interesting exhibition has been opened to the public this week of the paintings, etchings and water-colour drawings contributed by several hundred artists to the Art Union, inaugurated for the purpose of furnishing means whereby the Institute may secure the property and galleries of Princes Hall as a permanent home in Piccadilly. The prospectus announces that £15,000 worth of pictures will be given as prizes, and each subscriber is to have a photographic copy of Sir James D. Linton's grand picture entitled "The Declaration of War," which was exhibited in the Royal Academy a few years since. There can be no doubt as to the assured success of the undertaking, seeing that already over 4,000 pictures chiefly by well-known painters, have been contributed, leaving still promised works by such men as L. Alma-Tadema, R.A., J. E. Burgess, A.R.A., Fred. Goodall, A.R.A., E. Blair Leighton, A.R.A., H. S. Marks, R.A., Sir J. E. Millais, R.A., Joseph Nash, R.I., J. W. Waterhouse, A.R.A., and over 100 others yet to come in. The collection naturally includes not a few frames containing familiar studies or pictures which have seen the light on more than one occasion, while there are some which, if the truth must be told, should never see the light again, at least in such company as that in which they now appear. These will, we suppose, count as so many prizes, and thus swell the attractions of the list to the general public. We question the wisdom, however, of showing such things, especially when there are so many really good pictures presented to the Art Union. To notice all such contributions or even a fair percentage of them, would take far more space than remains at at our disposal here; but we will briefly go over our notes as they appear in the catalogue. Sir James D. Linton, the president of the Institute, gives an exquisitely finished study of a girl's head in a white mob hat, calling it "Ellen," a charming face treated with considerable thought of Jessie Lidwell, in massive mouchoirs rests the painter's strength, while he generally fails in composition. Mr. E. M. Wimperis, R.I., sends a characteristic "Autumn Evening," and Mr. Ernest Parton delights us with a glimpse of the river called "The Thames at Maple-durham." Few can paint old architectural-esque subjects of a grandiose kind like Mr. John Fulleylove, R.I. His "Window of the Long Drawing-room, Hardwick Hall," is a scrupulous rather for want of interest in the subject: but Christ Church, Hants, down the gardens looking over the water where the hollyhocks grow, is a rich specimen of his work which one would be fortunate to own. Mr. F. G. Cotman, R.I., gives us a harmony in greys and yellows, called "Mending the Lock," and Mr. Seymour Lucas, A.R.A., sends a sketch marked "The Reader," a bold-ing figure in light tones, ruby plush breeches, wide collar, and blue sash. Mr. C. Burton Barber seldom fails to win a hearty approval, and "Kittens" is sure to be popular as a solid piece of work illustrating a young girl seated in a wicker armchair playing with a little cat. There is, however, more true grit in Mr. Edwin Hayes's "Dutch Boats Waiting a Signal to Reach Scheveningen," and we find more sentiment of thought and idea in the "Dinner Hour" by Mr. J. C. Dollman, R.I. In this latter we like the subdued tones and attention for holidays without glare, and the scenery without mere greenness. Two tired plough horses rest by the roadside while the ploughboy takes his modest meal under the shady hedge. Nothing could be more unsophisticated, and yet the picture illustrates a page of real life very cleverly. Mr. Edwin Hayes, R.I., is generally seen at his best in his smaller canvases of Scotch scenery, and "On the Shore of the Moor" is certainly one of these, which, like "Near Nuneham, on the Thames," by Mr. R. Hallgarten, would be welcomed in any home. Of still life there are perhaps, not many specimens; but "Wallflowers," by Miss C. H. Norman, is a fine one. Mr. Charles Green, R.I., is fortunately much interested in the Art Union, and therefore has given three or four of his masterly drawings of Old English life to the exhibition. "Tête-à-Tête" is one of them. On a blue satin sofa, by a sombre red curtain in front of a century damask wall, sit two musical admirers. The girl in a white silk frock powdered with roses and set in black knee breeches costume and a grey wig. An old fellow "Taking Snuff," by the same hand, is quite Meissonier-like in finish and "A Fleet Marriage" too, is another specimen from Mr. Green's fertile pencil. The "Place d'Armes, Vitre, Brittany," by Mr. L. J. Wood, R.I., is an architectural water-colour; and "Amused," by Mr. F. P. Bassano, is another. Messrs. Arthur Severn, R.I., S. P. Dadd, R.B., and James Orrock, R.I. send other beautiful pictures in pastel ones; and Mr. A. E. Haigh, ever charming in his work, graces the gallery with a "Quiet Corner," "Toulouse," "Every Time Mark's Appeared For your Thief" by Mr. Frank Dadd is a comical picture, admirably rendered of highwaymen.

THE SOCIETY OF ARCHITECTS AT YORK.

DURING the present week the members of the Society of Architects are holding their annual meetings in the ancient city of York. An informal reception of the visitors took place at the Church Institute on Monday afternoon, and shortly afterwards the members of the society visited the Guildhall, St. Martin Church, the Merchants' Hall, and other places of interest in the city. In the evening the first meeting was held at the Church Institute, when the chair was taken by Mr. W. Hopper, President of the York Architectural Association. The chairman, on behalf of the local association, gave a hearty welcome to the visitors, and then referred to the Architects and Engineers Registration Bill, which it is proposed to have introduced to Parliament next session. He was sure that the society was doing the right thing in promoting the Bill, as it was evident that something was done to place the profession on an equal footing to that of the surveyor or engineer, and it would give it a more standing and better social position. For the welfare of the public also, it was necessary that architects should be properly qualified to undertake and sanitary science as well as to art, and in order to ensure the possession of the necessary qualification, it was necessary that compulsory examinations should be held.

Mr. Hugh Roumieu Gough, F.R.I.B.A., past-President of the Society, then read the following paper on

THE ARCHITECTS AND ENGINEERS REGISTRATION BILL.

The subject which we have met together to-night to consider is undoubtedly one of the

most important which has ever occupied the attention of our profession. At the present time we are without organisation, and it is open to anyone, however ignorant he may be of construction and sanitary science, building materials and labour, and the cost of the same, to call himself an architect or engineer, and to practise as such, provided only that he can find clients to intrust work to him; and, alas! we all know how easily such charlatans do secure work, to the lasting disgrace of what should be a noble profession. What would be thought now if any ignorant person could, of his own will and pleasure, and without any previous training, commence practice as a doctor or a lawyer, and what would be thought of those foolish enough to employ them? The object we have in view is to raise our profession to the status enjoyed by medicine and law, and one would scarcely think it possible that any reasonable being could oppose such efforts as we are making. Ask any medical man or solicitor what he would think of getting rid of registration and examination as a test of qualification to practise, and he will probably doubt your sanity; yet such are the jealousies, ignorances, and vanity of many members of our own profession, that there are men calling themselves architects, and even enjoying good practice, who are vainly opposing a scheme intended for the benefit of their fellows no less than that of the public at large. It has been a study of mine for very many years past how to bring about the genuine reform of our profession, and when the Royal Institute of British Architects was considering the question of a new charter I made endeavours to secure the adhesion of all in practice to that body, in the hope that efforts might then be made to obtain the necessary legislation. The resolutions I proposed were ridiculed by the *Builder*, which is rightly or wrongly looked upon as the organ of that body. I then turned my attention to the Society of Architects, in the formation of which I had taken a deep interest, and which did me the honour to elect me President in two successive years. The energy shown by the Society seemed a striking contrast to the apathy of the Institute, and that this energy has been appreciated may be seen in the fact that we, in the commencement of our fourth year's existence, number more members than the Institute did after 25 years. Let it not be thought for one moment that I wish to speak ill of the Institute, of which I am a Fellow of many years' standing. I would gladly see it take the lead in every effort made for the well-being of our craft, and fully recognise the fact that it ought to do so. I heartily approve of the excellent examinations it has appointed for those desirous of becoming associates; but what I feel is that these examinations, although of the greatest benefit to those who qualify for them, are practically useless to the profession at large until they are made compulsory on all desirous of calling themselves architects. The same remarks of course apply to the Institution of Civil Engineers' examinations. So long as men can practise without any examination to test their qualification and right to do so will these examinations be useless to the profession at large, however beneficial they may be to individuals. We all know that there are many able men, about whose skill and qualifications there cannot be the shadow of a doubt, who belong neither to Institute nor to any professional society whatever. It is these men and others who have won their reputation already, and have nothing to gain themselves by such An Act as we seek to obtain, who are our opponents. One, I know, has declared that he would rather retire from practice than register under the Act. Can anything be more short-sighted? It is perfectly true we cannot make men artists by Act of Parliaments, but we can insure that all shall have a proper technical education, and learn the art of construction before commencing practice, and gaining, if he ever does, his knowledge at the expense of his clients. We have, alas, already too many merely artist practitioners, ignorant of materials and construction, and I say unhesitatingly that these gentlemen are a very curse to the profession. They openly say they are above mixing themselves up in trade affairs; they are totally unable to estimate the value of work, and such a prosaic matter as the drainage and ventilation of a building is left by them to their quantity surveyor. No wonder that their clients think them, when too late, either knaves or fools, and imagine the entire profession may be included in these terms. Much has been said to me about the expediency or otherwise of including civil engineers in the Act we are endeavouring to obtain. Can anyone say that these are two distinct professions? Examine the derivation of the term "architect," and we find the meaning to be "chief constructor." The same knowledge which every architect requires and ought to possess to enable him to design a girder, say, for a shop front, is precisely the same which the engineer needs to enable him to bridge over a river or a railway. The only difference I can see between the two branches of the one profession is this—viz., that at present the architect too often is very ignorant of construction, and unable to calculate the strains upon a truss or girder, though frequently a man of much artistic taste, and that the engineer, on the other hand, is usually a perfect master of construction, but generally utterly devoid of, and caring nothing for, art. How is it possible to separate the two branches? Hideous as our railway stations, factories, and warehouses usually are, can anyone say that engineers are incompetent to build them? Of course not. The architect must study construction, the very root of his calling; and the engineer must study art, and learn to ornament his construction, and the two will be found to be but one profession which never ought to have been divided, and which probably never would, had it not been for the great rush made in the early railway times, when in the fevered heat men did not pause to study appearances, but only thought of how to construct with safety, quickly, and cheaply. The true "chief constructor," whether you call him architect or engineer, must learn to do all this and something more: he must bring artistic power to bear upon his work and render it beautiful, or, at least, pleasing to the eye. I do not propose to attempt anything like a detailed explanation of the various clauses of the Draft Bill. Indeed, so little time have I had at my disposal in which to prepare a few remarks by way of introducing the subject for your consideration and discussion, that I must necessarily content myself with advocating the general purpose of the Bill—viz., that of registering all at present in practice or duly qualified, and making it hereafter compulsory upon all who desire to practise as architects or civil engineers, that they should receive a proper professional training, and pass such test examination or examinations as may be deemed necessary by the General Council. I trust that all here who have not already done so will procure for themselves a copy of the Draft Bill, and carefully study its provisions, and then favour the committee over which I have the great honour of presiding with any remarks or suggestions which may occur to them. The Bill, as drafted, is based mainly on the Medical Acts and others of a similar character, such as the Act to amend the laws relating to Attorneys, Solicitors, &c., 1860, the Pharmacy Act, 1868, the Dentists' Act, 1878, the Veterinary Surgeons' Act, 1881, the Law Agents (Scotland) Act, 1873, &c. Those who desire to thoroughly study this most important subject, should obtain and carefully consider these Acts. We have received much valuable help and advice in our labours from Mr. Ed. Trimmer, the energetic secretary of the Royal College of Surgeons, and from various officers of the Society of Medical Officers of Health. It would be impossible to over-estimate the benefit such advice as theirs has been to us. The Medical Acts are so very similar to what we require, that no better model could have been found, and we have this advantage—that we are able to base our draft on their latest Act, which contains all those requirements and improvements which have been found, from actual experience, needed. That the public desire to see such a reform of the profession as I am advocating has been amply evidenced by articles and letters in the *Times*, *Morning Post*, *Standard*, *Daily Telegraph*, and other papers; and in the monthly magazine or review entitled *Time*, a valuable and very carefully-written leader appeared a short time ago. That our profession is in favour of such legislation may be seen from the following few figures. A circular was issued some months ago to 2,500 architects, with the following form of declaration f signature:—

"Whereas we, the undersigned, are of opini that it is for the benefit of the public and t architectural professions alike that legislati powers should be obtained, so that all perso hereafter entering the profession shall be du qualified by examination, we are desiro that committees should be formed to promo the object in view, and to obtain the necessa Act of Parliament."

Of these 2,500 circulars, 1,500 were sent architects not being members of the Roy Institute of British Architects, and over 1,1 were returned signed in favour. Of 1,000 se to members of the Institute about 180 replied i favour, but of this number some 20 withdre on receipt of a circular from the Institut pointing out, what was very well known b fore, that the movement did not emanate fro that body. Had it done so, I have very litt hesitation in stating my belief to be that 9 out of the 1,000 would have declared themselv in favour. Of course, the 20 who withdre agree to the principle, but think the Institu the proper body to move—and in this I perfectl agree with them; but the Institute does n take action, and, after all, it is the measure w care for, not the men who carry it out. Pe haps I am not strictly correct in saying t Institute has taken no action, for in May las at one of their open conferences, papers we read upon the subject, and a resolution i favour of such legislation was only defeat by the casting vote of the chairman, and a amendment substituted and carried that t subject be referred to a committee to consid and report upon. Whether anything furth has been done I know not. One of the cor monest objections I hear urged against t registration of all at present in practice is th we shall be obliged to include many who qualifications, to say the least, are of a lo order, and whom, perhaps, some would rath not recognise; yet other bodies have had to the like. We cannot attempt to exclu any who are making a living by their prof sion, and so long as they act honourably, the names must appear on the register. There surely no hardship in this? At the present ti their names appear in the Post Office directori and on brass plates. Existing societies are n in any way interfered with, and they can be exclusive as they like. They can admit membership only those who have proved t their works their title to the highest honou or they can admit only those who have be in practice some specified number of year but until all are united in such a manner compulsory registration makes it possible, t status of the profession can never be raised the dignified position it ought to occupy. T register, instead of placing all on an equali as some seem to fear, will do the very opposit for it will give the various titles and distin tions of those who are entered in it. Thus o may be simply registered as an architect, su veyor, or civil engineer, whilst another ma appear as a Fellow of his Institute, Membe of Council, Gold Medallist, Fellow of t Society of Antiquaries, Master of Arts, & Another objection taken is this. It is said b some that the Act will not benefit the publi because it will not prevent jerry builde putting up badly-constructed and insanitar dwellings. It is true we do not attempt for moment any such drastic measure, which coul only end in the utter defeat of our objec What we have to do is to teach the public tha it is an advantage to employ a qualifie architect, and we shall never succeed in th until we compel all to become properly qual fied. Indirectly the Act will undoubtedly ha a very important effect in ridding us of t jerry builder's fever dens. After the passing the Act no unregistered person will be allowe to take or use the name or title of architec civil engineer, or surveyor, nor to hold an public appointment. The result will be this that all town and borough surveyors, &c., wil like medical officers of health, be proper qualified practitioners, and I will not enlarg upon the importance of this further than point out the enormous advantage it will be t the public to have such a staff of skilled officer whose interest it will be to see that work properly carried out and that the building law and regulations of their respective localities a made such as they should be. The Act w

thus give the public an efficient staff of officers whose duty it will be to protect them from the evils of insanitary and badly constructed dwellings, and this without cost. We all know how thoroughly and conscientiously medical officers of health carry out their duties, and I venture to think that they will find the registered architects and surveyors of the future their best and staunchest allies. Those who doubt that the legislation we are seeking will do any good either to ourselves or the public, must, if they be consistent, say that we could afford to throw over the protection and benefits of the Medical Acts, and throw open such important offices as those held by medical officers of health to chemist's assistants, nay, even to their shopboys, or, in fact, to any one with impudence enough to undertake such appointments for the minimum payment. This, for want of organisation and State recognition, is what is happening daily in our own profession, and we constantly read of builders' clerks, inspectors of nuisances, and others of far less knowledge, or no knowledge at all of building, undertaking the office of parish surveyor, a post which, of course, should be filled by a properly qualified practitioner. The task we have undertaken is no light one, but all can help us by advocating the cause whenever an opportunity presents itself. Hitherto the committee have borne the expense themselves, with some aid given by the Society of Architects, but to carry our labours to a successful issue further aid is needed. How best to raise the requisite funds is a matter occupying the serious attention of the committee; but if all who take an interest in the passing of the Act were to give a small subscription—and it need be only a small one—this difficulty would be speedily overcome. Another plan which I have sometimes thought might be adopted would be for the committee to open a provisional register of all those who would be qualified under the Act, charging a small fee for registration. This is a matter which probably may be discussed presently. I cannot conclude these brief remarks without impressing upon all the importance of doing their utmost to strengthen the existing professional societies, and agitating within them the need of the proposed legislation. Your own society here might probably be largely increased if every member made up his mind to introduce another within the present session. Those who prefer joining the Royal Institute of British Architects may render good service to the cause, as every vote we can get there in our favour is of consequence to us, and I am sure I need not tell you that those who like to join the Society of Architects will meet with a hearty welcome. In all or any of these ways you will be helping forward a cause which I trust you are all sympathisers with.

The Chairman, in opening the discussion, said he knew that the Royal Institute of Architects did not look very favourably upon the proposed Bill, and it seemed to him a very strange thing that there should be any opposition to it; it seemed so self-evident that there should be an examination for architects. If the examinations were compulsory, students would be compelled to work up to the required qualification, and that would not only have a beneficial effect upon their future life, but it would also be greatly to the advantage of the public generally. Some persons said builders were more practical than architects; if it were so in any instance it ought not to be allowed to continue, for architects ought in all cases to be able to teach the builders.

Mr. E. Farman, London, hon. sec. of the Society, gave a sketch of the movement that had led to the Bill being drawn up for submission to Parliament. What was wanted was a compulsory examination. That society did not wish in any way to interfere with the Charter of the Institute of Architects, or with that of any other society. All they desired was that there should be a general council like the General Medical Council, which should have supervision over the examination, and should represent architects from all parts of the United Kingdom, each district having its own representatives on the council. In the Bill proposed they did not want to take away the power of the Royal Institute; they were willing that the Institute should be the examining body, but they desired that the general council should have the supervision of the examination, and be able to step in should the examination be made too easy.

Mr. W. J. Moscrop (Darlington) said as a non-society man he thanked the society for the trouble they had taken in preparing the Bill. He thought they had done a great work, and forced the question forward at least 25 years. He congratulated the society on their having proposed that the Institute of Architects should be the examining body. He had never been able to make up his mind that it was desirable to include engineers, and surveyors, and architects in one Bill. He thought that as time went on the distinction between these branches would be more clearly marked than at present, for although it might be policy to include them all in the Bill at present yet difficulties would arise in future. If the ranks of the profession could not be closed by the Bill proposed, he should like their opponents to say how they would do it. By the proposed Bill they would stop the "quacks"; if they could not prevent them practising altogether they would prevent them holding public appointments or recovering fees in courts of law.

Mr. A. Pollard, of York, thought that although there might at first be some little unpleasantness connected with the working of the Act, yet the profession would derive benefit from it afterwards. If registration became a matter of fact, youths on leaving technical schools would be better qualified when they left school than many were now on leaving the architect's office.

Mr. W. G. Penty, York, said that they were much indebted to the Society of Architects for the great efforts made in drafting the Bill, and everybody, he thought, must be impressed by the very disinterested way in which they had framed the various provisions. Although they were opposed by the Royal Institute of Architects, they had not tried to take from them the power they possessed, and which they ought to have exercised. The great question was, Was the Bill desirable? He thought there could only be one opinion on that matter, and therefore the next thing for them to do was to consider the best way of obtaining the Bill and protecting the profession. He referred to the fact that assistants according to the Draft Bill were required to have acted as such for eight years before they could commence business as architects. He thought the term might be reduced, and he pointed out that the effect of compulsory examinations would be to make articled clerks apply themselves more diligently to the profession. He thought builders would have no cause to grumble about the Bill. They would not lose work. Architects did not profess to become builders, and therefore would not interfere with them.

The discussion was continued by Mr. Jeffry (Kent), Mr. Benson (York), and Mr. Burleigh (York); and Mr. Gough replied.

On Tuesday, the members of the Society visited Beverley and Hull, where they inspected the chief buildings, including the Minster and St. Mary's Church at Beverley, and at Hull—where Mr. Robert Clamp, A.R.I.B.A., acted as guide—the parish church of Holy Trinity, the Dock Offices, Town Hall, and Market Hall. In the evening, a meeting was held in the Church Institute, York, when Mr. Edgar Farman occupied the chair.

YORKSHIRE ARCHITECTURAL ART.

Mr. W. Hepper, president of the York Architectural Association, read a paper on "Yorkshire Architectural Art." He said in selecting the place in which to hold the visit of the society he thought it would have been impossible to have chosen one more suitable than the county of Yorkshire, or a more important place than the ancient city of York. What county existed that abounded with more works of architectural art than Yorkshire, or what city or town was there in which Mediæval remains were of a more interesting character and historical value than were found in the ancient city of York? Yorkshire was almost the foremost of all counties in every branch of Mediæval art. It was replete with monuments of the most magnificent character; it was full of the remains of as magnificent abbeys, churches, and estates as England could boast of, all of which charmed the eye of the traveller, found employment and enjoyment for the antiquary, and endless food for the architectural student. In the city of York* alone, within a stone's throw of each other, were old churches, abbey, cathedral, manor-house, bar walls, half-timbered houses, and other works, all of which counted among the glories of Yorkshire. Foremost among the Mediæval works of which the county could boast were its cathedrals, of which there were three—York, Beverley, and Ripon, and foremost of these, not only in Yorkshire but Great Britain, was the noble and glorious Minster,† the finest of all English cathedrals. There might be studied Mediæval architecture in all its phases; the Norman in the crypt, with its massive moulded pillars and carved capitals, all in the most excellent preservation; the Early English in the transepts, one of which had so ably been restored by the late Mr. Street; the unique Five Sisters' window; the Decorated style in the chapter-house, with its delicate carving, and in the elegant proportioned nave famed for its west window with heart-shaped tracery; its magnificent western towers, shorn of their beauty by the Parliamentarians, who took away and destroyed most of the carved figures figures with which it was adorned. The splendid western front, the glory of the cathedral, had been compared to Rheims for richness, sublimity, and beauty of architectural design. Lastly, the Perpendicular style was to be found in the upper portion of the west towers and in the grand choir, with its nine-light east window, one of the largest windows in the world, filled with stained glass, and representing all the subjects of the Creation. Here from a gallery which crossed the window a magnificent view of the whole cathedral was obtained, and the visitors could not but feel the wonderful skill shown by their ancestors in designing and carrying out such a glorious work. He would not close his remarks about the Minster without mentioning the beautiful oak reredos designed by Mr. Street, and decorated by Mr. Bodley, which now adorns the altar. The stained glass also was unusually perfect and ancient, and although there were some windows by Peckett in the 18th century, there were very few of the tasteless productions of the earlier part of this century. Second to York was Beverley Minster,‡ which they had that day visited. In the 17th century, civil war and pestilence, bringing ruin upon the inhabitants of Beverley, nearly brought the Minster to the verge of ruin. It was, however, repaired in 1717 in the Debased taste of that period; but fortunately a more tasteful restoration at the commencement of this century restored the building to more nearly its pristine glory. The eastern portion of the building, including the transepts, is mostly in the Early English style, except a later insertion of an east window, made in manifest imitation of the east end of York Cathedral. The nave was Early Decorated with Geometrical windows and flying buttresses, the ornate north porch and the west façade were in the Early Perpendicular style. The interior of the Minster was a grand field for the student of Gothic, in all its styles, commencing with the plain pointed lancets. Ripon Cathedral§ had been restored by Sir Gilbert Scott within recent years. During the early part of this century a new roof and ceiling was placed over its nave, the choir groined and the windows repaired. The western façade of the cathedral is one of the best specimens of Early English architecture in the kingdom. On the north side is the transept in Transitional Norman work, adjoining the Perpendicular nave. The choir is partly Decorated, but a portion of the original clerestory remains. The interior of the North transept demanded attention, as presenting a continuous and elaborate specimen of Transitional Norman. Beneath the centre tower, after travelling along a narrow passage 45ft. in length, is the far-famed crypt called "St. Wilfred's Needle," the purpose of which seemed to have been for retirement

* See various sketches in city in the Building News for Feb. 12, 1875.

† The following illustrations of York Minster have appeared in the Building News:—Archbishop Gray's Monument, June 5, 1874, Aug. 18, 1876, and May 9, 1884; Archbishop Grenefield's tomb, Sept. 7, 1883; archbishop's palace, April 4, 1884.

‡ Measured drawings of the north-east transept, by H Downs, were published in the Building News for July 18, 1884; the altar, &c., Feb. 22, 1883.

§ See illustrations in the Building News for June 22 1877, and Dec. 9, 1881.

and penance. In the choir was to be found a harmonious admixture of three styles, and also a remarkable arrangement of two tiers of windows, which was obtained by glazing the traceried apertures of the triforium. The chapter-house and vestry are attached to the south aisle of the choir, under which was a crypt of Early Norman work. Next in importance to the cathedrals must rank the ruins of the numerous ancient abbeys and priories, which abound in this country. In York they could boast of the celebrated ruins of St. Mary's Abbey.* In sketching the history of this abbey, Mr. Hepper said that in 1088 William II., finding the monastery which then existed too small, laid the foundation of another with his own hand. At the Dissolution the abbey was retained by the Crown, yet it shared the fate of religious houses in England at that period. What chiefly tended to the speedy overthrow of the Church and conventual buildings was the order issued by the Crown to erect on the site a palace of the Lords Presidents of the North. The monastic buildings furnished abundant material for the stately edifice. When it ceased to be used as a palace a large portion of its walls, which had gradually fallen into decay, were granted in 1701 to the magnates of the county to be employed in building the gaol, and afterwards to other places. For instance, in 1707, the Corporation of Beverley were allowed to carry away during the space of three years as much stone as might be required for the repair of Beverley Minster. A kiln was erected upon the site to burn lime, and thus perished one of the finest of the English Abbeys, the ruins of which now remaining are protected by the Yorkshire Philosophical Society. Sufficient, however, remained to show the extreme beauty of its architecture. In 1132 certain of the Benedictine monks of the Abbey of St. Mary's, at York, disgusted with the relaxation of discipline there displayed, determined to migrate to a place where monastic manners were practised with more severity, and determined to embrace the rules of the Cistercian monks. They went and founded the Abbey of Fountains†, four miles from Ripon, in the splendid grounds of Studley, and no ruin in Yorkshire was better known or more visited than that. Art and nature alike had striven to adorn that delightful valley with their choicest treasures. The building, when complete, covered twelve acres of ground, but the ruins now remaining occupied only two acres. The refectory was remarkable for its beautiful proportions and simple and graceful architecture. The gloomy vaults and the cloisters form a double arcade 300ft. in length; in fact, Fountains Abbey became one of the wealthiest monasteries in the kingdom. In reviewing the habits of the monks who lived in the old abbeys, Mr. Hepper said those who lived in Fountains Abbey were of the Cistercian order, and nearly all the abbeys of the order were dedicated to St. Mary. The whitewash on the walls was their only decoration. The glass was generally plain, and never more richly ornamental than with grisaille patterns. The abbeys of this order were very numerous—Yorkshire: Fountains, Kirkstall‡, Rievaulx, Kirkham§, Roche, Jervaulx, Byland, and Bolton, all belonging to it. Mount Grace Priory was the most complete ruin extant belonging to the Carthusian monks. One peculiarity of this order was that the monks had a house each with a garden to himself. The houses formed three sides of a large inclosure, the fourth being formed by the church and prior's residence. The cells, which were two stories high, were in fair preservation, and the curious hatchway, through which food was given to the monks, was plainly seen. There was a small church and large cloister. Each monk had a living room, with bedroom and storerooms—a narrow stair 2ft. wide led to another room, the use of which was not clearly known. The priory was about eight miles from Northallerton, and was founded in the fourteenth century. There are only nine Carthusian houses in England. The buildings were long, narrow, and aisleless, for, like the stern Præmonstratensian Canons, the Carthusians wanted no congregations, and cared for no processions. Of the abbeys belonging to the Præmonstratensian orders were those of Easby* and Egglestone. Among the Augustinian abbeys were Bolton† and Bridlington priories. The choir of Bolton Priory shows some beautiful work of the Norman period, with circular interlacing arcading all round. The upper part is in the Decorated style, with tracery windows. The nave has been restored by Mr. Street, and is now used as a parochial church. Around the church are a good many conventual buildings, and the prior's dwelling. The gate house remains in entirety, and with various additions forms a shooting box of the Duke of Devonshire. On the walls of the lower story are some curious frescoes, the work of monks, and represent deities and devices, but it was only when the glory of Medieval architecture was declining that the heathen emblems came into favour. Bridlington Priory was founded in the reign of Henry I. After a brief reference to Whitby Abbey,‡ Mr. Hepper proceeded to speak of Kirkham Abbey and the Abbey of Byland. The last named, he said, was the ruins of a beautiful Cistercian monastery, perhaps once the finest in England. He then referred to the collegiate and abbey churches. Among those which had been converted to parochial use he noticed the churches of Selby, Howden, and Nun Monkton. The parish church of Selby, he said, was the glory of that town. Having during recent years been restored by Sir Gilbert Scott, it now presents one of the finest examples of a conventual church to be found in England. The central tower fell in 1690, destroying the south end of the transept. It was replaced by a small erection in the Debased style. Rich Norman work beautifies the nave, showing its different gradations from Early Norman to Transition. The choir is an example of Decorated work in its best period. The east window of seven lights is a notable example of flowing tracery. St. Peter's, Howden, stands unique among churches of its own individualities. It is neither cathedral nor parish church, and yet it has something of both in its composition. In the days of Edward the Confessor it was connected with the Benedictine Abbey of Peterborough. Until 1267 it was a parish church with a rector, but it then became collegiate. The west front is exceedingly fine, and a centre tower rises 135ft. At Nun Monkton Priory are no remains of any importance, except the church, which is a gem of Early English architecture. It was restored and reroofed by Mr. Crawhill, of Nun Monkton. The porch is fine Transitional Norman. He next referred to the parochial churches of Yorkshire, first noticing those of the City of York—Castlegate, Coney-street; All Saints', Pavement; and St. Michael-le-Belfry—as generally representing the Perpendicular style. Of these, St. Mary's, Castlegate, with its elegant spire, was restored a few years ago by Mr. Butterfield. All Saints', Pavement, was originally a Decorated church, but very little of that now remains, and it is noted for its fine lantern tower. The churches of St. Margaret and St. Dennis are noted for their fine Norman doorways; St. Mary's, Bishophill, junior, for its supposed Saxon tower. Holy Trinity, Micklegate, was originally a priory church of great beauty; nothing remains, however, of the old church except the nave arcade and some ruins of one bay of the triforium and clerestory, and of the western doorway. Among the numerous parish churches with which this county abounds, one of the most noteworthy was that of Doncaster, which was burnt down during this century, and entirely rebuilt by Sir Gilbert Scott. It was originally a Perpendicular church; but he rebuilt it in his favourite style of the Geometrical Decorated. After referring briefly to Thirsk, Northallerton, and Hemingbrough churches, Mr. Hepper proceeded to speak of some of the ancient castles in the county, including Tickhill, Conisbrough, Pontefract, Sendal, Cawood, Harewood, Knaresbro', York, Skipton, Scarborough and Middleham* Castles. Among examples of domestic architecture he would refer to Wentworth House and Castle Howard. Two miles from York was Heslington Hall, a fine example of the Elizabethan period. In York itself were many examples of domestic architecture. The Manor House and St. William's College were among the largest of these, the last-named being of the Perpendicular period, and a favourite haunt of the architectural sketcher. Having referred to the architectural features of the King's Manor House, he now reminded them of that magnificent example of Classic Architecture, the town hall, Leeds.

On Wednesday, the members of the Society visited Leeds, where they saw the Town Hall, Corn Exchange, Mechanics' Institute, and St. Peter's Church, and afterwards proceeded to the Cistercian Abbey of Kirkstall and Adel Church—the latter a Transitional Norman building, illustrated in our pages on May 20, 1870, and April 30, 1875, and in the evening a conversazione was given by the York Architectural Association at the Fine Arts Institute, York. Yesterday (Thursday), an excursion was made to Ripon Minster and Fountains Abbey, the evening meeting in York being devoted to a discussion on "Architects' Charges," opened by Mr. Edgar Farman. To-day (Friday), the programme includes visits to St. Mary's Abbey and York Minster, and closes in the evening with a discussion on "Yorkshire Building Stones."

* Illustrated in the BUILDING NEWS for July 6, 1877 and Dec. 15, 1883.

† See illustrations in the BUILDING NEWS for July 6 and Nov 9, 1883, Aug. 7, 1874, and Nov. 26, 1875.

‡ Illustrated in our issues of March 30, 1882, and March, 4, 1877.

§ See two illustrations in BUILDING NEWS for March 17.

* See the late Rev. Mackenzie Walcott's plan of conventual buildings, in our issue of Dec. 26, 1879.

† The house and vicarage at Bolton were illustrated in our issue of July 6, 1883.

‡ In the BUILDING NEWS for Oct. 29, 1869, was published a detailed account of the abbey, with perspective of interior of north transept, both by Mr. E. H. Smales. Sections of mouldings by the late Edmund Sharpe were given in our issue for Aug. 25, 1871; a view of east end of choir sketched by "W. C.," May 4, 1877; a drawing by Mr. Jas. Langham of exterior of north transept, June 28, 1878; and a series of measured drawings by Mr. A. P. Garston, July 2, 1880.

EDUCATION, CULTIVATION, AND EXAMINATION.†

THE subject upon which I am to address you to-night is Education, Cultivation, and Examination, and I cannot, I think, better open it than by quoting a striking observation of the present President of the Architectural Association. "A most important discovery has been made within the last few years," remarked Mr. Slater, "that is, that one necessity for an architect is a thorough education, and the results of this discovery must have very far-reaching effects on our profession." These words formed the close of the paper on "New Inventions and Discoveries," read last May before the Conference of Architects, and though there is a strong spice of humour in the introduction of them there, and as they stand, that humour only serves to make their truth the more forcible, and their truth the more pungent. The pleasantries of a wise man sometimes discover his weightiest thoughts, just as it is the jokes of a fool which first betray the emptiness of his head. I cannot hope to-night to throw any startling light on the subject of education for architectural students, or to say much that has not been well said already; but I hope I may be able to add my voice to those which are calling upon the rising generation of architects so to train themselves as to take the place in society to which our noble profession entitles them. And appearing here as Professor, and also as one of the Council of the Institute, I am not sorry to have an opportunity of saying a word upon the action of this College as an educating body, and that of the Institute of Architects as an examining body. I should like to add that as this subject is an extremely large one, I have limited myself to what I thought would be useful to the audience for whom this lecture is written—an audience of London students or intending students of architecture. The object of education is to equip the scholar for the part he has to play on the stage of the world. The modes of doing this are various, and they meet with infinitely varied success; but, broadly considered, their action may be divided into *teaching* and *training*. The first communicates knowledge, the second develops power; the first prepares a man for his work, the second fits him for his life. This distinction, as I have hinted, comes out from

* Illustrated in the BUILDING NEWS for Aug. 28, 1874.

† By Prof. T. ROGER SMITH, F.R.I.B.A. A public introductory lecture to the Classes in Architecture at University College, London, delivered on Wednesday night last, Oct. 5, 1887.

a broad review of the subject of education. It eludes us if we attempt anything resembling a microscopic analysis, but it is none the less real because the boundary line is not capable of being sharply drawn. There is, perhaps, no study which can be said to be exclusively valuable as conveying information, and to be powerless to influence character or to develop powers of mind, just as there is none which can be looked upon as solely a mental discipline, and of absolutely no value as an acquisition; and yet there can be no manner of doubt that a certain course of study will convey more information than training, while a different course will be of more use as discipline than as doctrine. For the most part, instruction is the obvious and often the sole apparent object; development is the less patent result, and apparently less intended. On the whole, the theory of education received among us has seemed to be that a schoolboy's training ought mainly to be directed to furnishing him with a series of almost indispensable acquirements, and any mental discipline which is gained in the process is so much thrown in, while he who continues his studies at college, or elsewhere, and takes his degree, does so chiefly, if not exclusively, for the purpose of developing the power and faculties of the mind. The first is often spoken of as education, the second as cultivation. I am not clear that this distinction between the two words is quite accurate; but it is a received one, and it was to indicate these two branches of the subject that I introduced both these terms into the title of this lecture. There are many occupations, and even some professions, in which a person of very moderate general education, if he knows his business thoroughly, and devotes himself to it exclusively, may run a very successful career, that is to say may do much useful work and make money. I do not think this has been to any extent true of architecture in the past, and I feel little hesitation in saying that it cannot be so in the future. In this metropolis, and in every great business centre there are scores of men to be found who, after a short and not very profitable course of schooling, were at an early age set down to the desk, or the counter, or the factory, who through long years toiled and worked till every detail of their occupation became as familiar to them as their meals or their clothes, and who by honesty, industry, and enterprise, aided by some favourable circumstances which they were able to turn to account, have attained competence, prosperity, fortune. Perhaps some of you have made the acquaintance of the butterman in "Our Boys," and you may take him as an illustration—though a caricatured one—of the man of limited education who becomes rich. He has little general knowledge, less cultivation, his range is very limited; but he has the shrewdness and knowledge of affairs that a busy life gives, and he possesses in perfection so much as he wants of acquaintance with his business—in vulgar English, he knows his trade, and nothing but his trade. There are some professions—even some high ones—especially those which can or must be pursued to a great extent in solitude, and which do not bring him who pursues them constantly or frequently into contact with his fellows—where it is possible for a man to rise even to the highest eminence, who yet is extremely limited in general knowledge or culture. Turner, the great landscape painter, and Paganini, the violinist, may be cited as examples of the most trancendant powers, but of very little general cultivation. This is not, however, necessarily the case with a great painter or a great musician, as may be proved by many examples of high cultivation in both professions. There are other callings where, from the nature of the work to be done and the circumstances under which it is performed, a considerable amount of general cultivation is almost essential to great success, and among these I am disposed to class architecture, while, independent of professional success, there can be no doubt that the man of varied information and carefully-trained powers will lead a far happier life, and have far more opportunities of being a useful and an influential member of society than the mere specialist, if he will only remember the rule that his profession must have the first place and his accomplishments be all kept subsidiary to it. There is a third object towards which at the present day teachers and scholars alike only too often all but exclusively direct their efforts. I need hardly say that I mean passing examitions. Properly speaking, an examination is intended as a test of education, or rather that is its theoretical function. Practically, at the present day the whole aim of a large part of that which we call education is to get men successfully through one exam. after another. This is a very great misfortune. Probably this evil will be corrected in time; but in the present generation the liability of examinations to abuse is a disadvantage which is possibly inevitable, and must be perhaps put up with, as the natural drawback or compensating disadvantage attendant upon the privilege of having been born into the most wonderful and advanced epoch that our country has yet known. I have great respect for an examination so conducted as to show whether a student who has been at work upon a subject with a view to knowing it has made proper use of his opportunities or no. I have some confidence in the serviceableness of examinations as a stimulus to the exertions of the indolent and the unsatisfactory scholar. An examination, of which the programme has been well devised, may be of great use in directing the attention of students to those collateral branches of knowledge which the experience of their seniors leads them to point out as desirable to know. But the pernicious influence of examinations pushed to excess (recognised both by students and teachers alike) is to be felt in all institutions from the elementary school up to this college. It substitutes the art of answering questions for the faculty of learning, and the practice of getting a superficial acquaintance with the facts of a subject likely to appear in the examination papers for the serious and complete study of the subject to which that paper relates. The difference between cramming for an examination and studying a subject is almost like that between an actor learning his part, and for a brief hour seeming the hero, the king, the lover, or the sage, which he is not, and the real king, lover, sage, and hero working out the drama of their actual lives on the world's stage. As matters stand, there is an absolute necessity for spoiling the work of many a young man's best years. He is to be a civil servant, a soldier, a doctor. He must pass certain examinations, and his best teachers are forced at any sacrifice to make sure work of his preparation for this ordeal, and must hope to be able in such scraps of time as can be spared to carry him in some of his subjects further than to the bare limit of the programme, and so to some extent to teach him more thoroughly than is requisite or indeed serviceable for this preparatory, I had almost said mercenary, end. Happily, there is as little about the examination for which architectural students in England are required to prepare themselves which will necessitate cramming in place of study, as there well can be in any examination where the examiners are entirely distinct from the teachers. I believe the fairest of all examinations are conducted by the teachers. I am, for example, able in the papers which I set for students in these classes at the end of each session to put such questions as will show whether they have made good use of their time here, and can do so better than a stranger not aware of what has been taught here, and what is passed by, could do. This, of course, is impracticable in the examination for Associateship of the Institute. It necessarily takes a variety of subjects which have to be variously learned, and has been so carefully devised with a view to fairness that it appears to me that it would be difficult for any student to have much chance of fitting himself for passing except as the result of a genuine acquaintance with the subjects, and not easy for an expert crammer to do much in the way of artfully enabling an incompetent man to answer a set of questions so as to deceive the examiners into passing him. On the other hand, I think no student who has honestly and for a sufficient time studied his subjects under proper guidance, need fear failure. To return to education and cultivation. Higher education, as you know, is sometimes carried on by the help of classical and literary studies, sometimes by scientific studies. I shall not even attempt to suggest which is best, but the results are sure to be different. A literary training brings the student into intimate relations with human thought and human ways, makes him large-minded, widens his scope, and fosters a taste for the literary side of human work. Literature—remarked Mr. John Morley in a recent address—"literature, the masterpiece of literature, furnishes the ideas which guide the conduct and mould the character, and it is upon conduct and character that the future of the nation will depend." Scientific training makes a man accurate, observant, acute; but it is not unlikely to narrow rather than broaden the scope of his mind. His attention is more directed to things than to thoughts; matter more than mind furnishes the subjects of his study; and the exactness of natural science will be reflected in his habits of thought. Let it not be forgotten, however, that this is the day of science—that an almost infinite possibility of work stands open before the man who is scientifically trained—and then even I, whose prejudices all lie the other way, must admit that for many, though not for all, a scientific education is the right thing. But man is a complex creature, and out of the many powers he possesses a good education should not confine itself to the cultivation of one group. Mathematics and modern languages, and now, to some extent, sciences are recognised as properly to be included in the scheme of a good classical education; nor, on the other hand, will the scientific teacher, though Greek and, perhaps, even Latin be denied his scholars, refuse modern languages, and that perhaps most interesting of language-studies—the thorough knowledge of our own tongue from its rise downwards. Self-culture is, however, of more immediate interest perhaps to hearers at the stage which I conclude most of my present audience have reached than scholastic or college courses; and I invite your consideration of these studies and accomplishments, which go to cultivate the mind or the taste, and which may be taken up after school or college has been left, or may be carried further at that stage in our career, even if they were begun at an earlier one. How can I best cultivate my own mind? is a question of the greatest possible importance to young men who find themselves to a greater extent than formerly their own masters with all the responsibility, as well as the pride and dignity of having the disposal of their own leisure, the selections of their own subjects and books, and the choice of their own pursuits. The exercises which more than any other will make raw schoolboys, or youthful collegians into cultivated men, are summed up by the most sagacious of all English writers on life and things in one of his immortal essays. Bacon, writing of studies, in his fiftieth essay says, "Reading maketh a full man, conference a ready man, and writing an exact man." "Reading maketh a full man" sure enough, and nothing is so great a help to the youth who wishes to improve his mind as a taste for reading. However reticent a man may be with his fellows about his work, his discoveries, or his views, when he becomes an author he always puts his whole heart into his book; and so we have ready to our hand on our shelves the very best thoughts of the most gifted thinkers, and the sum of the knowledge of the profoundest students. The best books are now accessible, cheap, plentiful; and for a few shillings a valuable library (even Sir John Lubbock's hundred best books) may be got together. I need not say that trash is plentiful also—and so is poison—and that it is of importance to read the right books, not to read the wrong ones, and to waste as little time over newspaper-reading as possible. I am disposed to press my objection to newspaper-reading a little. It is not that the contents of the newspapers are not often interesting and important, or that the articles are not well written. There is no fault to find with several of the best English journals on this head; but the habit of taking up a paper, skimming the headings, selecting a bit here and a bit there, reading hastily and fastidiously, and forgetting all about it the next day is so entirely opposed to everything that is studious or serious, that, especially if formed early in life, it to no small extent impairs a young man's, or any man's, power of reading steadily and well. When an habitual newspaper reader takes up a book that ought to be dealt with seriously, he is apt to treat it as he treats his journal; and I need

hardly point out that a valuable book dipped into is of not much more service to you than your dinner would be if you merely tasted it. Perhaps, too, it may be worth while to point out that the money spent on a penny paper daily would buy you a shilling volume every fortnight, or at the rate at which shilling volumes can be got, four every six weeks, quite as fast as even with a good deal of leisure you can read valuable books. I do not propose to offer much advice as to reading; but I will hazard one or two suggestions. First, I think few studious youths are the worse for mixing some poetry with more serious stuff, and even the better sort of fiction *in moderation;* secondly, if you have mastered any foreign language, you will be doing yourself a double service if you read a book in that language from time to time. You will keep up your French, German, or Italian, and you will gain the advantage (which is not inconsiderable) of reading a good book (for I presume the selection to be a good one) more slowly than one reads one's native tongue. Let me add here that for your professional training you will depend largely upon books. There are a certain number of textbooks which you ought to have at hand and refer to. There are a very few books, not textbooks, but books like Ruskin's "Seven Lamps," calculated to make you think, and there are books of illustrations, monographs, &c., which you should, from time to time, look through in the libraries. A very good selection of these is named in the little book issued by the Institute of Architects, and containing the programme of examination and advice to students. "Writing," says Bacon, "makes an exact man." Writing well is an accomplishment which does not, as a rule, come of itself, and the value of which, let me add, in our and, in fact, in every profession, can hardly be put too high. No better mode of learning to write is known to me than translation. Here the thoughts or narrative are provided, already expressed in language, and the exercise is to express them afresh and accurately in English, and so a command of words and of the correct use of them are gained. Accuracy is, I think, the most important quality of writing, and the most important result of the habit of writing. Simplicity and directness are of importance also, and possibly the habit of letter-writing may help to develop these. Writing the every-day occurrences of our life to some friend or relative, who will take an interest in what we write, but with whom we have no inducement to attempt fine writing, or laboured composition, is a simple, but often a serviceable, training in the use of the pen; and another practice, useful in itself, as well as in teaching the use of the pen, is the habit of writing abstracts of important books or chapters of books. "Conference," again says Bacon, "Conference maketh a ready man." This includes, with conversation, those more formal opportunities of speaking and discussing which are afforded by the many discussion societies, classes, and similar assemblies which exist. The classes of the Architectural Association and the meetings of that body are, to architectural students, a good means of what Bacon calls "conference," and that readiness which they beget will be found in after life extremely useful. The discussion of materials, construction, planning, &c., which often goes on among clerks and pupils, is another part of the same engagement; and let me add a word to point out the immense advantage to those who engage in it of the almost disused art of conversation. Talking always will go on; but conversational powers are rare, and even good, sensible conversation on topics of interest, without any claim to brilliancy, is rare. If you have the opportunity of talking over your work, your studies, your difficulties, and so forth with any well-informed friend who can talk, and who knows a little more than you yourself do, it is not time lost. I lately heard a successful engineer, addressing the members of a students' engineering society, urge them strongly to keep up the discussions and speak at them for the sake of practice in speaking. "It is not enough," said he, "that you should make yourselves competent to carry out engineering work; it is also essential to your success that you should be able to convince those persons of your competence for whom such work has to be done, and nothing will better enable you to do that than the practice of discussion in societies such as this"—advice quite as good for architects as for engineers, and which I therefore beg to press on you, gentlemen. In addition to the influence in forming character, of the pursuits just considered, there are certain other studies and pursuits which are of the greatest service in self-culture. Modern languages for example. A really thorough knowledge of French, German, or Italian, or, better still, of two or all three of those languages, besides its value as an exercise of memory and judgment, opens opportunities of conversation with foreigners in their own country, and gives the command of a new literature. Of course, in many businesses this attainment is an advantage. In some it is essential; but apart from that and as cultivation, I think modern languages and literature claim a very high place. Next to these I would put the practice of some of the fine arts. Nature has denied a musical ear to some and a painter's eye to others, and these she means should cultivate some other side of their character. But those who can draw or paint, or model, or who can sing or play with pleasure to themselves, and some fair amount of success, are many, and for such the study and practice of this or that art is a means of cultivation of the highest importance. With practice should go the understanding of whatever art is pursued, a man who can draw and paint, but has no ideas about or knowledge of paintings, has reaped no more than half the benefit which he ought to have received from the fine arts. Of pursuits, one of the most cultivating, if I may employ the word in an unusual sense, no doubt is travel. No greater boon has been bestowed upon the young men of the present day, among all their advantages, than the means of visiting every corner of our native land, without cost for transit, on the rapid and independent tricycle and bicycle. Travelling in all its varieties, from the shortest Saturday to Monday trip, to the tour round the Globe, has done more to enlarge the notions of modern English folk than any other, among the many changes in the habits of life which we have made. Of course, there is travelling and travelling, and one person will get more good from it than another; but hardly anyone can well fail to be the better for a journey. This first trip on the Continent is an era never to be forgotten in the life of a young man, and so far as I have observed, travelling is one of the few recreations which seems to retain the power to charm old as well as young. It is not, however, as a pleasure, but as a profitable employment of time and money, that I introduce travelling here, and I do so in the firm conviction that as a means of cultivation it has hardly any equal. Lastly, all the social accomplishments which tend to make a person acceptable in the company of others are parts of cultivation which in a highly-civilised community like ours ought not to be overlooked. To be able to dance, shoot, ride, play tennis are all of them aptitudes worth acquiring. I fear I can hardly say so much of athletic pursuits. I have the strongest admiration for cricket, football, Volunteering, and such occupations. They refresh the mind and invigorate the body; but I do not notice that the pursuit of them has much of a civilising effect on the ways and manners of British youth.

(To be continued.)

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

On Monday last the annual exhibition of this useful Society opened at 5A, Pall Mall East with a display of much interest. Naturally the studies of architecture and old buildings furnish the chief attraction to us, though we most thoroughly appreciate the landscapes and character pictures as specimens of photographic art. The portraits, too, are generally well chosen in this collection, and in some cases for finish and artistic character rise considerably above mere personal interest. Space fails to permit of any detailed notice of these prints. We may note, however, the exceptionally large bromide enlargement by the Eastman Dry Plate and Film Co., No. 366; also the life-size direct portraits by Messrs. W. J. Byrne and Co., to whom a medal has been awarded. We consider Mr. F. W. Edwards' platinotype reproduction of an old engraving, in which the colour of the original is exactly imitated in the development, to be a clever piece of work, even though it may not claim to be specially original; and we admire very much the photographic enamels vitrified on "cuper or gold plates" by Messrs. Benque and Co., of Paris. The portraits on red and pink grounds are particularly decorative, and the miniatures by the same process are exceedingly good. Among the photographs of special interest beyond the exact merit of the photographs themselves we were attracted with a series printed by the Autotype Company, of tree houses and other scenes in illustration of picturesque New Guinea, from negatives by Mr. J. W. Lindt, R.A. The natives and their houses, shown just as they are in all the primitive simplicity of their naked barbarism, afford many a novel detail and much instruction. Messrs. Henry Dixon and Sons, Mr. Vernon Heath, and Mr. H. P. Robinson are, as usual, well represented with highly meritorious examples of their most finished productions. Before passing on to the views of architecture, we must for a moment stop to note Mr. J. Gale's splendid work under the titles of "Too Wet for the Woods To-day," "A North Country Doorway," "Oat Cutting in Sussex," "Sleepy Hollow," and, above all, "Saturday Afternoon," in which the light and shade seems so adroitly managed, the figures so skilfully posed, and the group so well photographed. The platinotypes, by Mr. H. Collis Pettitt, from Helvellyn, Derwentwater, Windermere, and Borrowdale, well deserve the medal they have won; and Mr. J. C. Andreæ's views from Rye, Falmouth, and Pullborough do their author great credit, as do the scenes from "David Garrick," taken by ordinary gaslight by Mr. J. F. Roberts, to whom a medal is awarded.

Eaton Hall furnishes the rich subject for several studies by Mr. G. Watmough Webster, of Chester, who also shows a large platinotype of a chimney-piece elaborated with a figure-sculptured frieze, and constructional overmantel, massively treated and finished. Another similar set of even greater interest is supplied by Mr. Richard Keene's Interior of Hardwick Hall, which, in their way, are quite perfect, showing the most exquisite manipulation and execution on the part of the operator. "The Release of Barabbas," is one of Mr. George Tinworth's most successful panels in terra-cotta; and Mr. Edwards sends a fine photograph in illustration of it (39). St. Mary's Church, Banbury, has of late years been cleverly decorated in colour, rendering the interior both church-like and in harmony with its uses. Mr. George Mold exhibits two photographs here which show the building very truthfully, and give a correct rendering of the edifice. Mr. S. H. R. Salmon contributes a group of studies of City churches, and Mr. W. Cobb some instantaneous views of London thoroughfares, while Mr. William England shows other scenes in our streets taken from a tricycle. Of all the instantaneous photographs exhibited on the present occasion, we like those showing the elephants performing at "Olympia" before the Queen, by Mr. G. P. Cartland, who takes the medal for them (17). We conclude by praising the enlarged print of St. Paul's Cathedral, from a negative by Mr. J. Bracebridge Hilditch. "Flamma Vestalis," by Mr. Fred Hollyer, is a photograph of great merit, after a picture by Mr. E. Burne-Jones, A.R.A.; and Messrs. Luke Fildes, W. J. Yeames, J. Pettie and P. R. Morris, Sir Frederick Leighton, and Mr. J. B. Burgess are among the members of the Royal Academy whose work is also represented. Of other painters of note, there are photographs of works by Mr. Holman Hunt and Mr. Walter Crane.

A new Wesleyan chapel in Hinde-street, Manchester-square, W., built at a cost of £16,000, was opened on Wednesday week. Mr. James Weir, of Victoria-street, Westminster, is the architect, and Mr. Holloway, of Clapham, the builder. The style is Classic, and the chapel has a tower rising to a height of 100ft. Sitting accommodation is provided for 800 persons, and at the rear of the building is a church house.

The town council of Warrington have decided to mark the site formerly occupied by a house of Austin Friars, in that town, by a bronze tablet, and the tender of the Coalbrookdale Iron Co. has been accepted for carrying out the work.

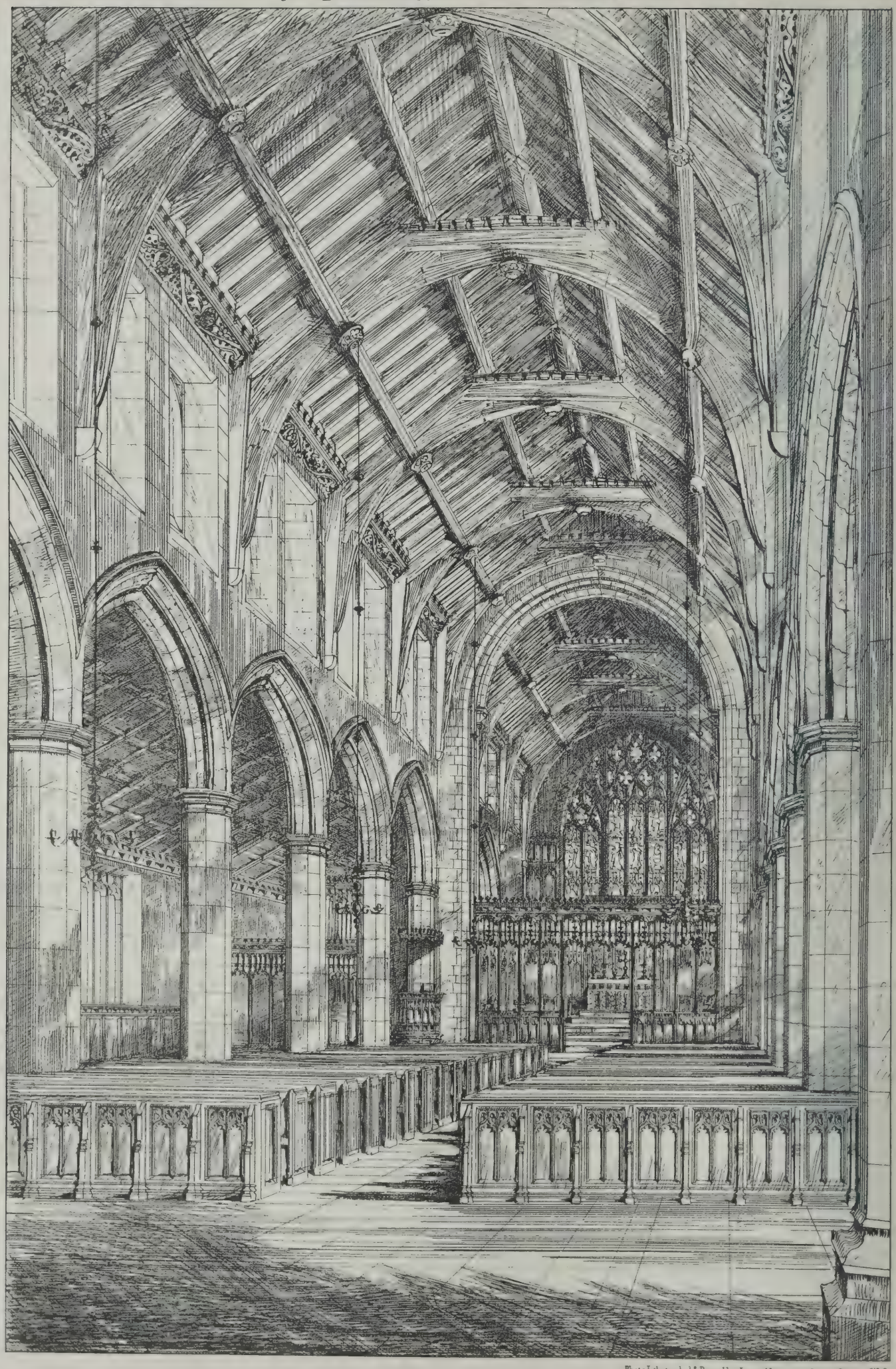
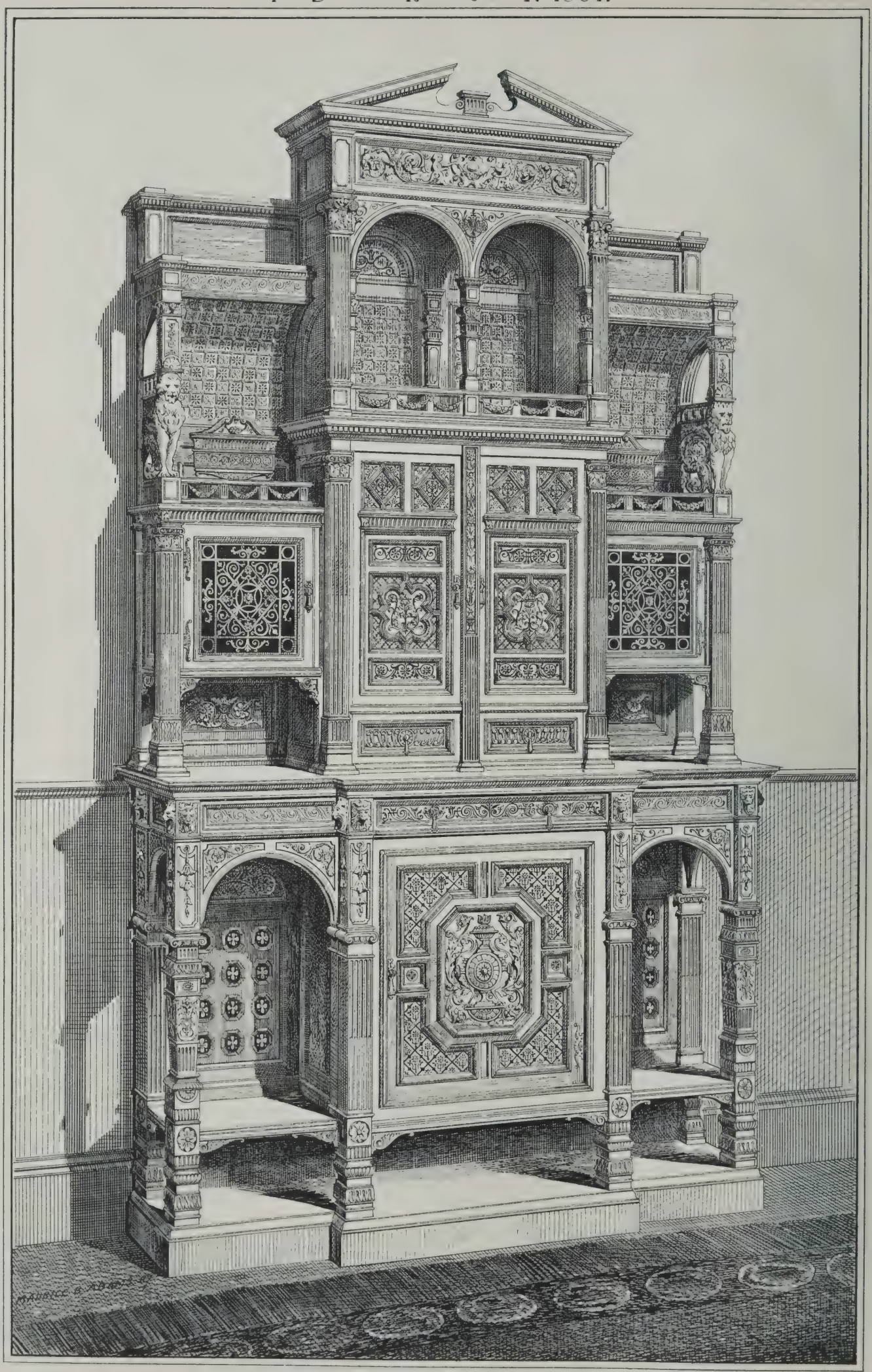


Photo Lithographed & Printed by James Akerman, 6, Queen Square, W C

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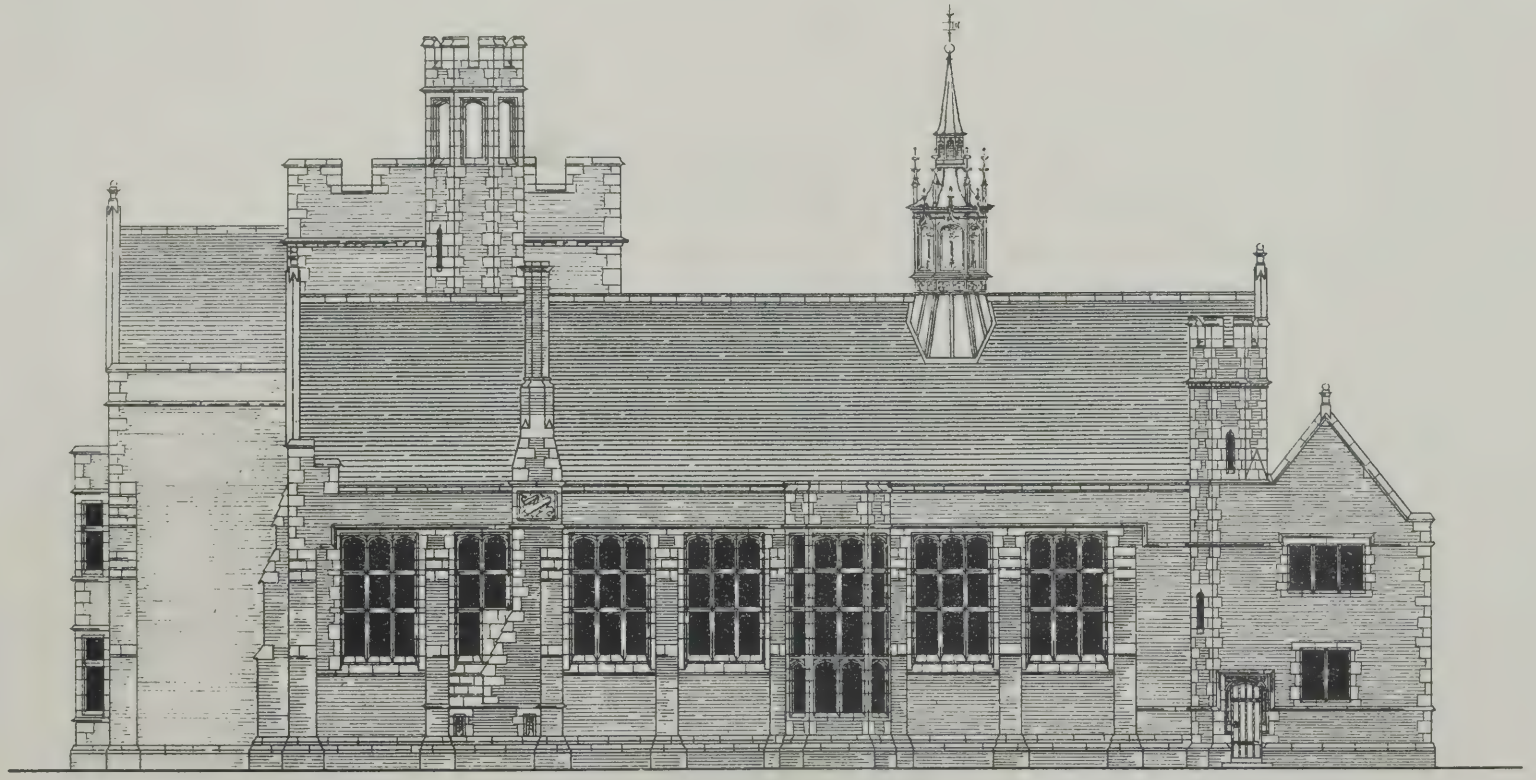
ITALIAN RENAISSANCE CABINET

DESIGNED BY C. TRAPNELL

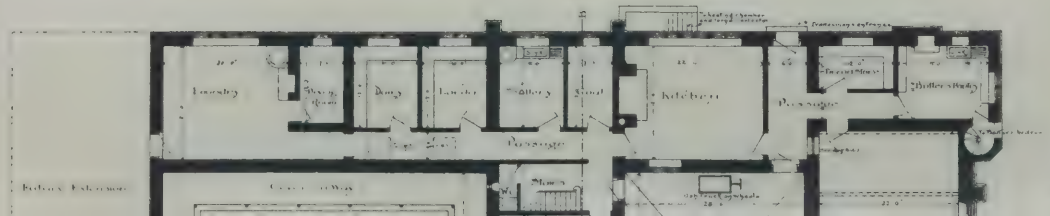
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SELECTED DESIGN FOR THE Mc ARTHUR HALL BELFAST

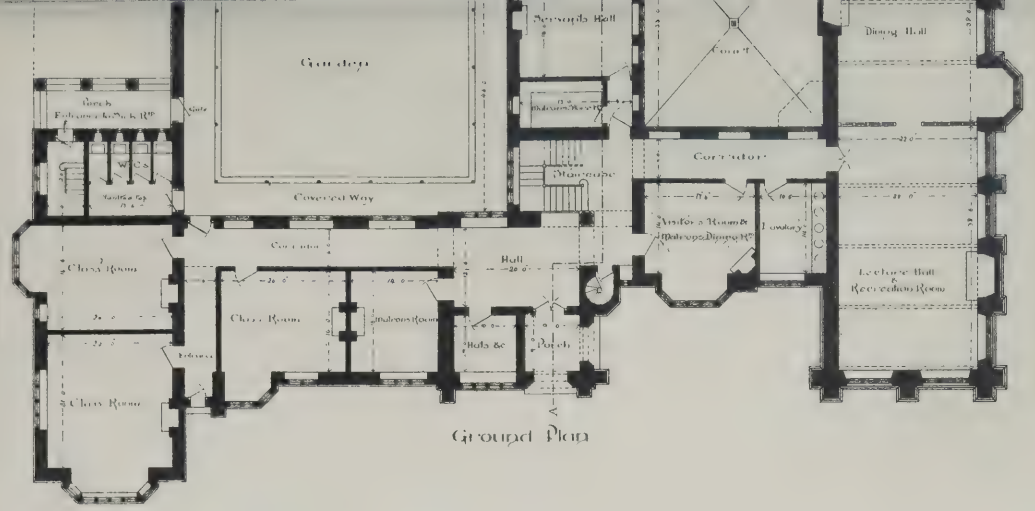
MESSRS T N DEANE & SON ARCHTS



North Elevation







Ground Plan

First Floor Plan



East Elevation

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PLAS MAWR CONWAY
ARTHUR BAKER Del

Oct. 7. 1887.

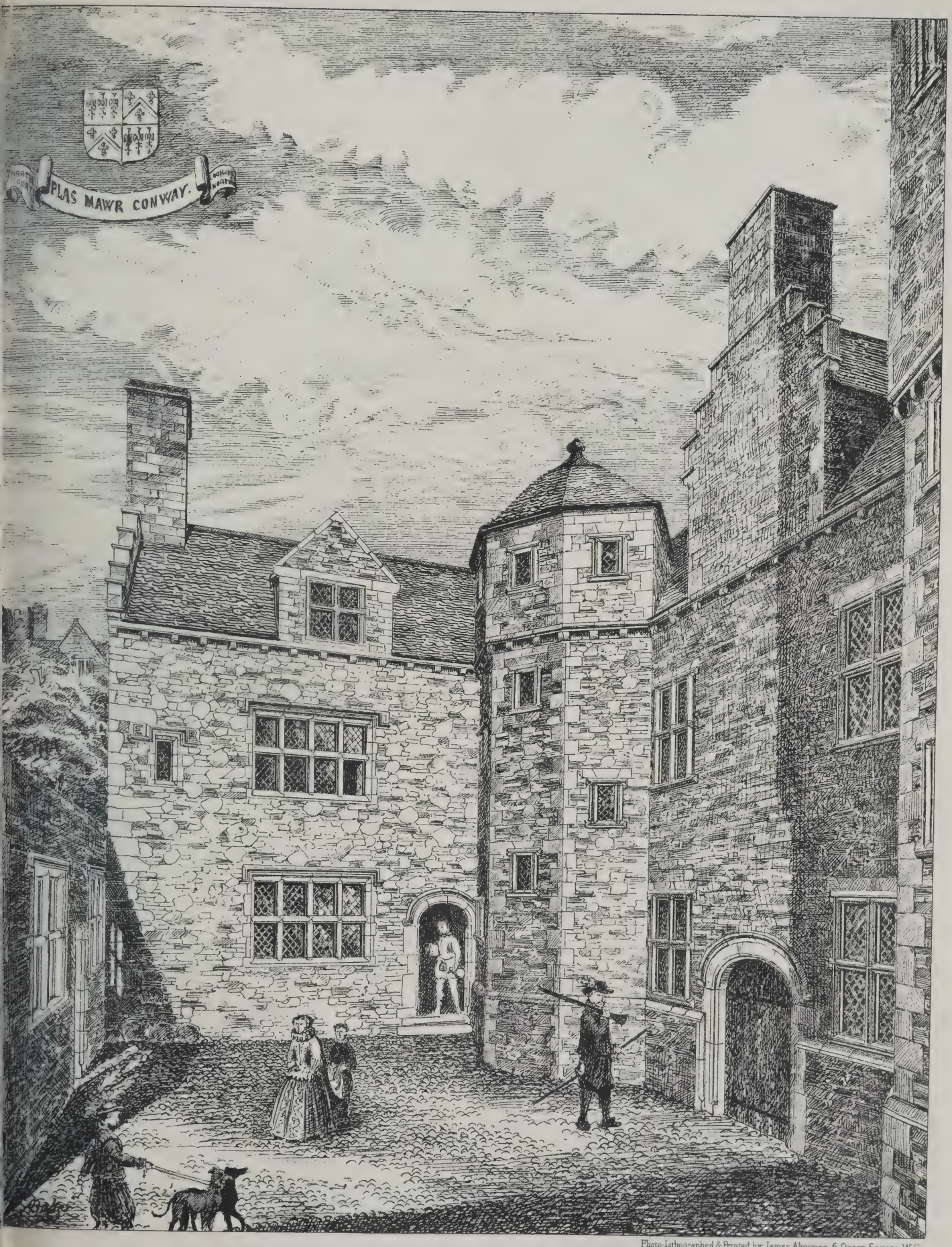
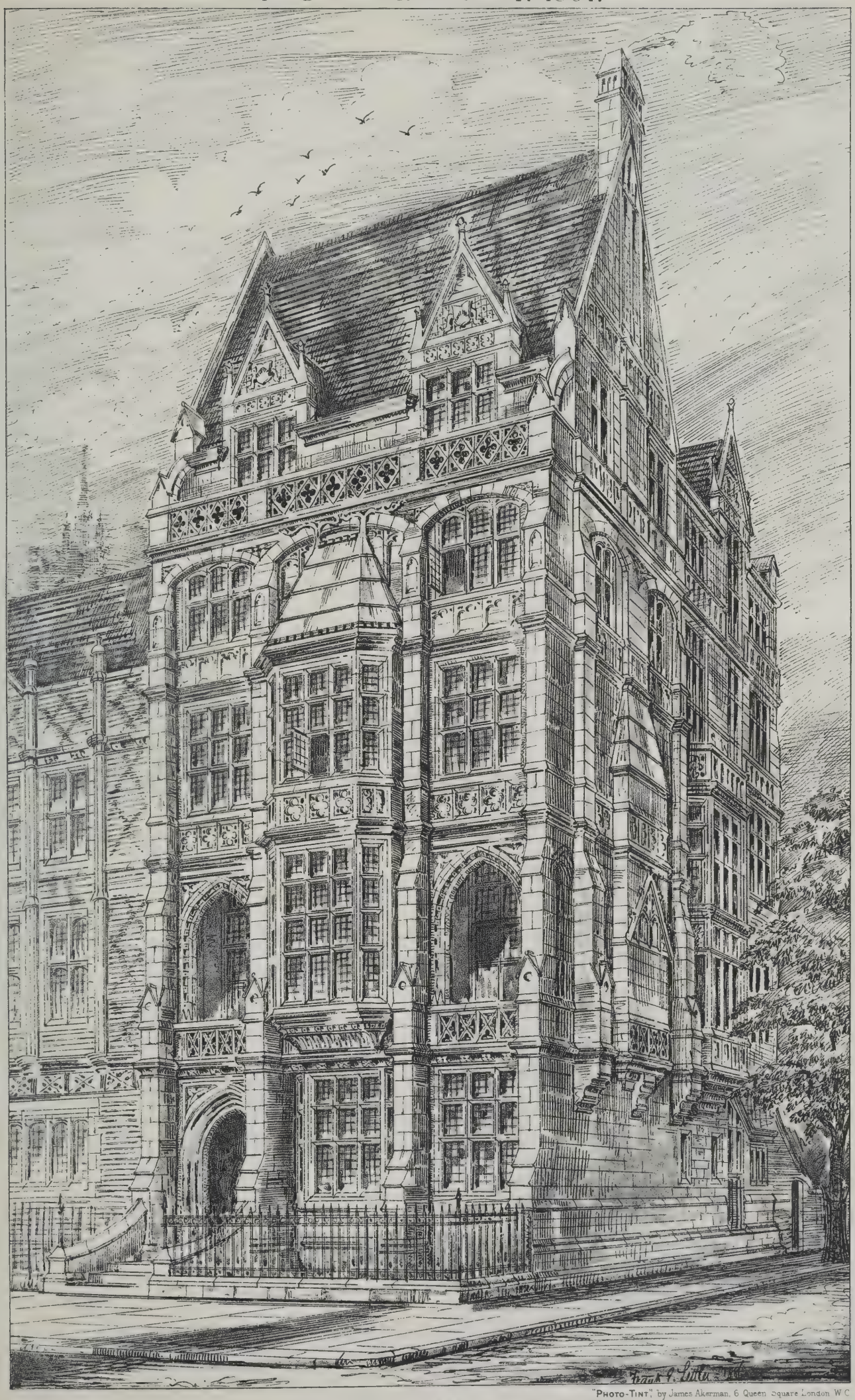


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A · TOWN · HOUSE · FRANK · E · LITTLER · ARCHT.

ALL SAINTS · CHURCH · GOSFORTH · ROBERT J. JOHNSON · ARCHITECT

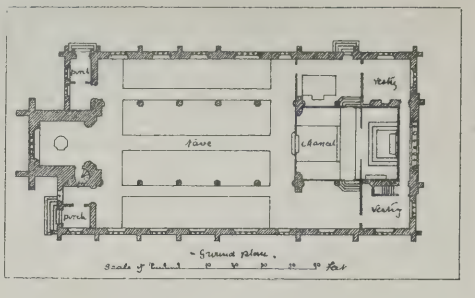


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CONTENTS.

Professional Custom 535
The Building Handicrafts.—II.... 536
Royal Institute of Painters in Water Colours 537
The Society of Architects at York 537
Education, Cultivation, and Examination 540
Photographic Society of Great Britain 542
Our Lithographic Illustrations 543
Proposed Staircase and Hall, Rufford Hall 543
Ecclesiastical Art Exhibition at Wolverhampton ... 543
Society of Engineers 543
Competitions 543
Wayside Notes 562
Studies in the History of Art 562
Schools of Art... 563
Engineering Notes... 563
Architectural and Archæological Societies 563
Building Intelligence 564
Correspondence 565
Intercommunication 566
Legal Intelligence... 566
Stained Glass 566
Our Office Table 566
Meetings for the Ensuing Week 567
Water Supply and Sanitary Matters 567
Tenders 568

ILLUSTRATIONS.

PLAS MAWR, CONWAY.—THE McARTHUR HALL, BELFAST. — ITALIAN RENAISSANCE CABINET. — ALL SAINTS' CHURCH, GOSFORTH.—A TOWN HOUSE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

PLAS MAWR, CONWAY.

PLAS MAWR, in the town of Conway, is a very perfect specimen of Elizabethan architecture, having escaped the alterations usually attending an occupation of three centuries, mainly owing to the fact that it passed by marriage, early in the 18th century, into the Mostyn family, who, having many other seats, did not reside, and after a time let it out to a number of tenants, who found its preservation and exhibition to tourists a source of profit. It has now found more worthy tenants in the Royal Cambrian Academy of Arts. The views we publish are from drawings by Messrs. Arthur and Herbert Baker, the architects to the Academy, who are about to issue a work containing measured drawings and views of the house, with details of the plaster ceilings and wall decorations, which are very curious, and a full description of the house and of the families of its former owners, and their pedigrees. The issue of the work has been considerably delayed owing to the amount of research required to identify the armorial bearings on the walls, but the authors hope very shortly to complete their work. Applications for the work, which will be published at a subscription of £1, may be made to Mr. Arthur Baker, 14, Warwick-gardens, Kensington.

THE McARTHUR HALL, BELFAST.

THE plans for this building were submitted to Mr. Waterhouse, who selected the successful design out of 12 sets. The conditions of competition were that the cost of the work was not to exceed £10,000, and the building was to accommodate 60 young ladies (daughters of Wesleyan clergymen). Sir William McArthur, K.C.M.G., Lord Mayor of London in 1880, and M.P. for Lambeth for many years, generously gives the money, or the greater part of it. The building will be larger than shown in the competition drawings, and will be erected in the grounds of the Wesleyan College at Belfast. The architects are Messrs. T. N. Deane and Son, of Dublin.

AN ITALIAN RENAISSANCE CABINET.

THIS is a cabinet of picked Riga oak inlaid with walnut wood, and richly carved, by Messrs. Trapnell and Gane, 39, College-green, Bristol. The centre portion consists of an upper open compartment or arcade inclosed with square columns, and panelled at the back with an inlay of walnut wood and oak. The end compartments are also open. The front posts of which are supported by conventionalised lions, wrought into the structure. The back panelling of this portion is carved and inlaid. The central doors above and below, also the frieze, are elaborately carved and inlaid. Some brass grilles inclose the upper end doors. The other portions of the work are explained by the drawing itself; and in almost every detail this piece of furniture is of the highest finish. It is designed by Mr. Caleb Trapnell, the senior partner of the firm.

ALL SAINTS' CHURCH, GOSFORTH, NEWCASTLE-UPON-TYNE.

THIS church is built to supply the needs of a rapidly-increasing suburb of Newcastle. It was consecrated on the 2nd October by the Bishop of Newcastle. The tower is not yet built, and the internal fittings are only temporary. The design and character of the church are sufficiently shown by the lithographs, which are from drawings exhibited in the Royal Academy in 1886. Mr. Robert J. Johnson, F.S.A., of Newcastle, is the architect.

A TOWN HOUSE.

THE illustration under the above title is from a design for a house in a main thoroughfare, the aim of the design being to obtain as great a contrast of light and shade as possible under the circumstances. The dining-room is on the ground floor in front, the morning room behind. The drawing-room takes up the whole of the front on the first floor, the deep recesses on either side form balconies accessible from it, which would give air without being exposed, the space between forming a deep bay to the drawing-room. The library is on the same floor behind, bedrooms on the floors above, kitchens in basement. The bay window at the side lights the staircase. The drawing from which the illustration was taken was exhibited in the Royal Academy this year.—FRANK E. LITTLER.

PROPOSED STAIRCASE AND HALL, RUFFORD HALL.

THIS drawing now illustrated is a view in the present autumn exhibition at Liverpool. It shows some new work, from the designs of Messrs. Hornblower and Son, architects, proposed to be carried out in Rufford Hall, long the seat of Sir T. G. Hesketh, Bart., and his family. The mansion was built about 1798, and is in the Grecian style of architecture. Formerly the estate belonged to the Fyttons, and was brought into the Hesketh family by the marriage of Maud Fytton with Sir William Heskayte, in 1310. In the park is Rufford Old Hall, the well-known Elizabethan half-timber house, with wood and plaster panels, some of which are carved. The banquet hall was a handsome open-timbered roof, with carved angels supporting shields. The detached screens are exceptionally rich, and are movable.

ECCLESIASTICAL ART EXHIBITION AT WOLVERHAMPTON.

IN connection with the Church Congress which is being held at Wolverhampton this week, a collection illustrative of the arts as applied to ecclesiastical purposes is on view at the School of Art. This is the ninth of these ecclesiastical art exhibitions, and in many respects is far ahead of its predecessors, and, thanks to the large number of loans and trade exhibits offered, the committee have been enabled to keep more nearly than before to the original idea of the promoters. The loan exhibits include a large number of Persian and other Oriental fabrics, recently collected in Kashan and Teheran, and lent by Mr. Cecil Harcourt Smith; as typical specimens in this collection may be mentioned the boghebehs, or "patchwork" of silk embroidery and brocade, sumptuously executed in the richest materials. The Rev. W. Nigel W. Gresley, rector of Dursley, lends four cases, containing some 400 relics from Piedmont, and attested as to authenticity by a Cardinal-Archbishop's seal; also numerous memorials, crucifixes, and embroidery. Messrs. Doulton and Co., of Lambeth, exhibit four terracotta panels, and photographs of others, by George Tinworth, many of which have been illustrated in our pages; the East Grinstead School of Embroidery show many specimens of their work, and numerous rubbings in brass are contributed by Mr. H. E. Franks, of Willesden; while from the South Kensington Museum are sent about a score of photographs of church plate in the collection of the department. Among the general exhibitors are Messrs. Jones and Willis, of Birmingham and Bloomsbury, who exhibit numerous and excellent examples of their productions in ecclesiastical metal-work, wood and stone carving and embroidery, all executed by their own workmen and upon their own premises. Messrs. W. B. Simpson and Sons, 100, St. Martin's-lane, W.C., show their revival of the ancient art of enamelling on copper in conjunction with their patent system of sectional jointing, affording a novel adjunct of rich character for decorative art purposes. The discovery consists in dividing the design into sections like those of stained glass, where the pieces of glass follow the contours of the objects, the junction running along well-defined outlines, so as not to disturb the general design. Another improvement in Messrs. Simpson's process is the shallow modelling of the forms by working in *repoussé*. By this process, patented by Messrs. Simpson three years since, it is possible to produce much larger works in enamel than formerly. Messrs. West and Collier, of Hambledon, Henley-on-Thames, have on view their church chairs, and Messrs. John Smith and Sons, of Derby, show a large turret clock and other church clocks. Stained glass and cartoons are exhibited by Messrs. A. O. Heeming and Co., of Margaret-street, Oxford-street, W., and examples of art metal-work by Messrs. Benham and Froud, of Chandos-street, W.C. Messrs. Maw and Co. show an altar-piece of the Crucifixion intended for Grosmont Church, near Whitby, also lustre ware, and tiles.

SOCIETY OF ENGINEERS.

THE Society of Engineers had its first meeting for the session 1887-8 on Monday evening, October 3rd, at the Town Hall, Westminster, Professor H. Robinson, president, in the chair, when a paper was read on "Stability of Factory Chimneys," by Mr. R. J. Hutton.

The author entered fully into the theory of stability of tall chimneys, pointing out some errors in the formulæ ordinarily used, and, in connection with stability, considered the relative effects of wind pressure on various forms, as circular, octagonal, and square, and at various angles. He then showed that the section of chimney which combined the highest theoretical stability with the least amount of material was not the same as that required by practical considerations for its greatest efficiency in producing draught, and that a compromise had to be effected between the two forms. Some examples of successful chimneys were then given, and also of some that had failed, with an examination of the causes of failure.

COMPETITIONS.

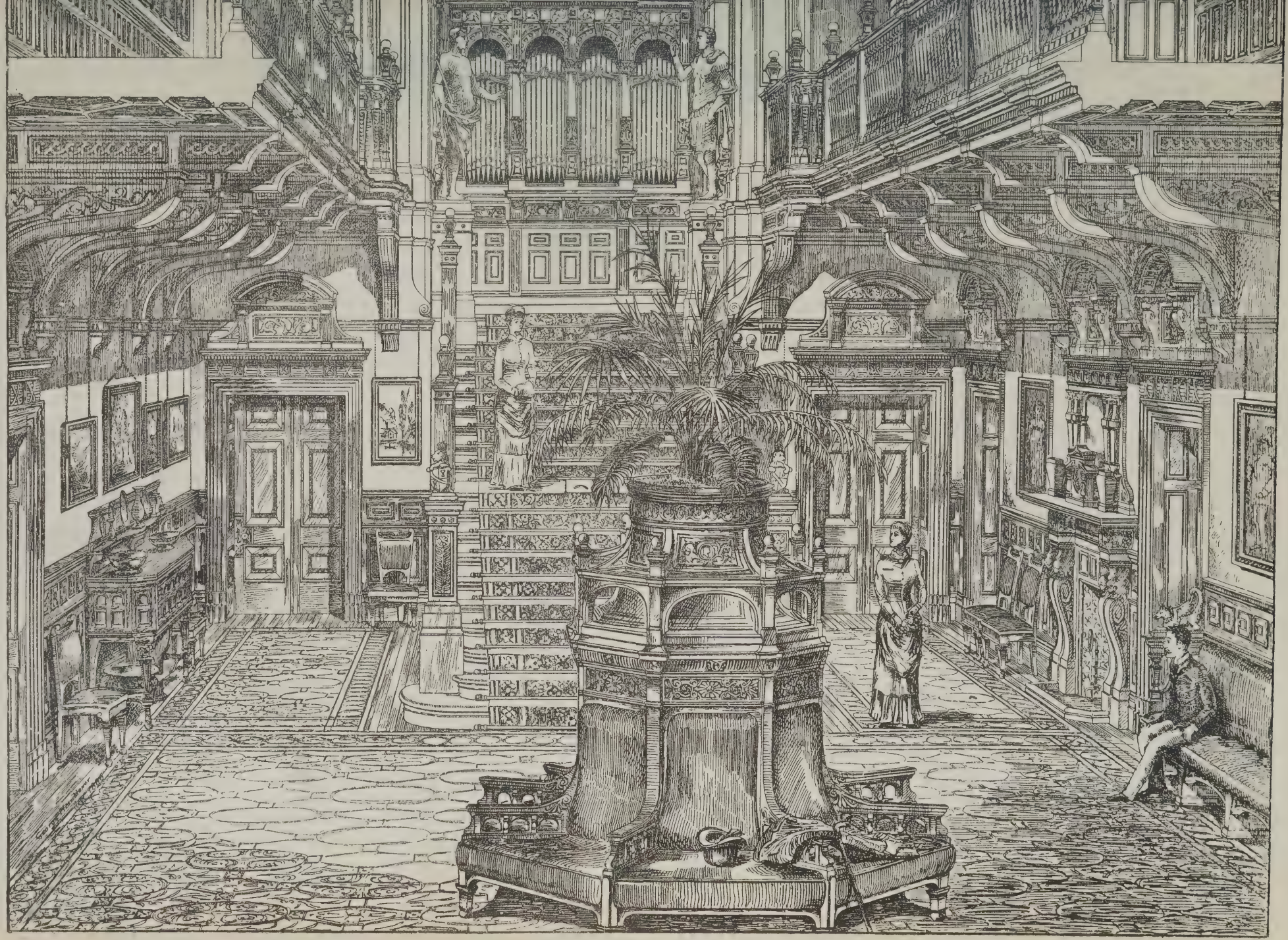
MAYNOOTH.—An important competition is now taking place among half a dozen architects in Ireland for the completion of St. Patrick's College Chapel at Maynooth. The college was built by Pugin about forty years ago, and the chapel was erected in carcase from the designs of Mr. J. J. McCarthy at a cost of £26,000 about ten years since. It has from then remained unfinished, and the work now proposed is for the completion of the building with stalls, altars, and other fittings, together with the decorations of the vaulted roofs. The designs were sent in last Saturday. The competitors are Messrs. Charles McCarthy, T. J. O'Calloghan, Wm. Byrne, Wm. Hague, J. L. Robinson, A.R.H.A., and Messrs. Geo. C. Ashlin and Gotché, all of Dublin.

Roman remains have been discovered on Tockington Court Farm, near Bristol. Excavations have revealed the foundations of a Roman villa, consisting of five rooms and a portico, with tesselated pavements, the largest piece of the latter being 50ft. by 10ft. without a break, and all in a remarkably fine state of preservation. The farm is rich in Roman remains, many relics having been discovered there.

At the annual general meeting of the Association of Public Sanitary Inspectors held at Westminster Town Hall on Saturday, October 1st, Mr. Hugh Alexander, chief sanitary inspector, Shoreditch, was unanimously elected chairman of the council, vice Mr. G. B. Jerram, C.E.

At Glasgow Exhibition next year it is proposed to make a representative display of sculpture executed during the Queen's reign, on the plan so successfully adopted this year at Manchester with regard to paintings.





PROPOSED STAIRCASE AND HALL, RUFFORD HALL.—Messrs. Hornblower and Son, *Architects*.

WAYSIDE NOTES.

I LEARN from my very good friend, Mr. "Chips," that a further sum of money has been granted by the French Government for the restoration of old St. Pierre, at Caen. Alas! and alack-a-day! the marks of the harsh-handed restorer are but too plainly evident at Caen already. Such restoration, too! I wonder where the destroyers will recommence at St. Pierre? On the elegant spire, the exquisite north portal of Flamboyant times, or the hybrid Renaissance stuff in the apsidal chapels? If I remember rightly, the spire and tower are both rendered sleek, so I fear the charming north doorway is doomed. Such a little gem, too!

French restorers, like new brooms, generally sweep clean. "Neck or nothing" would seem to be the motto of all disciples of Viollet-le-Duc. Was there, for instance, ever such a dreadfully hard piece of restoration as the present west front of St. Ouen, at Rouen? But such work is moderate by the side of that of the present-day official engineer-like restorers. It is all very good of the Minister des Beaux Arts to be liberal in his grants to the old churches; but the kindness is misplaced when the work is badly done.

There has, I see, recently been an interesting ceremony at Worcester in connection with the restoration of the College Hall, formerly the refectory of the monastery, which, with the crypt, exhibits work of the 12th and 14th centuries. The town must have had quite a gala day when the bishop and the Mayor and Corporation opened the hall.

In the West of England, too, I notice they have unearthed a Roman villa, or what remains of one. At a farm called "Tockington Court," near Bristol, "five rooms and a portico, with tesselated pavements," in a fine state of preservation, have been discovered. The "tesselated pavement" I take to be a piece of old Roman mosaic. It is reported to be about 50ft. by 10ft. in area, and is without a break, and of good design and harmonious colouring.

The action of the French Government in deciding to complete the purchase of the Celtic remains at Carnac, near the south-west coast of Brittany, is to be highly commended. But are we going to have another specimen of the unfeeling restoration-work of the French authorities? Will they "provide and fix" any new monoliths of granite that may be required to make good the old plan? It is to be hoped not. One would prefer to see the venerable stones propped up with balks of timber, and tied together, if necessary, with copper bands. They would then appear like aged men, resting upon their helpful crutches, and not be enamelled back to a spurious youthfulness.

One of my notes must have gone astray last week. I had intended to have remarked that there was a good deal that was interesting in the drawing of Birtley Church, reproduced on the 23rd ult. The church had, it will be remembered, a tiny chancel arch. But as there was no scale appended, it was impossible to judge of its size. Would Mr. Plummer kindly give us the dimension? Many of the readers of the "B. N." would be very glad of the information.

The most ardent defenders of the church of St. Mary-le-Strand may well feel their hearts sink within them when they hear that the residents and ratepayers of the parish of St. Mary have petitioned the Board of Works to sweep away the fabric. *Et tu Brute!* might well be the cry of anguish of the old building. When the persons nearest to the church conspire for its annihilation, the beginning of the end may be expected. I understand, however, that the Metropolitan Board of Works will probably instruct their clerk on Friday to reply that they do not propose to take any action in the matter.

What shall we say about the Middleton competition? My idea is that if any young architect took the advice of the ancient "Goth" of some weeks back, and inquired into the most desirable manner of arranging the internal economy of free libraries, he had better enter the struggle. It will, at any rate, afford him good practice. The experience, too, will be very *apropos*.

I note that the failures in the Building Trades up till the 1st of October of the present year are ten in number. It is very probable that the sum total of bankrupt architects and builders will be greater this year than either of the preceding ones. In 1885 there were twelve failures, and last year only eight.

Fires in theatres, and how to prevent them, is still a topic, and occupies the attention of the newspaper letter-writer. We have had some excellent ideas all round, but want more. Everyone should make some suggestion, if they have any, and if they haven't they should beg, borrow, or steal somebody else's, and peg away with that. Rather loose morals this, it is true; but I excuse myself on the Jesuit principle, as we sadly want a little concentrated energy to make hay while the sun shines, and help to prevent the recurrence of more fearful holocausts. Good is already resulting from the Exeter disaster. One hears of greater activity on the part of magistrates and others on all sides. Out of the tears of the mourning people of the Devonian city future generations will reap much benefit.

The result of the inquiry into the disaster at the Opéra Comique at Paris was less cheerful for those persons concerned than was that of the Exeter affair. Several persons in connection with the theatre were convicted. It was rather curious that a *fireman* should be among the number.

The fever epidemic continues, in spite of the meeting of the Sanitary Institute, and the efforts of the Asylums Board — the *so-called* epidemic, that is to say. Query: Is there any epidemic of scarlet fever? I am told it is simply a case of demand and supply.

I note that there has been a renewance of earthquaking in the South of Europe. This time it is Greece that is favoured, and one feels quite anxious and concerned about the Parthenon and other treasures there.

A few days back I was conversing with a friend who was at Nice during the whole time of the continued earthquake at that beautiful town. I am given to understand that Nice is practically rebuilt, and that the disastrous nature of the earth tremors there was never known by any but those who have sojourned at the town ever since the disaster. I am told that the authorities and townsfolk did their utmost to "hush up" the matter, and so endeavour to lessen the evil effect on the persons who live by the large number of visitors. To prevent the "season" from being a failure, the greatest ingenuity was displayed. Any wholesale rebuilding and repairing must almost have been prohibited by those in power. As an instance, I am told that the houses built on the sea front at Nice were greatly injured. But there was no rush to put them to rights. One scaffolding was erected before one building, and when it had been repaired it was moved on to another, and not before. Thus to the casual observer it would appear that there was but one house or so injured in the whole front.

If such was indeed the case, it is difficult to see how anything but an edict of the town authorities could have prevented a wholesale rebuilding of slightly injured houses. There is a little discrepancy in these two facts—the "practical rebuilding" and the slowness of the works—that hardly bears investigation. If the houses were repaired so slowly they could scarcely have been completed by this time—that is, if there were so many to do. Anyhow, it is said that the earthquake was a greater affair than is generally supposed, and that the inconvenience to townsfolk and residents alike, was in no wise exaggerated in the accounts of the London papers.

GOTH.

The hall of the Worshipful Company of Sadlers has just been reopened, after being redecorated, and the reconstruction of the sanitary arrangements. The latter work, including the provision of a new lavatory, was carried out by Messrs. Jennings, of Stangate, Lambeth.

STUDIES IN THE HISTORY OF ART.

THE first of a series of twelve lectures on "Studies in the History of Art" in connection with the University Extension Scheme was given in the Art Gallery, Exeter, on Wednesday week, by Mr. Ernest Radford, LL.D., Trinity Hall, Cambridge. Sir Thomas Acland, the chairman, remarked in his introductory observations that, so far from the subject of the lecture being a narrow or technical one, it was wide, deep, human, and of very general application. If they tried to arrange a library beginning with books on the most spiritual subjects, the records of revelation, and passing through all human subjects till they came to the most physical, hard, and material, the very elements of earth, they would find it rather difficult to settle the place in the series for books of art. Art was still exercised on human material. True art administered to comfort, to beauty, and to human interest; but it rose higher, to an ideal, and there came in contact with poetry, music, and literature. We could not benefit by the great work of artists unless we considered the time in which they lived. Here art derived light from history, and, what was more important, it also threw light on history. He would now go one step further to show that art was connected with religion; but this, perhaps, was outside the University course. He would venture to utter a word of caution. Philip Pusey, eldest brother of Dr. Pusey, who was among the first to promote schools of design in conjunction with Mr. Dyce, R.A., said we must beware of speaking of the refinement of art as a moral principle. It might be so, but it might have the opposite tendency by ministering to sensuous indulgence and luxury. Let his young friends beware of thinking that art was mere imitation. Imitation there must be, but that was absolutely subordinate to the higher work of the mind and heart. Selection, suggestion, omission, subordination of each part to the unity of the whole, these were essential and were not tricks of art. In conclusion, Sir Thomas quoted the following passage from Ruskin's "Two Paths:"—"There are two characters in which all greatness of art consists. First, the earnest and intense seizing of natural facts; then the ordering of those facts by strength of human intellect so as to make them for all who look upon them to the utmost serviceable, memorable, and beautiful, and thus great art is nothing less than a type of strong and noble life."—Mr. Radford, after alluding to the language and styles of the modern art critic, said they all wished to be art critics, but not of the modern kind. They must first ask themselves what was meant by education, and then they would understand the word critic in a somewhat larger sense. If he gave his idea of an educated man he should say that he was not a man that knew everything, but a man whose faculties were so trained and who so kept his mind and his heart open that he was ready to receive knowledge through whatever channel it came. This fact had been realised by the Universities, and consequently it came to be considered that art was of the same importance as literature, and almost of as much as history was. Art, he contended, was of itself a department of history. History, looked at from this point, was no longer a dull subject, but it became a profusely illustrated picture-book. He believed that the record of art was more faithful than the record of history, as the latter found its shape in the printed book, for they must look on it as if the arts of all time had been preparing the illustrations. In order to be educated people we study art, and we study art in order to become critics. The function of criticism was two-fold; it was to discern the direction of fault and the quality of achievement. The true criticism was that which sought for some signs of dignity and effort, but that of the modern critic was that which looked for the dismal and crude parts of the artist's efforts. What was desired was that they should be able to become familiar with the conditions of the time in which the artist lived, so as to enable them, as it were, to place their minds inside his mind, to work behind his hand, and to strive, as he strove, to achieve the desire of his heart, and follow him through every difficulty and triumph of his craft. To learn to appreciate effort required at least a cultured mind. There was some cultivation of mind that did not belong to the ordinary

erson, especially those who visited the English icture galleries and walked through the miles f galleries on the Continent. The gallery ystem was prejudicial to the artist himself ad his integrity, and was the subject of small onversation to the public at large. Now, what as the primary sense of pleasure in art? he pleasure in art was based simply and solely n recognition. The business of an educated an was to expand the area of recognition, and o to train his mind that he might be able to ecognise the resemblance in any form over the idest area. They must cultivate this pleasure o recognise any noble effort, and not only to onsider how far that effort was dignified, but ow far it had been successful. After pointing ut the distinction between criticism and con-ossieurship, he went on to say that he had een frequently asked if he believed in the cience of art. After giving the matter con-deration he had come to the conclusion that ere might be two sciences of art in the odern sense of that word. The first was the ience of æsthetics in the true and proper nse of the word, the science of the law of the nse of perception. If they could find that ertain effects of pleasure arose from certain auses they might get a sense of art production. fter stating several other views on the uestion, the lecturer went on to give defini-ons of art, concluding with that of William orris, "Art is the expression of man's delight labour."

SCHOOLS OF ART.

Hanley.—The annual meeting in connec-on with the Hanley School was held on Thurs-ay in last week, when Viscount Wolseley distri-uted the prizes, and in the course of his ldress observed that, in the case of all great eoples, they were in the highest vigour and osition when their art and literature flourished ost. The true function of art was to elevate ankind. Mr. Cartledge, the head master, in is report, stated that the school continued to aintain a high state of efficiency. The total umber of students during the year was 334, owing a decrease of 18. The average attend-nce had been better than in any previous year. he awards of the Science and Art Department eached the high total of 187, including the art aster's certificate, master in training scholar-ip, gold medal, silver medal, and eight free holarships. The report of the science classes ated that the number of students had been , with a percentage of 42 first-class and 42 cond-class passes.

St. Helens, Lancashire.—The annual dis-ibution of prizes to the successful students of e St. Helens Science and Art Classes took ace in the Town Hall, St. Helens, on Monday. he report of the committee showed that uring the year the number of candidates ex-nined at the St. Helens centre was 366, of hom 256 passed, four in honours and 55 in the dvanced stage, in which ten Queen's prizes ere given; 199 passed in the elementary age, 58 securing first class certificates in that age. The successes this year were not only ore numerous, but they were also higher in ality than those of the previous year. Sixty-x prizes had been awarded by the Central ommittee. The silver medal, awarded by the mmittee to the most successful candidate at e Government examinations had been varded to Henry Bickerstaffe, who had taken st-class certificates in five subjects.

CHIPS.

A new organ, built by Mr. Isaac Abbott, of eds, was dedicated on Michaelmas Day, at St. ichael's Church, Headingley, Leeds.

A fresco, having as its subject the "Crucifixion," s been placed on the wall over the chancel arch St. Michael's and All Angels' Church, Maid-ne. It has been executed by Messrs. Heaton, tler, and Bayne, of Garrick-street, by their new rmanent process.

The parish church of Upper Poppleton having come dilapidated, it is proposed to build a new ne edifice on a fresh site, the present building ing left. Messrs. Fisher and Hepper, of York, e the architects.

Mr. Edwin A. Bernays, M.Inst.C.E., late superin-ding civil engineer at Her Majesty's Dockyard, atham, died on the 27th ult., at Worthing, aged years.

Engineering Notes.

Glenfarg Railway.—The new Cowden-beath and Glenfarg Railway, the contract for which was recently obtained by Messrs. Charles Brand and Son, Buchan-street, Glasgow, is now in process of construction. The object of the railway is to shorten the distance between Edinburgh and the North of Scotland by way of the Forth Bridge, and the new line will be finished simultaneously with the Forth Bridge, in the spring of 1890. The line is divided into two sections. The southern section is three miles in length, and extends from the Cowden-beath Station on the Dunfermline line to Keltie Station, where it joins the Kinross-shire Rail-way. In this section about 300,000 cubic yards will have to be excavated, and several road bridges will be necessary. The second section commences at Mawcarse Station, on the Fife and Kinross line, and extends to the Bridge of Earn, where it joins the North British Railway. This section, which is ten miles long, runs through the wild and picturesque pass of the Ochils known as Glenfarg, and obviates a de-tour by Ladybank and Newburgh. From Maw-carse to Damhead—where the only station on the route is to be erected—the line will rise with a gradient of 1 in 100, and from Damhead to the Bridge of Earn there is a declining gra-dient of 1 in 75. The cuttings in this portion of the line are extremely difficult, and embrace about 800,000 cubic yards, more than half of which is through solid Whinstone rock. There are to be two tunnels of 500 yards each in length, two viaducts, and a number of bridges. The first of the viaducts will pass over the diversion of the Farg water, and will consist of five arches, with a span of about 60ft., and the second is to cross the Roden stream, near Kil-knockiebank, and will also consist of five arches, the span of which will be 40ft. The amount of the contract entered into by Messrs. Brand is slightly over £210,000; but the sum fixed by the North British Railway for the completion of the new scheme, which includes the doubling of the line from Keltie to Maw-carse (the contract for which has not been let yet), is £432,870.

Ribble Dock Works, Preston.—The Pres-ton town council held a meeting on Michaelmas Day to consider the proposal to apply to Par-liament next Session for power to borrow another £510,000, to complete the Ribble works, on which half a million has already been spent, under the direction first of Mr. E. Garlick, and latterly of his former partner and successor, Mr. Sykes. Mr. Walker is the contractor. Alderman Edelston proposed an amendment to defer the application until the opinion of some river engineer was obtained as to the sufficiency of the estimates of Mr. Sykes, the engineer to the scheme. He said he thought at least two million pounds would have to be spent upon the works. After a long debate the motion to seek Parliamentary powers was carried by 37 to 10. In his report read at the meeting, Mr. Sykes said:—"I am substituting sodding for the top portion of the pitching of the south slope of the river diversion, and dispensing with the hard rock on the south slope opposite the proposed shipbuilding yards. I also pro-pose to carry up the pitching on the north slope in front of the shipbuilding yards to about 10ft. high instead of to the top of the slope. These reductions will cause a consider-able saving."

Scarborough, Bridlington, and West Riding Junction Railway.—Operations are about to be commenced for the construction of the first section of the Scarborough, Bridling-ton, and West Riding Junction Railway, between Market Weighton and Driffield. Although only 14 miles in length, the first section will reduce the distance from Leeds to Bridlington from 82 to 63 miles—a saving of 19 miles. The second section of the line, from Driffield to Seamer Junction, will create a direct route from Hull to Scarborough, and will effect a saving of about 11 miles. At present, however, it is only intended to construct the first section. Messrs. John Fraser and Sons, of Leeds, are the engi-neers. Commencing by a junction with the branches of the North-Eastern Railway at Market Weighton, the line will proceed in an almost straight line north-east to Driffield. It presents no great engineering difficulties, and is to be completed within two years from the date of the commencement of the works. There will be four stations—at Londesborough, Mid-dleton-on-the-Wolds, Bainton, and Southburn. The railway company will have no terminal stations to construct; and are not required to provide rolling stock or engines. The capital required for this section of the line is £230,000. The contractor is Mr. Rigby, of London.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Newcastle Society of Antiquaries.—The monthly meeting of this Society was held on Monday night at the Old Castle. The Rev. Dr. J. C. Bruce presided. Mr. T. W. U. Robinson, of Hardwick Hall, exhibited several objects of great antiquarian value, which he himself had brought from Egypt, and which, not wishing to keep, he desired to present to the Society. Mr. Heslop presented a porcelain head, found at Corbridge. Mr. W. L. S. Charlton presented a piece of lead, found at Corbridge, which had been used by the Romans for the purpose of fastening the square stones of the bridge together. The Rev. Canon Franklin exhibited models of the Viking ship from Gokstad, now preserved in the Christiania Museum, and the church at Borgund, Norway. Explaining the models, he said that one of the most striking features of Norwegian life was the almost universal use of wood. Although stone abounded as in few other countries, wood was used as being warmer, cheaper, and more com-fortable. The church of Borgund* belonged to the oldest style of architecture in that country. It was of a dark colour, and a peculiar shape, and stood in the midst of a fair valley. The steeple was surmounted by a cock, and the shingled roofs were surmounted by dragons' heads and crosses. It was surrounded by a low-covered gallery, lit by open windows, and there were three doors for entrance and exit. The interior was small and very dark, lit only by a few small holes in the roof. The interior was covered with curious carvings. The roof was supported by ten wooden pillars. The gallery was occupied by the women, as was still the custom in the East. The old baptismal font was *in situ*. Like the Italian *campanili*, the bell tower was a separate building apart, for calling the worshippers to service. Two of these churches existed in Norway, dating from the same period. Though small and unecclesiastical in appearance, the Borgund church was built on true church lines, and stood east and west. Older than York Minster, it stood unimpaired by the hand of time, and, until a recent period, was the only church for miles round. With reference to the Viking ship, he said, this was found at Gokstad, in the south of Norway, in 1880. The vessel was of oak, and was clinker built, and the seams were caulked with a three-stranded cord made of cattle hair. The vessel was 80ft. long, 16ft. wide at her broadest part, and 4ft. deep from gunwale to keel. She was composed of keel, stem, and sternpost, with framed timbers, beams, and external planking. The framed timbers were lashed to the planking by willows made from the roots of trees. The ship must be deemed the masterpiece of its kind, and could not be surpassed by anything which the shipbuilding craft of the present day could produce. The following papers were also read:—"Note on an Inscribed Roman *Patera* of Bronze from South Shields," by Professor E. Huebner, in a letter to Mr. R. Blair, secretary; "The Gold-smiths' Company of Newcastle," by the Rev. J. R. Boyle; and "On a Roman Inscription at Cliburn," by Professor Huebner.

Mr. R. H. Wyrill, for many years borough surveyor of Swansea, has been promoted to the position of borough engineer, and will have charge of all new works, both as to water supply and sewerage works. Mr. Bell (the estate superin-tendent) has been appointed to carry out the duties of borough surveyor.

New board schools for infants in Roman-terrace, Swinton, Yorks, were reopened on Friday. Mr. A. Whitaker, of Swinton, was the contractor.

* Borgund Church was illustrated by a perspective and plan by Mr. G. Canning Richardson in the BUILDING NEWS for Feb. 9, 1877.

Building Intelligence.

Bristol.—A Workmen's Institute and Public Hall, St. Philip's, Bristol, is now in course of erection for the St. Philip's Coffee House Co. at Bristol. The building is of red brick, with purpose made or cut and rubbed dressings, the bay windows and projecting doorheads being executed in wood. The roof of turret is covered with plain tiles, the other roofs with double Roman tiles. A lift connects the bar with the kitchen on the second floor and the women's room between. This latter room is capable of division into two by a revolving shutter, and will serve as a committee room when the hall is used for public meetings. The hall has an open boarded roof, with wrought and chamfered principals, and provision is made for the future erection of a gallery, with seats for 100 people, the present accommodation being for 400. The rooms will be heated by hot water, and ventilation is provided for by flues in the walls and pneumatic ventilators. The cost of the building will be about £1,600, exclusive of site and fittings. The contractor is Mr. H. J. Rossitter. Messrs. Foster and La Trobe are the architects.

Belgrave, Leicester. — St. Michael's Church, Melton-road, in the suburb of Belgrave, Leicester, was consecrated on Thursday, the 22nd ult. The style is Early English, and the church is chiefly built of brick. As opened, it consists of a nave, 120ft. long by 35ft. wide, without aisles, and 50ft. in height and a chancel, with organ-chamber and vestry to north and south. Eventually transepts and a south morning chapel will be added, and a tower and spire built at the south-west angle of site. The west front is flanked by angle turrets, having spirelets and projecting buttresses, between which are three two-light windows, with a projecting gallery and pierced stone parapet over them. The church is seated for 600 persons. The floors in the passages are laid with durable tiles, in simple patterns, and in the choir and sacrarium the work is of richest design in Maw's encaustic tiles. On the fronts of the steps to the altar there are inscriptions. In the nave there are floors of solid wood blocks, upon which stand chairs. A font of stone and marble stands in a small baptistery in the centre of the west end. The work has been carried out by Mr. G. Hewitt, builder, Humberstone-gate, Leicester, and the duties of honorary clerk of works were undertaken by Mr. A. T. Draper, diocesan surveyor. The stone and wood carving is by Mr. Silvanus Wilmot, of Stoughton-street, Leicester. The architect is Mr. G. Vialls, A.R.I.B.A., of London and Ealing.

Birmingham.—By the erection of a new wing at the corner of Bull-street and Dalton-street, Mr. A. R. Dean has just completed a block of buildings with a frontage to Corporation-street, not long since erected, as a furniture and carpet depôt. The addition, which has been erected from the designs of Mr. J. Jenkins by Mr. J. Bowen, is in the same style as the original building, and has a turreted corner in Dalton-street corresponding with the one in Corporation-street. In the new section of the building a restaurant occupies three rooms. The basement will be used as a grill room, the ground floor as a dining room, and the room over it as a billiard room. The kitchen will be at the top of the building. Behind the restaurant in Dalton-street is an inclosed room for loading delivery waggons, and one for receiving goods. Above these, and approached from the street by an inclined plane, is a lofty stable with stalls for seven horses, a harness room, and corn room. This part of the building is fireproof, being constructed of brickwork and concrete. On the second-floor level new showrooms run over the restaurant premises, and over these are additional rooms for the manufacturing and finishing departments. The entire block of building has a frontage to Corporation-street of 136ft., to Bull-street of 70ft., and to Dalton-street of 140ft. Its height from basement to roof is 80ft.

Blackheath.—A new church for the English Presbyterian Congregation was opened on Wednesday, the 5th inst., at Vanbrugh Park, Blackheath. The building consists of a nave, transepts, lecture hall, classrooms, &c. The exterior is of Kentish rag and Bath stone, and the whole of the roof, pews, pulpit, reredos, &c., of selected pitch pine, and the outer doors of teak. The tower and spire at the angle of the building towards Mycenæ and Vanbrugh Park-roads is over 100ft. high. The site, an admirable one, was presented by Mr. Young, a member of the congregation. Mr. Thomas Arnold, M.R.I.B.A., of 10, Basinghall-street, E.C., was the architect, Mr. Jas. Morter, of Stratford, the contractor.

Blackburn.—A new Congregational chapel at Cherry Tree, near Blackburn, was opened on Oct. 2. The building is in the Decorated Gothic style of the early part of the 13th century, and is internally 50ft. long, 26ft. wide, 15ft. high to the square, and 32ft. to the apex of the roof. It is stone built with Yorkshire parpoints and red Runcorn stone dressings. The interior of the building is lined with bricks. The roof is formed with hammer-beam principals, is open to the apex, and has a boarded ceiling with ornamental embattled frieze, the whole being of pitch-pine and varnished. The windows are of lead, glazed with cathedral-tinted glass, and have iron ventilating casements; the glazing of each window is of a different pattern, specially designed by the architect for this building. The building has been carried out from the designs and under the personal supervision of Mr. James Bertwistle, F.S.I., M.S.A., architect, Blackburn. The names of the contractors, who are all of Blackburn, are as follows:—Mason, Mr. John Fecitt; bricksetter, Messrs. Charnley Bros.; joiners, Mr. Dugdale's carpenters, under the direction of Mr. David Critchley; slaters, Messrs. John Dyson and Son; gas pendants, ornamental brass railing, brass pulpit desk, locks and hinges, Messrs. Jones and Willis, Birmingham and London.

City.—The new City of London Court, which is about to be erected on land adjoining the Guildhall, near the Library, will take the form of a long line of buildings designed in a Late form of Gothic architecture, with cusp-headed windows richly moulded, having mullions and transomes. The style will harmonise with Sir Horace Jones's new wing to the municipal buildings. Mr. Murray, of the Guildhall, is the architect, and Mr. J. Mortar, of Forest-lane and Stratford, is the successful contractor for the work. The cost to the Corporation will be nearly £14,000. The offices are so contrived that when the lease of the property to the rear of the site falls in the courts will be extended, and with this idea in view the present buildings are to be constructed. The architect has promised us a drawing which will enable us to illustrate his work. The foundation stone will probably be laid some time next month.

Holme.—St. Mary's Church, Holme-next-Sea, was reopened on the 25th ult. The old-fashioned pews, which were painted in various colours, have been removed and new open benches substituted. Two plain but effectively designed prayer desks have been placed in the chancel, and a stone pulpit. There are also several minor alterations and additions, but further restoration is contemplated. The works have been carried out by Mr. Southgate, of Hunstanton (at a remarkably low figure), under the direction of Mr. Wm. Adams, architect, Lynn.

Manchester.—The headquarters for the 2nd Manchester Volunteers, situate on Ardwick-green, were opened by the Duke of Cambridge on Friday. The drill-hall is situated at the rear, and is lighted from the roof. It is approached from Ardwick-green through an archway 12ft. in width, and also through an ordinary doorway from the side passage. The front portion of the building, which serves as a screen to the drill-hall, contains on the ground floor men's room, sergeants' room, bar, main entrance, staff-sergeant's office, the staircase leading to the upper rooms, and the armoury. The commanding officer's room, adjutant's room, officers' room, committee-room, clothing store, and lavatory are on the first floor, and over them are the shooting-gallery, band-room, and a store-room in connection with it. The staff-sergeant's residential quarters are situate in the upper part of a tower. The drill-hall is paved with wooden blocks, and the other floors are formed of concrete on iron joists. The front of the building is faced with Yorkshire parpoints, and has freestone dressings. The style is Gothic, beginning with Norman boldly treated as a groundwork, and finishing with castellated parapets. There are open fireplaces in all the rooms in addition to a system of warming by hot water. Mr. Lawrence Booth, F.R.I.B.A., of Manchester, designed the building and superintended its erection; and Messrs. Robert Neill and Sons, of Manchester, were the contractors for the principal works.

Shrewsbury.—Holy Trinity Church, erected fifty years since at a cost of £2,000 for the accommodation of the residents in the suburbs of Belle Vue and Coleham, was reopened on Friday after reconstruction from plans by Messrs. Lloyd Oswell and Pountney Smith. The old church consisted of a nave of brick, 60ft. by 46ft., with a flat plaster ceiling, 24ft. high. At the west end was a small tower, with a staircase leading to a large gallery, and at the east end was a very small apse. A chancel, with aisles, was built in 1860, from plans by the late Mr. Pountney Smith, and this is the only portion of the old church now standing. The new nave is 87ft. long by 25ft. wide, and has north and south aisles 14ft. 6in. wide, with arcades of five spans and clerestory windows above. The roofs to the aisles are open framed; that to the nave being boarded to a waggon-head shape. The roofs are all of red deal, covered with Sedan green slates. The whole of the work has been carried out in brick, being faced, both inside and out, with Ruabon red pressed brick, relieved with dressings and bands of Grinshill stone. The arches of arcades are formed with an outer ring of brick and an inner ring of stone, the columns being Forest of Dean blue stone, with caps and bases of Grinshill stone. It is proposed hereafter to build a tower of brick and stone. The nave and aisles are seated with low-framed benches of pitch-pine, the choir-stalls are of oak, the flooring under the seats is laid with wood-blocks, and the passages and porches have been laid with plain red tiles in herring-bone pattern, and the encaustic paving of the chancel by Messrs. Minton, Hollins, and Co., of Stoke-on-Trent. A baptistery is formed by a semi-circular projection from the west wall of the nave. A general scheme of subjects for filling the windows of the church with painted glass has been prepared by Messrs. Heaton, Butler, and Bayne. Two of the windows in the aisle have already been filled in by them, and also the five lights in baptistery. The church will accommodate 822 people, being an increase of 340 sittings. The work has been executed by Mr. Richard Price, of Coleham. Mr. H. L. Whittingham was the clerk of works.

Sunderland.—The foundation-stone of the new municipal buildings was laid on Michaelmas Day. The style will be Italian Renaissance. The central feature will be the clock tower in Fawcett-street, over the main entrance. On the ground floor rooms have been provided for the engineer, accountant, and medical officer, and rate offices, the latter approached from Athenæum-street. On the first floor there will be a reception-room, art gallery, town clerk's offices, mayor's chamber, committee rooms, and council chamber. The upper floor will be devoted to a sanitary museum, school of art, and residence for caretakers. In the basement of the building provision has been made for polling booths during elections. Both the main fronts will be faced with Prudham stone, and the roofs are to be covered with green Westmoreland slates. There were 23 sets of plans sent to the Building Committee of the Corporation, and the design of Mr. Brightwen Binyon, of Ipswich, was selected by the referee, Mr. Alfred Waterhouse, of London. The total cost of the new building will amount to over £25,000. Messrs. E. H. and G. Allison, of Sunderland, are the contractors.

Westbury-sub-Mendip. — The restoration of the parish church, from plans by Mr. W. V. Gough, of Bristol, was reopened on Friday. The works now completed include the rebuilding of the north wall and tower, a new vestry and organ chamber, and new roof of oak to the chancel and deal to the nave and aisles. A few fragments only of the original roofs were discovered, the ancient chancel roof having entirely disappeared. These remains have, how-

ever, been copied in the new work. The interior has been cleared of the old seats, gallery, and a vestry which blocked up the side chapel, and new oak seats provided throughout the church. The windows have been reglazed with leaded glass, the eastern chancel window being filled with stained glass representing the Resurrection and Ascension. The floor space occupied by seats is laid with wood blocks, elsewhere with encaustic tiles. An anonymous donor has presented a reredos of Bath stone and marble. It is composed of five divisions, having in the centre a representation of the Agnus Dei, and on each side two panels with gilded backgrounds, containing carvings of the passion flower, lily, vine, and wheat. It has been executed by Mr. H. T. Margetson, of London, from the architect's design. The contract has been carried out by Messrs. W. H. Cowlin and Son. The lectern and other metal work was supplied by Messrs. J. W. Singer and Son, of Frome.

Worcester Cathedral.—After a course of restoration and repair, the ancient refectory of the monks, used in modern times as the King's school, was reopened on Monday. The repairs disclosed some interesting features in the old building which had been hidden for centuries behind plaster and colour-wash. The building was erected in 1372, is of red sandstone, 120ft. in length by 64ft. in breadth, and stands against the south cloister of the cathedral. It was found during the repairs that a window at each end—east and west—had been blocked up with brick and plaster. The west window (of which only the main framework existed) has been restored, with its tracery; as also has the east window, which much resembles one at Bolton Abbey. Beneath this window is a curious quatrefoil panel in the wall, which was discovered some years since; it had been obliterated by plaster, and is much defaced. The old timber roof is now hidden from sight by a groined timber ceiling, which greatly reduces the height of the room, pronounced one of the best in the kingdom for sound. Where the stones of the wall have decayed new work has been inserted. This is especially noticed in the fine Norman archway at the east end, giving entrance to the cloister, which has been in this way partially restored, and has at present a very patchy appearance. The cost has been £5,000, borne by the Ecclesiastical Commissioners, from plans by their architect, Mr. Ewan Christian, of Whitehall.

CHIPS.

A new organ, built by Messrs. Casson and Miller, of Perth, was opened on Friday in Penicuik parish church. It has a canopied front of pitch pine, with panels of oak and teak. Messrs. J. Ewart and Sons, of Penicuik, carried out the structural alterations to the church.

A reredos in Beer stone, and of 15th-century character, has been placed in Sompting Church, Sussex. Mr. R. S. Hyde, of Worthing, was the architect, and Mr. Harry Hems, of Exeter, the sculptor.

Memorial stones of a new Wesleyan chapel at Norton Down, near Midsomer Norton, were laid on Friday. Mr. Orlando Baker, M.S.A., Regent-street, New Swindon, is the architect, and Mr. W. A. Catley, of Midsomer Norton, the builder. The chapel is Gothic in style, built of local stone, and will seat 200 persons.

A new organ, built by Mr. J. J. Binns, of Bramley, near Leeds, was opened last week at Queen's-road Wesleyan Chapel, Hull.

In celebration of the centenary of the Masonic Girls' School, the governors are about to erect another wing to the institution at Battersea-rise at a cost of £30,000. The new buildings are to accommodate 75 children.

Mr. Frank Bagshaw, late of Nottingham, has been appointed assistant surveyor to the Corporation of Harrogate.

Messrs. Arthur Lee and Bros. have just completed a flight of marble steps, which have been placed in St. Mary's Church, Tyndall's Park, Bristol. The steps are wrought out of St. Silvester, a Portuguese marble. The prevailing columns are pink and white; the pink is of a coral tint, and the white is of semi-transparent appearance, the whole of the surface being interlaced with dark red and brown veins.

The new sewerage works at Henley-on-Thames, constructed on the Shone hydro-pneumatic system, will be publicly opened on Thursday in next week.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is One Shilling for Twenty-four Words, and Sixpence for every eight words after. *All Situation Advertisements must be prepaid.*

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

Received.—H. W. F.—C. and Co.—H. W. W.—J. B. G.—J. L. A.—E. and Co.—C. and J. M.—T. T. S.—B. of B.—J. W. S. and Son.—F. and B.—S. L. B.—H. and R.—S. A. and Co.—P. and Son.—J. W. and R.—W. O.—W. S.—B. and Co.—W. C. and Son.—W. B. H.—C. G. R.—L. W. and V. Co.—R. Bros.—E. U.—A. E. Co.—D. and H.—J. F. and Son.—C. T. and Son.—Admiral M.—D. L. B.—B. L. Co.

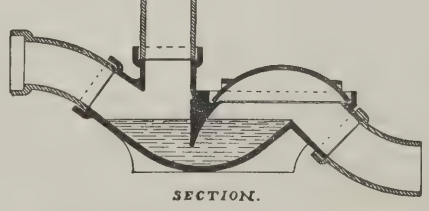
One in a Fix. (The Statute of Limitations does not bar your claim. It is six years, not six months; but we fear the fact that you have probably no contract with the Board *under seal* does.)

Correspondence.

DRAIN TRAPS.

To the Editor of the Building News.

Sir,—The accompanying drawings of drain trap may be of interest to some of your readers.



SECTION.



PLAN.

The "black" section shows the trap with 6in. inlet and outlet. The depth of water in centre is 6¼in., and the passage below tongue 2½in. deep, and in the tail end of trap is an oblong inspection opening, as shown by plan and section.

Three traps of this description have been in use upwards of eighteen years on the drainage system of a dwelling house, and, although the passage below tongue is only 2½in. deep, the traps were always cleaned with the ordinary flushing allowance from w.c.'s and waste pipes. Unfortunately, the traps were not ventilated as shown on the section, but covered over with a stone.—I am, &c., A Clerk of Works.

LODGE FOR THE KING OF THE BELGIANS.

Sir,—*Re* this week's "Wayside Notes." The lodge that the King of the Belgians is about to build is a counterpart of the one at the entrance of Radnor Park, Folkestone, designed by Mr. Conquest, the Folkestone Borough Engineer, and built by Mr. Holdom.

The King saw the building in passing (it stands close to Radnor Park Station, S.E.R.), and wrote to ask the Mayor of Folkestone if he could forward plans and particulars, which was done by Mr. Conquest.

The materials were as far as possible local, and local materials are now being shipped by the Belgian Consul at Dover for the King.—I am, &c., One who Knows.

CHIPS.

During the past year an entire reconstruction has been in progress at the Calton Prison, Edinburgh, and except perhaps in one particular—the gate leading to the governor's house—the reconstruction has involved a distinct gain to the picturesque appearance of the castellated pile which figures so prominently on the south side of the Calton Hill. The work has cost the Government about £40,000, and is carried out in an ornate phase of the Scottish Baronial style, in harmony with the adjacent buildings.

The Corporation of Huddersfield have decided to adopt "Eclipse" glazing for their new wholesale markets, and the order has been placed with the patentees, Messrs. Mellowes and Darby, Church-street, Sheffield.

By the great fire which occurred in Stafford Market-place on Saturday, resulting in damage to the extent of £15,000, the finest old building in the town, and the chief characteristic of the market square, was destroyed. This was Elizabethan House, a splendid specimen of half-timbered work, three stories in height. It was erected about 1560, and was regarded as one of the finest examples of its class in Staffordshire.

The town Council of Hamilton have decided to seek Parliamentary powers to carry out a scheme of increased water supply from the Cadzow Burn, prepared by Mr. Gale, C.E. The estimated cost is £15,000.

A new national theatre is being built in Brussels. When completed it will be the largest and finest theatre in the country, and is to be named the Flemish Theatre. Considerable attention has been paid to the ventilation, Messrs. Robert Boyle and Sons' (of London) system being adopted; the extraction of the hot, vitiated air being effected by the latest improved air-pump ventilator.

A free public lecture, entitled "A Brief Retrospective Glance at the History of Artificial Heating," will be given by Mr. W. G. McMillan, at King's College, London, at 7 p.m. on Monday evening next, as an introduction to a course of lectures on "Fuels: their Use and Economy," to be delivered on Monday evenings, from 7 to 8 p.m.

A new church of St. Anne's, Cardiff, was opened on Wednesday by the Bishop of Llandaff. It is situated in Snipe-street, Roath, and has been built from a design by Mr. J. A. Reeve, architect, of London. It is in the Early English style.

A requisition has been made to the council of the Working Men's College, Great Ormond-street, Bloomsbury, numerously signed by clergymen of all denominations in South London, asking them to establish a branch of the college on the Surrey side of the Thames. A public meeting will be held a fortnight hence to give opportunity for ventilating the subject.

Plans and estimates for a permanent infectious diseases hospital in Hornsey were submitted at a meeting of the Hornsey Local Board last night, by Mr. T de Courcy Meade, the board's surveyor. A resolution was carried to the effect that the estimate to erect a permanent hospital in the best possible manner at a total cost of £3,240 (exclusive of the cost of site) be adopted, and the work carried out with the utmost despatch.

Intercommunication.

QUESTIONS.

[9418.]—**Ventilating Small Room.**—Will any of your practical correspondents kindly give me an opinion respecting the best mode of ventilating a rather small sitting-room, and oblige ?—J. MARSHALL.

[9419.]—**Waterworks.**—I should be glad if any reader experienced in waterworks will kindly give a sketch and explanation of an arrangement for ascertaining the height of water in a service reservoir visible from the outside of reservoir, and at a distance of about thirty yards? Also, I should like to know if, by only partially opening the sluice-valves on a water-main, the full pressure of the water is exerted on the pipes ?—CLARENCE.

[9420.]—**Church Seating.**—Could any of the readers of the "B. N." kindly let me know of any work on church seating ?—CHURCH.

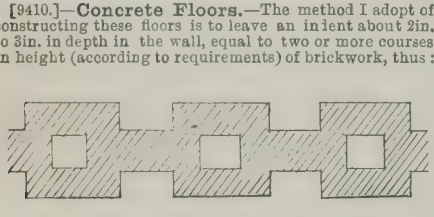
[9421.]—**Proposed Public Buildings at Christiania.**—Could any one oblige me by information as to where one could obtain the particulars of proposed public buildings at Christiania ?—R. BLACKWELL.

[9422.]—**Measuring.**—I have some houses to measure up the whole of the trades which are completed, and I wish to know the proper course to follow in doing so. I am told by one surveyor to commence at the top of the building, and by another I am told to start at the bottom —*i.e.*, the foundations. Also, how to proceed during the erection of a building.—YOUNG SURVEYOR.

REPLIES.

[9381.]—**Extras.**—"Young Surveyor's" question is hardly explicit enough. He does not say whether there was a clause in the agreement binding the builder to complete by a certain date, subject to extras. In such a case the builder will be excused only in case the employer knew at the time of ordering extras that they were not consistent with the original terms, or that it was impossible to complete the work under the first contract until the extras were done. "Thornhill v. Neats," and "Legge v. Hancock" are cases in point. If an express agreement were entered into to the effect that extras were not to interfere with the time of completion, it can be enforced, even if the time given is unreasonable.—G. H. G.

[9410.]—**Concrete Floors.**—The method I adopt of constructing these floors is to leave an indent about 2in. to 3in. in depth in the wall, equal to two or more courses in height (according to requirements) of brickwork, thus :



the indent being represented by the portion hatched; this is better than oversailing. The best shape for the slab is a flat segment arch about 3in. thick at crown, and 10in. to 11in thick at walls (this latter, of course subject to width of span). If formed of good materials this may (when well set) be cut through the entire length, dividing it in two halves, and it will then carry any reasonable weight that can be placed upon it. The width stated is not excessive for this mode of construction.—JAMES THORNELOE.

[9412.]—**Eyesight.**—In reply to "Vedra," will he take the trouble to wash his eyes? When a pupil I suffered severely from prolonged work by gaslight, and found complete relief by regularly washing my eyes every morning in plain cold water. It will be a very unpleasant sensation, and somewhat painful the first time, much less the second, and none at all the third or fourth. For nearly forty years this has maintained my sight sharp and clear, though I have at last to use glasses. Put your face into the water and open your eyelids fully, look well round the basin, and blink freely so that the eyeball is truly washed.—E. C. P.

[9414.]—**Bird's-eye Perspective.**—The only difference in this kind of perspective is that the horizontal line, and therefore the point of sight and points of distances are raised considerably above the objects, so that if "Topsman" is "at home" with other perspectives, there is no difficulty to him. Consult Nicholson's "Principles of Perspective."—G. H. G.

[9415.]—**Mun. and San. Engineers' Exam.**—"Æolus" should read "A Practical Guide for Sanitary Inspectors," by F. R. Wilson, published by Knight and Co., price 4s. 6d.—MEM. ASSOC. SAN. ENGINEERS.

[9415.]—**Municipal and Sanitary Engineer's Exam.**—"Æolus" had better get Boulnois's "Mun. and San. Engineer's Handbook," and follow the course of studies given. After studying Latham and other works on Sewerage, the "Suggestions on Main Sewerage and Drainage," by Rawlinson, he had better study the provisions of the Public Health Act.—G. H. G.

A pastoral staff, for the Bishop of New Westminster, British Columbia, has been executed according to ancient examples of the 14th century. It consists of a gilt metal crook surmounting an ebony rod, which is divided into three portions by metal rings, and terminated by a metal tip or point. The length of the staff is about 6ft. The crook is foliated with the leaves and berries of the "Fruitful Vine." There is a chased knob under the "volute," which is set with "bossed" amethysts. The work is inclosed in a polished oak case, lined with violet velvet, and the whole was designed and hand-wrought by Messrs. Cox, Sons, Buckley, and Co., of London and New York.

LEGAL INTELLIGENCE.

IN RE CHARLES CHURCHILL.—The receiving order in this case was made on the 1st ult., the debtor being described as of Cross-street, Finsbury, importer of American machinery, trading as Charles Churchill and Co., and accounts have now been filed showing assets, £3,972 3s. 4d., and liabilities £15,213 16s. 10d., being a deficiency of £11,241 12s. 9d. The debtor, an importer of American tools and machinery, took over the business in 1880 on the death of his father, with whom he had previously been in partnership, and he believes that he was then worth between £2,000 and £3,000. He attributes his failure mainly to heavy losses in respect of speculative undertakings outside his business, and to his expenses having been in excess of his profits since December, 1884. A large proportion of the creditors are resident in the United States, the debtor having an office and agent in New York. The first meeting of creditors is fixed for Nov. 1st, and the public examination of debtor for Nov. 3rd.

THOMPSON V. THE MAYOR AND CORPORATION OF STRATFORD-ON-AVON.—This was a motion, heard before Mr. Justice Charles, on Friday, on behalf of Mr. William Thompson, of Evesham-road, Stratford-on-Avon, architect, to restrain the defendants, their servants and workmen, from using a piece of land near his house as a sewage farm, so as to cause a nuisance. Mr. Marten, Q.C., and Mr. Brinton, for the plaintiff, referred to the Public Health Act, 1875, section 27, and the Rivers Pollution Act, 1876, section 3. The defendants had no right to cause a nuisance, and if they used the best practical means to render the sewage harmless the Local Government Board would permit them to discharge the sewage into the river Avon. The plaintiff by his evidence had proved an intolerable nuisance, which the defendants did not deny; they only said that they had very much mitigated the nuisance. Mr. Justice Charles said that he was not satisfied that the plaintiff had made out a case for an injunction; having regard to the balance of convenience, he made no order except that the costs be costs in the action.

SERIOUS CHARGE AGAINST AN ARCHITECT.—Thomas Fleming, architect and surveyor, of Streatham, and formerly of Southsea, where he owned a large amount of house property, was charged at the Portsmouth Police-court on Monday with forging and serving a writ purporting to have been issued from the High Court of Justice. The fictitious writ, which was on an official form, was served upon Mrs. Clarke, of Southsea, and claimed damages from her on the ground of slander and for harbouring Mrs. Fleming, his wife, during the last two years, thereby ruining him. The prisoner, who, when arrested, said he merely intended the document to be shown to Mrs. Clarke, was remanded.

STAINED GLASS.

ST. MICHAEL'S AND ALL ANGELS' CHURCH, BEDFORD PARK, CHISWICK.—Two stained-glass windows have been erected in this church. The subject of one is Our Lord seated on a throne surrounded by the nine orders of angels bearing their respective symbols. In the upper part beneath are (in the six outer lights) the four-and-twenty elders offering crowns, and in the centre light is a cross with the four Evangelistic symbols—viz., SS. Matthew, Mark, Luke, John—the whole idea being to represent Our Lord as described by St. John in the Revelation, surrounded by the heavenly host. The small east window of the south aisle is one of a series designed to show the ministration of angels, and represents the Angel and the Mary's at the tomb on Easter morning. In the lower lights above are angels bearing scrolls. The work has been designed and executed under the personal supervision of Mr. Daniel Bell by Mr. R. Davison. Mr. Maurice B. Adams, F.R.I.B.A., is the architect.

The Ipswich School Board had under consideration last week the appointment of an architect for proposed new schools for 250 girls and 250 infants, as an addition to existing boys' school in Bramford-road. A proposal to institute a competition was defeated, and eventually Mr. E. Fearnley Bisshopp, of Ipswich, was elected by seven votes to three over the other local architect named, Mr. Bisshopp having designed for the board the Rose Hill Schools, which were reported by the building committee to have given more satisfaction than any other schools erected for the board.

The Bishop of Ripon consecrated on St. Michaelmas Day the church of St. Mary, Ingleton, which has been practically rebuilt at a cost of £3,200, from the designs of Messrs. Sherlock, Wood, and Keep, architects, Liverpool.

Monday next, the 10th inst., has been appointed for the reception of works of art intended for the autumn exhibition of the 19th Century Art Society, at the Conduit-street Galleries.

Our Office Table.

WE regret to announce the death of Mr. James Stanning Edmeston, A.R.I.B.A., of 42, Old Broad-street, E.C., and district surveyor of Charlton, which took place at his residence, 5, Lansdown-road, Blackheath, on Wednesday. The late Mr. Edmeston was a pupil of the late Arthur Ashpitel, V.P.R.I.B.A. (to whom his father was formerly managing clerk), and was afterwards with the late Sir Gilbert Scott, R.A., for three years, at the time when the Midland Terminus and Hotel (St. Pancras) designs and those for the Law Courts competition were in hand. In conjunction with his father, Mr. James Edmeston, F.R.I.B.A., Mr. J. S. Edmeston has since carried out many important works of a commercial character, and was the architect to the London and South Western Banking Co., for whom he had just completed new branches at Wimbledon, Bow, Hackney, &c. He also designed the very important head office, having a frontage in Fenchurch and Gracechurch-streets. Eleven years ago the late Mr. Edmeston, jun., joined the Royal Institute of British Architects as an Associate, being one of the few candidates who prepared for and passed the former voluntary examination, in which he came out in the highest or proficiency class. In January last he was elected district surveyor for Charlton, Lee, and Kidbrooke in succession to the late Mr. James Collis. Mr. Edmeston, who had been in failing health for some months, died from enlargement of the spleen, the end being hastened by a bronchial attack. He was about 40 years of age.

A CORRESPONDENT of the *Times*, signing himself "Fever Stricken," has appealed to that journal to protect the public against unqualified persons acting as architects, adding :—"Surely it is time that architects themselves should protect their own interests by agitating for Government interposition, that a system of compulsory examinations may be established, as in law, medicine, and other professions, to prevent incompetent persons from bringing discredit on a calling which ought to stand in the highest public estimation. When really effective checks have been enforced, we shall hear no more of terrible tragedies like that at Exeter, and we simple-minded and trustful members of the community, who take houses in London or elsewhere, will not have to suffer from outbreaks of fever caused by the architect's utter ignorance of the most elementary laws of sanitation." To this Mr. H. R. Gough, F.R.I.B.A., Chairman of the Architects' Registration Act Committee, has replied, pointing out that strenuous efforts are being made by the architectural profession to obtain an Act of Parliament for the registration of all at present in practice, and the compulsory examination of all hereafter desirous of entering its ranks. Mr. Gough fully admits the serious charge, that very many so-called architects are utterly ignorant of the most elementary laws of sanitation, and this being so, he holds that "it is of the utmost importance that, for the protection of the public and for the honour of a noble profession, the same safeguards should be provided to prevent incompetent persons from practising as the Legislature has deemed necessary for law and medicine. With such purpose in view a Bill has been drafted, and will be presented to Parliament next Session."

THE Corporation of Birmingham, like the local authorities in most other large provincial towns, have experienced of late years increasing difficulties and inconvenience from the state of their building by-laws, some of which are obsolete, many ill-defined, and others, from frequent alterations, had become self-contradictory. Additional powers having been obtained by the Corporation under a Consolidation Act, a committee has been at work framing a fresh code, and this was submitted to the town council on Tuesday. It differs considerably from the model by-laws of the Local Government Board, and contains, among other features, clauses relating to the details of the plans of houses to be erected in new streets, the entrances to courts, the covering of unwholesome sites with concrete, regulations as to the dimensions of staircases in houses, the thickness of walls in chimneys,

and the walls of ovens and furnaces, and the prohibition of the use of rooms over privies. The draft rules were submitted by the committee to the local Architectural and Master Builders' Associations, but neither body suggested any alterations, and the town council on Tuesday after some discussion adopted them without change.

Among the City Companies who realise their responsibilities and are making an endeavour to advance the interests of their craft is that of the Carpenters'. Their splendid new hall in London Wall has, for the past two or three years, been utilised for courses of free lectures on matters connected with the building trades by competent authorities, and they have recently offered a home to the Clerks of Works Association. Their latest movement is in the right direction — namely, the formation of the nucleus of a library of works dealing with the carpentering and joinery trades. The new library, which was opened on Monday, has two branches—lending and reference—and it will be available for the livery of the guild and for all those who have entered to pass the examination of the company and who have paid the fee of 5s. It will also be opened, on the payment of 5s., to any other person provided with an introduction from some liveryman of the company, from a member of the Royal Institute of British Architects, the Society of Architects, or the Architectural Association, or from some well-known employer connected with the building trade. Should the library prove successful, many other books will be added, so as to make it one representative of the building trades.

The movement for the registration of plumbers is rapidly making headway in all parts of Great Britain, but there is manifested a growing indisposition in great provincial centres to amalgamate with the London City Company of Plumbers. This was clearly shown at a meeting of the craft held in Edinburgh on Friday, when it was, after some discussion, unanimously decided to form an association for Edinburgh and Leith, for the registration of plumbers. Mr. Ogilvie, Principal of the Heriot-Watt College, intimated that the governors of that institution have under consideration a scheme for supplying the apparatus and technical knowledge of the various crafts. Mr. Thomas Proctor, President of the Edinburgh Master Plumbers' Association, having strongly supported the movement for registration, the following were appointed as a committee to take the necessary steps for the formation of an association:—Bailie Russell (convener), Councillor Miller, Mr. Thomas Proctor, Mr. Walter Brodie, Mr. Stewart, Mr. Allan Carter, and Mr. Hippolyte Blanc, architect, with power to add to their number.

Mr. S. Clapp, clerk of works to the new Victoria Courts, Corporation-street, Birmingham, died very suddenly at his residence, No. 3, Golden Villa, Rookery-road, Handsworth, on Saturday morning, from an attack of erysipelas. He was formerly in the employ of Messrs. Martin and Chamberlain, of Birmingham, and many important buildings in that town have been erected under his supervision. Amongst them are the Chief Fire Station, Upper Priory; Moseley-street Police Station, School of Art, Monument-road Baths, Staffordshire Bank, Messrs. Southall and Barclay's, and the residence of the Right Hon. Joseph Chamberlain. He was a prominent provincial officer of the Masonic Order and other friendly societies. At Tuesday's meeting of the Birmingham Town Council the Mayor, referring to Mr. Clapp's death, said he had performed his duties to the satisfaction of the committee, and had worked easily with the contractor.

By direction of the Kent Archæological Society, excavations are now being made in the neighbourhood of the ruins of Richborough Castle, with a view to discover whether any foundations of buildings can be detected outside the walls of the castrum, where the growing corn exhibits traces of roads or streets at right angles. These streets have been laid bare, and found to be composed of pebble roads, and the adjoining ground has been trenched. Only slight traces of wall foundations have been met with, but everywhere there are traces of fire and destruction of Roman buildings. Nothing of value or importance has been met with, except two legible brass coins, belonging to the latest periods of Roman rule in Britain. Many fragments of pottery of all descriptions have been met with, and quantities of burnt wheat, some of which appeared stored in Roman amphoræ. The work is being carried on under the direction of Mr. G. Dowker, F.S.A.

The twenty-third annual report of the Pearl Assurance Company states that, while giving every attention to the extension of the company's business, the directors have devoted considerable attention to its consolidation, with the result that over £28,000 has been added to the assurance fund during the year, as compared with £14,318 7s. 7d. added the previous year. Three hundred and seventy-one thousand nine hundred and forty-five policies were issued during the past 12 months, representing a new annual premium income of £142,808 17s. 6d. The total income for the year amounted to £218,848 3s., and exceeded that of the previous year by £18,862 17s. 7½d. The assurance fund, with capital paid up, now amounts to £152,470 3s. 3d., of which £28,241 12s. 9d. has been added during the present year, being nearly double the amount (£14,318 7s. 7d.), added to the fund in the previous year. The directors recommend that a dividend of 10 per cent. be paid in two half-yearly instalments.

Messrs. Maw and Co., the well-known firm of artistic tile makers, of Benthall Works, Jackfield, near Ironbridge, have reprinted from the *Journal of Decorative Art* an illustrated description of their works and productions. Sketches are given of the various processes of manufacturing encaustic tiles, and also examples of figure panels, tiled hearth slabs, and chimney-pieces at present on view at the Jubilee Exhibition at Manchester.

The works in connection with the new *cloaca* in the Via del Colosseo, Rome, have brought to light two large fragments of a marble frieze, which must have belonged to some temple or similar public building. They are about 3ft. 6in. in height. One piece, about 4ft. long by 7in. thick, represents a winged Diana. The goddess, of whom the face and one foot are wanting, is in hunting attire, wearing a short chiton and chlamys. The figure resembles in pose the well-known Diana at Versailles. Close by is another female figure wrapped in a mantle, with the right hand resting on the hip. She wears a Spartan tunic, gathered at the bosom and confined by a girdle. The right arm is ornamented with a bracelet, and the feet are sandalled. Separated from this figure by an oak tree, there is a male figure, of which only the right side is preserved, his hand grasping a hammer, at his feet an anvil and smith's tongs. It may represent Vulcan. The other fragment is not nearly so well preserved. It represents portions of two female figures, and possibly of Furies. Roman archæologists incline to the opinion that the whole frieze represented the Battle of the Giants.

MEETINGS FOR THE ENSUING WEEK.

Monday.—King's College, London. Public introductory lecture, "A Retrospective Glance at the History of Artificial Heating," by W. G. Macmillan. 7 p.m.

CHIPS.

Kingskerswell parish church was reopened on Sunday, after restoration from plans by Messrs. Rowell and Son, of Newton Abbot, carried out by Mr. Seeley, of Newton Abbot. The old floor, being in a bad condition, has been removed, and a new one laid down; the aisles have been laid throughout with red and black tiles, and seats of varnished pitchpine substituted for the old-fashioned high pews. Unhappily the work of restoration has not swept away the hideous gallery which hides the west window—the finest in the church, and the pulpit is conspicuous by its absence. A new bell has, however, been added to the peal, and another is promised.

The negotiations between the agents of the corporation of Edinburgh and Leith and of the Edinburgh Gas Company for the completion of the final agreement to give effect to, and carry out, the provisional agreement signed at London on 1st April last, have been brought to a satisfactory termination, and all questions between the corporation and the gas company finally adjusted.

An exhibition of paintings and sculptures by living artists is to be opened at Derby.

WATER SUPPLY AND SANITARY MATTERS.

Market Weighton.—The system of drainage and sewage works which Messrs. Turner and Sangwin, contractors, of Hull, are constructing at Market Weighton, from plans prepared by Mr. Bohn, C.E., Hull, are in progress, and on Friday the ceremony of laying the "memorial stone" of the buildings required at the sewage farm was performed by Mrs. Bohn. The works consist of nearly two miles of pipe sewers, with manholes and ventilating shafts; also about one mile and a quarter of under-drains at the sewage farm, which is on the intermittent downward filtration system. Of this work 960 yards of 18in. pipe sewers have already been laid, and the manholes and ventilating shafts constructed.

Stroud, Gloucester.—The works of the Stroud Water Company, commenced in May, are being rapidly pushed forward, and on Saturday the directors visited the works. Under the Stroud Water Act they have power to supply water in nineteen parishes in the old borough of Stroud. The Stroud Local Board area is now supplied from the board's reservoirs, and the consent of the board will have to be obtained before the company can supply within that area. One of the places to which the company's powers extend is eight miles from the site of the reservoirs. Messrs. C. Minns, of London, and V. A. Lawson, of Stroud, are the engineers. Mr. Dierden, the contractor, has sublet portions of the contract to Messrs. Chew and Sons, of Stroud. The company recently opposed, at an inquiry before a Local Government Board inspector, an application by the Rural Sanitary Authority to borrow £1,000 towards the cost of providing Painswick (one of the places to which the powers of the company extend) with a supply of water from the hills near that place. The company are constructing a reservoir at Chalford, and another on the high level of Minchinhampton Common, which will command the higher parts of the district. The source from which the water is obtained is the Midford Sands. By sinking a well at Chalford to the depth of 75ft. a plentiful supply has been tapped, which flows into the well, at the rate of 28,000 to 30,000gals. per hour. It is proposed to sink the well 20ft. further. Some miles of 10-in. mains have been laid, and the work is now going on in Stroud streets. The contracts for two pairs of engines and three boilers has been taken by Messrs. Holborow, of Duddridge, Stroud, at £4,750, and one boiler of 18 tons has been delivered. The building of the engine and boiler houses, stores, &c., is to be commenced shortly.

The first section of an esplanade constructed by the local board of Lynmouth was opened last week. It has a footpath of 12ft., and a roadway of 30ft., and runs from the Rhine Tower under the hills towards Riddy Ball. The work has been carried out by Messrs. Jones Brothers, at a cost of £1,200, who intend now to erect a lift from near the esplanade to Lynton.

Stained-glass windows have been put into the west end of Bath Abbey during the past week.

The partnership heretofore subsisting between Tunley and Co., of Clement's-lane, Lombard-street, architects and surveyors, has been dissolved.

The Swinton and Pendlebury local board has lately appointed Mr. R. Vawser, C.E., of Cooper-street, Manchester, to report upon a sewerage scheme for a portion of their district, which has a population of over 20,000 inhabitants, and an area of 2,200 acres.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BETHNAL GREEN.—For alterations and additions to 354, Bethnal Green-road, for Mr. G. Medway. Messrs. Burr and Medway, 65, Chancery-lane, W.C., architects:—

Thomerson and Son	£87	10	0
Hood	83	8	9
Higgs	75	17	0
Lark and Son, Fore-street, City* ...	70	0	0

* Accepted.

BEXHILL, SUSSEX.—For finishing two houses in the Western-road. Mr. J. B. Wall, A.R.I.B.A., of Walbrook, London, and Bexhill, architect:—

King, J.	£520	0	0
Cole, J.	487	0	0
Sands, W.	480	0	0
Murrell Bros., Bexhill...	425	0	0

BIRMINGHAM.—For supplying the wrought-iron casements for the new Victoria Law Courts, Corporation-street, Birmingham. Messrs. A. Webb and E. I. Bell, 19, Queen Anne's-gate, Westminster, architects:—

Hope, H., 55, Lionel-street, Birmingham (accepted)	£663	0	0

BRISTOL.—For completing party-wall at Temple Backs, Bristol, for the Bristol School Board. Messrs. J. W. Trew and Sons, 22, Broad-street, Bristol, architects:—
Veals, W., Bristol (accepted).

BRISTOL.—For the extension at Bristol Post Office:—

Davis, D., Cardiff	£15,540	0	0
Wilkins, J., and Son	14,990	0	0
Wilkins, R., and Son	14,940	0	0
Krauss, A.	14,849	0	0
Davis, J. E.	14,743	0	0
Cowlin and Son	14,368	0	0
Brock, W.	14,265	0	0
Church, W.	13,966	0	0
Howell and Son	13,720	0	0
Lapthorn and Goad, Plymouth ...	13,666	0	0
Forse, H. A.	13,300	0	0
Hayes, C.	12,857	0	0
Stephens, Bastow, and Co. ...	12,769	0	0
Beaven, A. J. (accepted)	12,250	0	0
Turner, S.	11,793	0	0

Rest of Bristol.

CHAGFORD.—For the erection of a rectory house and stable buildings, at Changford, Devon, for the Rev. G. H. Ley. Messrs. J. W. Rowell and Son, Newton Abbot, architects:—

Lamacraft, Dawlish...	£3,598	0	0
Reed, J., Plymouth	3,289	0	0
Matthews, F., Babbacombe ...	2,650	0	0
Aggett and Underhill, Chagford ...	2,200	8	4
Stone, W., Chagford...	2,182	0	0
Brimblecombe and Ellis, Chagford*	2,024	15	0

*Accepted.

CHEADLE.—For constructing a line of railway from Cheadle to Cresswell, for the Cheadle Mineral and Land Co. Mr. J. Forsyth, C.E., Stoke-on-Trent, engineer:—
Baker, C., and Sons, Bradford (accepted).

COLCHESTER.—For the alterations and additions to No. 54, Priory-street, for Mrs. E. White. Mr. J. W. Start, Cups Chambers, Colchester, architect and surveyor:—

Dupont	£193	0	0
Shead	184	0	0
Chambers	168	15	0
Ambrose (accepted)	142	0	0

CRIPPLEGATE, E.C.—For repairing the chiming apparatus and bells at St. Giles's Church, Cripplegate, for the vestry:—
Moore, J., and Son, Clerkenwell-close (accepted) £76

DEWSBURY.—For Queen Victoria Jubilee Board Schools, for 900 scholars, for the Dewsbury School Board Mr. J. Lane Fox, Central Buildings, Dewsbury, architect and surveyor. Quantities by the architect:—
Mason, joiner and ironwork:—
Chadwick, E., and Sons, Dewsbury.
Slater:—
Thompson, W. R., Dewsbury.
Plumber:—
Newsome, F., Dewsbury.
Plasterer:—
Binns, J., Dewsbury.

FAREHAM, HANTS.—For the erection of new whiting works, cottages, stabling, chimney shaft, and other works (exclusive of large iron roof), for Mr. H. Rogers. Mr. F. Bath, F.R.I.B.A., F.S.I., Crown Chambers, Salisbury, architect. Quantities supplied:—

Gammon, J. and A., Petersfield ...	£2,736	0	0
Young, W. J. and C. S., Salisbury	2,579	0	0
Stallard, G., Havant	2,440	0	0
Kite, H. J., Salisbury	2,414	10	6
Blackman, G. H., Fareham... ...	2,278	12	0
Plummer, J., Fareham	2,274	7	3
Light, W. R. and Co., Portsmouth	2,250	0	0
Corke, J. H., Southsea	2,030	0	0
Mitchell, C., Downton†	1,972	19	5
Ingram, H., and Son, Woking* ...	1,960	16	0½

† Accepted subject to deduction for gravel and cement.
* Withdrawn.

For large iron roof to above:—
Lysaght, J., Ltd., Bristol (accepted).

GIPSY HILL, S.E.—For decorative works to General Brownlow's house, 87, Gipsy Hill. Mr. J. Wall, A.R.I.B.A., 32, Walbrook, London, E.C., architect:—

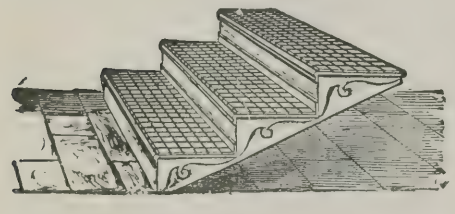
Stacey Bros.	£187	0	0
Wilkes, P.	135	0	0
Phippen, W.	132	7	0
Leng, J. D., Deptford	130	0	0

GLASTONBURY.—For constructing a sewer in Land Mead, for the town council:—

Higgins (accepted)	£67	10	0

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BlakeStreet, Sutton Coldfield
Blaydon-on-Tyne
Bletchley
Bolton
Bolts Bridge
Bombay, India
Bow
Bowdon Central
Brick Lane
Bristol
Broadfield
Broad Street
Broadstone, Dublin
Burdett Road
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Bury
Borough Road, Mersey Tunnel
Canonbury
Camden Road
Chalk Farm
Charing Cross
Cheddington
Cheetham Hill Junction
Chequerbent
Clayton
Clifton
Clitheroe
Crewe
Crooked Billet Level Crossing
Cross Lane
Crumpsall
Cullercoates
Cannon Street
Dalston
Daubhill
Daybrook
Denholme
Derby
Droylesden
Drighlington
Dudley
Dudley Port
Dundee
Ealing Common
Ealing Terminus
Earl's Court
Edgware Road
Failsworth
Farringdon Street
Farrington
Fenchurch Street
Finchley Road
Firsby
Forest Gate
Forest Road Level Crossing
Fulham
Geedley
Gloucester Road
Gower Street
Grantham
Greenwich
Hackney
Haggerston
Hammersmith
Heaton Park
Hereford, Barr's Court
Highbury
Highdrau Road, Wallsend
Hollinwood
Holyhead
Homerton
Horley
Hounslow
Hounslow Barracks
Keighley
KembleJunction
Kenilworth
Kensal Green
Kentish Town
Kilburn
Kilsby
King's Cross
King William Street
Langley Green
Latimer Road
Lea Bridge
Leamington
Leman Street
Leyland
Leyton
Leytonstone
Lichfield
Limehouse
Lincoln
Little Ealing
Liverpool Road, Manchester
Liverpool Street
Llandudno
Long Buckby
Londoun Road
Ludgate Hill
Mark Lane
Maidstone
Manchester
Manchester, Exchange
Manchester Road
Mansion House
Mildmay Park
Millhill
Milverton
Monkwearmouth
Moorgate-street
Monument
Newcastle-under-Lyme
New Cross
Newport
Newton Heath
North Brentford
North Bridge
Northampton (Castle Station)
Nottingham
Oldbury
Old Ford
Oldham (Mumps)
Paddington
Parsons Green
Patricroft
Penzance
Pickle Bridge
Plaistow
Pleck
Plymouth
Poplar
Portsmouth
Prestwich
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Salisbury Road
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Shadwell
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Sloane Square
Snow Hill, Birmingham
Slough
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South Bromley
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Southport
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Stourbridge
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Upton Park
Victoria
Victoria Park
Walham Green
Wallsend
Walsall
Waterloo, Liverpool
Weaste
Werneth, Oldham
Westbourne Park
West End Lane
Westminster
Whitchurch
Whitechapel
Whitefield
Whitley
Widnes
Willenhall Bridge
Willesden
Wood Green
Wormwood Scrubbs
Worsley
Wolverhampton
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Chester
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Dublin, Beggar's Bush
Dublin, Island Bridge
Dublin, Ship Street
Dublin Royal Barracks
Dundalk
Dublin Castle Police Barracks
Eastney
Fleetwood
Fulwood
Halifax
Hamilton, Glasgow
Hulme
Knightsbridge
Leicester, Glen Parva
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Newbridge
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Battersea, St. Mary's Church
Birmingham, Cowper Street
Clapham
Colchester
Forest Gate
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Harrow
Haverstock Hill Orphan Working School
Jamaica Level
Leyton, Grammar School
Leyton, Church Road
Newhaven
North Bow
Old Ford
Poplar, Byron & Bright Streets
Southsea, Church Path
Southsea, Omega Street
Stratford, Colgrave Road
Stratford, Salway Place
Sutton
St. Jude's
Tayport
Torrington
Upton Cross
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Hospitals.
Belfast County Lunatic Asylum
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THE BUILDING NEWS
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FRIDAY, OCTOBER 14, 1887.

EXTRAS IN BUILDING CONTRACTS.

THE unfortunate and unhappy incidents to all building operations known as "extras" arise chiefly: first, from those who build not knowing their own minds; and, secondly, from ill-digested and imperfectly-prepared contract drawings and specifications. Perhaps it would be fair to the architect to say that hardly ten out of a hundred employers know what they really want or are able to comprehend plans and other technical representations of buildings. Suppose, for instance, a client instructs his architect to prepare a plan of a residence to have a certain accommodation, the architect perchance may design a house that will give every satisfaction on paper; but as soon as the walls of the building show above the ground, disappointment is expressed — a fancied lengthening of one room, a bay window, or some other alteration is required. As the second floor is reached, the demand for some rearrangement or additional bedroom is required, all of which might have been accomplished in an hour on paper; but the alteration of which in brick and labour is a serious item. It is not a reflection on the intelligence or education of the employer to state that he does not understand plans, though he often has the unfairness to assert that the architect ought to have explained to him, and that he was to blame for not doing so. Everyone, however indifferent he may be as to domestic house planning, has an idea of what is convenient, or must have seen a room that pleases him in its proportions and arrangement; the employer might have told his architect that he wanted a room like it, and it would have been easy to have obtained what he wanted. But not so. The client has the plan submitted to him, and as it looks well on paper and has the architect's recommendation, he is satisfied. What is more natural? The client depends on his architect's ability, but so does the latter depend on his client's comprehension. Unless the architect makes his client understand by pointing out every room, and going over together with him *seriatim* every feature—fireplaces, doors, windows, down to the fastenings and furniture of the doors—it is impossible to obtain a set of plans or a specification that shall be perfectly satisfactory. We think the employer is justified in requiring more detailed explanations than he often gets. Models of buildings are not often made, and even they would not convey an idea of the internal effect and fittings. Between the vague apprehension of his requirements and the misapprehension of the architect "extras" are sure to arise.

But there is another source to which we must allude—the imperfection of the drawings and specifications, for which the architect is, of course, solely responsible. They are hastily prepared from the barest instructions without a knowledge of the requirements of the employer, who is only asked to pass the plans. At this stage questions of a vexatious kind are usually "snubbed" or unheeded. The employer often asks if this or some other point can be altered, and the architect retorts that it cannot without incurring expense. Hurried preparation is one of the most prolific sources of extras. The plans and sections are still in pencil to a small scale, or only roughly drawn to a larger scale, and before they are inked in they are handed over to the quantity surveyor, who, perhaps, to save trouble attends at the architect's office. In this unfinished state of the drawings and without a specification, which somehow or other is generally the last thing finished, he commences to take out the quantities of the building. Only the most experienced hand can follow under these circumstances, or provide for omissions and imperfect data. We know that the surveyor has to grope his way in the dark very often, not knowing how the architect intends to have a roof constructed or some other detail finished. How can he do otherwise without details of these parts drawn to a large scale? General drawings to an eighth or a quarter of an inch scale cannot possibly exhibit the intentions of the architect with respect to the "labour" on a roof principal of a decorative character. How is it possible to tell dimensions of newels and balusters to a staircase of an elaborate kind? Or a detailed drawing of a cornice or some detail of masonry may exhibit work that has entirely escaped the quantity surveyor's eye in the unfinished pencil drawing from which he has taken his quantities, and yet these little extra details may make all the difference possible between the crude and unfinished work of a builder and that of the architect. It is true the surveyor often "lumps" and makes allowances to meet omissions, and the builder does the same in pricing; but it is convenient to disregard these and to take notice only of discrepancies found to exist between the drawings or any excess of labour. An extra may often mean an omission on the part of the quantity surveyor, but the client looks at both an extra and an omission as one and the same thing; they are practically "extras" to him. Another and larger source of errors is due to the uncertainty of the owner's mind. Some men are fond of making variations or suggesting what they think are improvements, but of course they do so with their eyes open, knowing the consequences of their want of decision, or, if they do not, the architect is to blame for not making them understand that alterations or additions are extras, and have to be paid for.

From the frequent difficulties into which the architect falls, and the questions which we receive from time to time appertaining to extras, it is quite clear that there is a great deal of misapprehension. We shall not refer to the ordinary construction put on the subject, nor the legal decisions that have become established facts, and with which most of our readers are acquainted; but we may draw attention to one particular aspect of the question, or its bearing upon completion, which is rather troublesome. We will suppose a builder contracts to carry out a work by a certain time under the usual penalty. During its progress the owner requires the builder to make some alteration or deviation from the plans, the consequence of which is the builder is delayed in completing the work by the time stated in the agreement. The question arises, Can the penalty for non-completion be enforced, or does the extra work ordered by the owner invalidate the agreement? The answer to this question will depend entirely on the circumstances of the case. If the contractor has pledged himself, whatever additions or extras are ordered, to finish by a certain day, he is bound to the letter of the contract, however unreasonable such a condition may be. This position is entered into by many builders without knowing the consequences. The law, however, as Mr. Justice Hannen said, will not help a man if he enters into a contract to perform an impossibility subject to a penalty. There are, however, few contracts drawn up in this one-sided manner. Generally there is a clause in the contract by which the builder agrees to complete by a specified date, or in default thereof to pay a penalty for every day that exceeds the time. Should the employer order extra work to be done, causing a delay, the law has ruled that such order does not put an end to the original stipulation, but that it entitles the builder to an allowance of so much time as may be required to complete the extra work.

It often happens, however, that the extra work entails the non-completion of the original contract work, and a complication arises as to the responsibility of the builder under the agreement. The law is not very clear on this case, though we may gather the spirit of it from the decision given in the case of "Thornhill v. Neate." To understand it we must refer to the facts. A builder agreed to build six houses for the defendant under a penalty of £1 for each house for every week the work should remain incomplete. The houses were not completed, and possession was withheld for twelve weeks after the day stipulated. The builder replied that it was agreed that he should perform other work upon the houses, and that such additional work was to be done within a reasonable time. He further contended that the work under the second agreement was so mixed up with the original work, being part and parcel thereof, that it was impossible to complete the original contract until the work under the second was completed. It was decided that the second agreement operated as a waiver of the stipulation as to time in the first agreement. From this case it will be seen there was a second agreement made between the parties, by which a reasonable time was allowed for doing the additional work, and that the original work could not be completed before the additions. The works under the two were mixed up together, so that it was impossible to complete the first before the second. We therefore infer from these decisions that if an order for extra work at all interferes with the contractor's performance of his contract the law will give him more time It is a question, however, whether a Court would look at the matter in this way should the extra works be performed without a second agreement being entered into allowing a reasonable time. Contractors must, therefore, not trust too much to the decision when there is no second agreement to operate as waiver of the stipulation as to time. The mutual agreement in the above case was a consent that the works should be postponed until the lapse of a reasonable time.

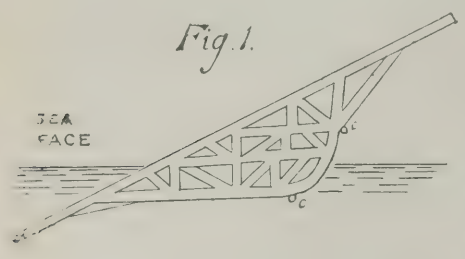
Builders are sometimes remiss in obtaining written orders for additions. A verbal order is given to do an "extra" either by the employer or his architect; the work is carried out, and the builder trusts to the architect, or rather to his honesty. The building is completed, and the order is forgotten or denied; the accounts are sent in for adjustment, but only those items are allowed which are confirmed by the written orders which the builder can produce. More necessary still is it to clearly understand the obligation under the clause as to completion within a given date, and to obtain remission of it when an "extra" is ordered, bearing in mind the ordinary contract provision does not discharge the builder's obligation to complete by a certain day under a penalty, but will enforce it in respect of the work under the original agreement. An order for additional work may not interfere with completing the original contract, but it may practically prevent the finishing of some decoration or room, in which case the contractor has a good plea for asking an extension of time; such, for instance, as the putting up of an additional cupboard or the decoration of a room. Generally there is not much difficulty in obtaining an extension of time under these circumstances, though it is safe to make it one of the conditions of doing extra work.

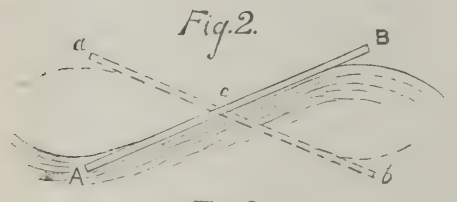
WORKS IN WATER.—XXXIV.

FLOATING BREAKWATERS.

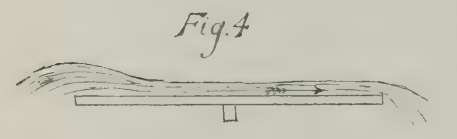
(*Continued from p.* 313.)

THE floating breakwater of Captain Sleigh is, in form, a sloping beach, the inclination offered to the waves being two horizontal to one vertical, or thereabouts, on being first struck. To support this floating platform, which is 50ft. or 60ft. in length in the direction of the waves, or say crosswise of the structure, a watertight caisson is constructed,









of which Fig. 1 represents a cross section. This, and the platform representing the beach, are made in lengths or sections of 60ft. or thereabouts, having their centre of motion in the main shaft, which runs through the length of the structure, and as many of these sections are jointed together as are required for different situations. The bottom is flat, and in smooth water is horizontal. This might be disputed; but we will confine our remarks to the manner in which it is represented by the inventor.

The elements of construction might be thus stated: If a very long plank or platform, A B in Fig. 2, float upon waves of water—leaving out of consideration for the moment the effect of wind—each part of it would oscillate vertically, the end A being at one period in the trough, and at half of the next period on the crest *a*, while the other end would be at the same period and half-period in the positions B and *b* respectively, and the centre *c* would rise and fall vertically, supposing the plank or platform to be rigid throughout; but if one end, A, were held down so that it could not rise above the mean level, the water above it, forming the crest of the wave, would travel onwards and up the slope, as shown in Fig. 3, being prevented from sinking into its accustomed hollow at the next half-period by the interposition of the platform, which it would then begin to sink by its weight, until both assumed a nearly horizontal position, as shown in Fig. 4, and the accumulation of water would shoot along the platform in a thin sheet with a velocity due to the height of the crest of the wave above it, and the vertical movement which it would have had in the absence of the platform would be converted into a horizontal one, which, taking place at or not much above the mean level, would not create further waves of any considerable height.

If one end of such a plank or platform were strongly buoyed up by a floating caisson while the other were held down, the force due to the height of the crest of the wave arriving at its edge would be expended in driving the water up the slope with such violence as to break part of it into spray on or before its arrival at the top of the slope; but before this effect could take place the inclination of the platform would become much reduced by the weight of the water upon it acting beyond the centre of motion, and it would assume a more horizontal position, pressing the caisson into the water, the floating power of which would again bring up the platform to its inclined position in time to receive the next wave, and so on. Captain Sleigh described his invention as a method of forming sheltered harbours by the employment of buoyant sea barriers, which are also useful in the formation of breakwaters and the protection of pier heads, embankments, &c.

We have just shown what the action would be, but Captain Sleigh claimed that the platform would be always maintained in a sloping or oblique position, that it would form a sea and wind barrier for sheltering ships and other vessels, and also pier heads, bridges, and other structures requiring such shelter from the ordinary destructive effects of heavy seas and gales of wind. The caisson was to be made, preferably, of ribs of timber, strongly planked on the outside and made watertight and buoyant; but it might be constructed of iron plates if desired. The back part of the caisson was to be rounded, the bottom flat, whilst the upper surface or back was to rise at an acute angle, forming an inclined plane extending longitudinally the whole length of the structure. The lower end of the platform would be immersed in the water. These floating breakwaters might be made of any dimensions, and in order to form a sea and wind barrier or harbour of refuge, a suitable number might be moored end to end, either in a straight or curved line, connected together by universal ball and socket joints or links and toggle joints, placed at the ends of the main beam, "by which they would be allowed to roll on their centres of gravity, or yield temporarily in any other way to the violence of the winds and waves." They were to be moored to the bottom of the sea by chains or cables attached to rings, *c* in the figure, at one end, and at the other to anchors fixed in the ground. In place of the peculiarly-shaped caisson or floating vessel above described, the sloping platform might be attached to a framework supported by a number of hollow and watertight wood or iron vessels, or the inclined platform might be employed even without any floating support, by connecting it at one edge by means of chains or cables to the bottom of the sea in such manner that the other edge may rise from the water in an inclined direction. A Select Committee was formed in 1860 to inquire how far it was practicable to afford better shelter to shipping upon the coast by the adoption of some plan for the construction of breakwaters and harbours less costly and better adapted for certain localities than the system of solid masonry, and before this committee Captain Sleigh replied to the question whether or not there was a doubt of the power of resistance of his floating breakwater to the force of the waves and the wind, tending to drive it from its moorings, that it had been ascertained by calculation that it was impossible to drive a structure of that shape from its moorings, in consequence of its presenting so very modified a resistance to the waves and the wind, being at an angle of 12° only from the horizon; and to a further question whether there was no danger of the cable or moorings being corroded, and so, in course of time, becoming rotten and giving way, Captain Sleigh replied that cables remained in use for forty years; that in Dublin Bay and elsewhere it was found that not a sixteenth part of the iron had been corroded after forty years; and as to the action of the sea and the friction of the cables upon a rocky bottom wearing them through before it could be known, he replied that that might be so eventually if they were not examined, but they could be examined daily if desired, and that, at any rate, they could be examined as frequently and effectively as any fixed work. The chain attached to the anchor was an endless chain, or, as sailors call it, a messenger, which permits of being hauled round, and every link examined; and as to the ring of the anchor, round which the chain passes, a diver could go down, or any sailor would jump overboard and dive down in nine fathoms water for half a crown, and see whether it was perfectly right or not.

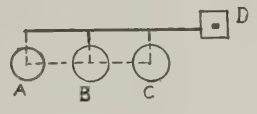
In questions of this sort lightships are often referred to, and it was suggested to Captain Sleigh that these have frequently broken away from their moorings during heavy storms; to which he replied that they had been badly moored. The form of a light-vessel was one of the most powerful agents in dragging an anchor up: there were two violent actions in a wave, the vertical or lifting power, proportionate to the buoyancy and extent of the structure placed on it, and the horizontal force of the crest of the wave, and the shape of a light-vessel was the best form of lever for weighing an anchor. In weighing an anchor in a launch by the stern, the stern is hove down nearly to the water's edge, and then the men rush forward to the bow to exercise that leverage which a light-vessel and every other vessel exercises at anchor. The leverage is similar in the two cases; the fulcrum is near the resistance; the lever is of the first order; and that is the form of leverage in operation in all cases in which the undulation passes underneath a structure. A ship's anchor sometimes holds so firmly that it has to be abandoned. With a range of 50 or 60 fathoms of cable in 10 fathoms of water, if the ship be made fast by the stern, and the anchor be attempted to be weighed, it is not in the power of any ship's company to bring it up: the capstan and bows of the ship would be torn out before the anchor would come home. But as to the strain upon an anchor, it depends greatly on the length of the cable. It is very small with a sufficiently long cable. With 100 fathoms of chain cable in 15 fathoms depth of water the chain would seldom be raised from the ground anywhere near the anchor, and therefore there would be but little strain upon it. On the question of mooring, Captain Claxton's opinion was that whatever might be the force of the waves, no matter how high, the cables by which the sloping breakwater was moored would be very little strained. The mooring chains would be fastened to either anchors or screw moorings, according to the nature of the ground and depth of water, and there would be to each length or section of a line of breakwater four cables on the sea face, each 80 fathoms in length, a cable at each end, and four inside on the shore face; so that for each section there would be ten attachments to the ground through the means of long cables, which would put very little strain upon the anchors or screw moorings. Considerable stress is laid upon this point, because it had been frequently said that any floating breakwater would be driven from its moorings. It seems, however, to be a question only of the strength of the cable itself, and not of the mooring to which it is attached; and as to the strength of any cable of given dimensions it is very well understood, the testing being a daily practice in

the dockyards. On the question of breaking adrift, nothing could be more emphatic than the statement of Captain Claxton—that "it will not break adrift; it shall not break adrift; it cannot break adrift; that is my answer. I am prepared to say that such chains and moorings can be found and laid down that it shall not be possible for a floating thing like Captain Sleigh's to be broken adrift." Another question arose: What was to become of a vessel if it were to run upon this sloping beach-like platform in a gale of wind? And Captain Claxton's answer to that was that the vessel would slide up the incline and depress it, but would not break it to pieces; the breakwater might be damaged by such an occurrence, but the vessel would be safe; it would go over it. On the general question of the height of the waves on some parts of the coast, Captain Claxton may be said to be an authority, for he was engaged in determining that question in conjunction with Mr. Brunel when he designed the *Great Eastern* steamship. The heaviest seas are upon the western coast of Ireland; the force of the sea depends upon the length of the fetch, which is greater there than anywhere else, and on that coast there may be seas 25ft. high; but in the North Sea Captain Claxton was quite sure there was never anything more than 14ft., for in deciding the height of the side of the *Great Eastern* he passed part of a winter in measuring the height of waves in the North Sea. He went in a steamer on purpose for Mr. Brunel, and made a great many measurements in gales of wind, and the average came out at about 14ft. A modification of the form of cross section of Sleigh's breakwater seems to have been made, whereby the height above water was reduced and the depth of immersion increased to 12ft., which was done with the view to prevent the undulation of water passing beneath the caisson.

IMPROVEMENTS IN CEMENT BURNING.

THE profitable production of Portland cement at the present time depends to a very great extent upon the economy practised in the use of fuel, and the more or less perfect method in which the waste heat of the kiln is employed in drying the compound of lime and clay used in the preparation of the cement. Most of the recent improvements in cement-making have been based upon an appreciation of these facts; thus the semi-dry process of Goreham aimed at avoiding the excessive use of water, and reduced the amount of liquid to be evaporated to a minimum. Again, the chamber-kilns of Johnson provided a ready mode of utilising the surplus heat in the burning for the desiccation of a fresh charge of the slurry; and the so-called dry-process has enabled the manufacturer to produce a mixture of lime and clay with the smallest possible amount of moisture. The dry-process, which has been used for many years abroad with the most complete success, has at present found but few exponents in this country. There can be no doubt that by this means a far more uniform and perfect admixture of the ingredients is secured than by any of the old-fashioned methods, and we look forward to the time when English cement-makers will abandon the antiquated and expensive system of the production of a wet slip in favour of the more rational and cheaper dry-process. The improvements in modern grinding machinery, and the invention of powerful plant adapted to the production of pressed bricks from a slightly moistened dust of lime and clay, enable the cement manufacturer to work from the mill to the kiln in one continuous process, as bricks can be made dry enough to be stacked at once in the hot-air chambers, or even, as Mr. Charles Spackman, of the Barrow Portland Cement Works, has just demonstrated, in the kiln itself. The improvements in the plan of burning patented by Mr. Spackman are, we believe, destined to effect a revolution in cement manufacture; and, as we have from time to time drawn attention in these columns to all matters of interest relating to Portland cement, we have taken some pains to acquaint ourselves with the details of the invention, for which letters patent were granted in February, 1886—No. 2,659.

The kilns employed are those of the ordinary type, and are of the usual intermittent form—*i.e.*, they are charged, burnt off, and allowed to cool. One great advantage, indeed, of the new plan is that the structural alterations needed to convert a set of existing kilns so as to enable them to be worked on this system are relatively small. The kilns are each provided at the top with hinged dampers or covers, preferably of cast iron, which may be raised or lowered at will by levers, or chains, or other suitable arrangement. The novel features are the provision of external wrought-iron flues in the nature of those attached to blast-furnaces, by means of which, aided by a forced draught, the waste heat, and even the products of combustion, may be extracted and discharged at will from or into any one of a series of kilns. We will explain the arrangement by means of a small diagram:—



Here A, B, and C are kilns which are connected by two series of flues, the one above the level of the charge, or, say, along the foot of the domes, or conical chimneys, the other below the ground, or connected with the spaces beneath the bars; the whole system of flues is worked from a fan, or blowing-engine, at D. In order to render each kiln capable of being worked independently, the space below the kiln is provided with iron shutters, or movable screens, and the flues are each furnished with stop-valves, which can readily be opened or closed. By means of this system of flues the waste heat or gases from A may be extracted and passed into B or C, or a current of cold air may be drawn through any kiln of the series and heated by contact with the charge of burnt cement, and subsequently passed into another kiln filled with unburnt materials. Let us examine how the system of kilns would be worked. We will suppose that kiln B is loaded with wet material—*i.e.*, the compressed bricks made on the semi-dry process (containing from 25 to 30 per cent. of moisture). The charge in kiln A has been burnt off in the ordinary way by means of interstratified fuel, and will consist of a mass of hot cement-clinker, the upper portion of which will be in a state of glowing redness. At about this stage of the calcination the metallic covers at the top of the dome of each kiln will be closed, the loading holes carefully stopped, and the drawing holes closed by means of the screens or shutters. The branch pipes connected with the tops of each kiln are then opened by means of the valves, and the exhauster at D, or whatever apparatus may be employed for producing a forced draught, is set in motion. The effect of this is to draw a current of air through the heated clinker in A, which air speedily acquires a high temperature, and passes along the iron flue, and enters kiln B above the level of the charge, penetrates downwards through B, and finds an exit at the outlet flue beneath the draw-hole, passing back to the blower or fan at D. The operation is continued until the contents of B are dry, by which time the clinker in A will be found to have been cooled down sufficiently to be drawn. The charge in B may then be lighted, and when B is burnt off the hot clinker may be used to dry a fresh charge in C, or in A, for the flues may be worked in either direction. It will be evident from this brief description that Mr. Spackman's invention is an exceedingly simple one; but to anyone who is practically conversant with the manufacture of Portland cement it will at once be apparent that an immense economy is obtained, first, in using the hot clinker for the drying of a fresh charge; secondly, in rapidly cooling-off a kiln; and, thirdly, in the avoidance of repeated handling of the green charge. At the very lowest possible estimate the saving secured amounts to one shilling per ton of finished cement in the cost of the manufacture. In many works the reduction in the cost would be fully double this sum, and, moreover, the wear and tear of kilns is decreased. Another great saving is in the area of land needed for the factory, while the whole process is rendered more manageable and compact by the adoption of this invention. In the works of Messrs. Ellis at Barrow-on-Soar, where Mr. Spackman's plan is in use, the cement is produced from a mixture of lias limestone (the well-known "Barrow lias") and shale from the same pits. A very uniform and high-class cement, with a tensile strength of from 500 to 600lb. per square inch in seven days is obtained by means of this process.

THE SOCIETY OF ARCHITECTS AT YORK.

WE conclude to-day our report of the visit of the Society of Architects to York, which aroused considerable interest in the city, and other towns in the county. On Thursday, the members visited Ripon Minster and Fountains Abbey, returning to York for an evening meeting at the Church Institute. Mr. A. Pollard, President of the York Architectural Association, occupied the chair, and a paper was read by Mr. Edgar Farman, of London, hon. secretary of the Society, entitled

THE REMUNERATION OF ARCHITECTS.

In his introductory remarks, Mr. Farman pointed out that in former days, and probably in the earliest times, the payment of architects was by time—so much money for so many days, weeks, or years spent on a given work. Such a system could not long survive the severance of the duties of the designer from those of the personal superintendent and chief constructor, when the architect was no longer on the building, but confined himself to his office; becoming, in fact, the architect of the present day, and delegating to others many of the duties which in earlier days would have fallen upon him. The change, probably, led to the adoption of the present system—viz., payment by a percentage upon the value of the work executed. We do not know the exact date when it first came into use. Under large corporations the salary system still lingers. The Government, the larger ancient companies, and some town councils all employ salaried architects; but whenever they require really good work they appeal to the general practitioner, by competition or otherwise. What salaried official in these days, for instance, would have given us the Houses of Parliament, the Law Courts, or the Manchester Town-hall? The architects for these and all similar successful buildings have been paid by commission—paid for their production, and not for the time spent thereon. Whatever may be said against the payment of architects by percentage, it is evident that under this system the vast majority of the better works of the present day have been carried out. The system, in fact, has proved successful; its simplicity commends itself to all parties, especially at a time when payment by commission is one of the principal articles of belief of every business man. For some time past, however, dissatisfaction, more or less pronounced, has been expressed against this percentage system. Mr. Farman continued: There is a class of architects who object altogether to the now customary practice of adopting

the scale of charges based on the percentage system issued by the Royal Institute of British Architects in 1872. Let us therefore consider the architect's position at the present day, the system of payment under which he works, and the effect of the same. Although the Institute schedule has been usually followed, it must not be thought that it will be admissible as evidence in a Court of Law. Because the members of a profession band themselves together, and make a set of charges which they agree to follow, this will be of no avail against a stranger if such charges are excessive. Under special circumstances only would the schedule of the Institute be admissible as evidence, such as in the case of an agreement between an architect and his client that the schedule should be evidence or an agreement that the fees shall be according to the schedule. Except as aforesaid, a jury will always be directed to find what is just and due to an architect for the work he has done, and not what is due to him under the scale issued by the Institute, or any other society. Of course reasonableness can be pleaded by a plaintiff in support of his fees, and he may obtain the testimony of architects of standing to give evidence as to the fairness of the scale issued by the Institute; but such would only be by way of personal evidence of what is reasonable. It would be quite open of course for a defendant to put in other witnesses to give evidence in an opposite direction, and put in a scale issued by some other society in support of their views. In the result we have it that no scale issued without the authority of an Act of Parliament will be of any use in a Court of Justice, for no scale issued by any society will be recognised as evidence of proper charges. The Bill that has been drafted by the Architects and Engineers' Registration Act Committee for the purpose of State regulation of the profession provides for the subject of remuneration, and adopts the schedule of the Institute *in toto*. When this Bill becomes law, besides the many other benefits that the profession and the public will derive therefrom, there will be brought into existence a recognised schedule of fees capable of being admitted as evidence, and upheld by the law of this kingdom. An architect's services are therein considered as equivalent to 5 per cent. on the outlay. The question as to whether a professional man ought to be paid by commission has been much disputed, but it is very difficult to find any better mode. Various methods have been suggested, one of which was discussed in the professional journals, in which a gentleman proposed that a calculation should be based upon the size of a building or upon the area of ground covered. This method appears to me to be absolutely unworkable, for in many cases a building of huge area devoid of detail would be productive of a better remuneration for the architect than one of smaller area, which perhaps through its nature might incur untold labour. The suggestion of charging a fixed price before starting work has a good many supporters, and, in fact, it seems in many instances to be followed in practice. The arguments of those in favour of such a scheme are—first, that an architect is an artist, and that he should be paid according to his ability and the beauty of his designs; secondly, that by having a fixed standard a first-class man only gets remuneration at the same rate as his office boy would be allowed (supposing he could get any clients to instruct him); thirdly, that a client is much more easily satisfied, and likes to know what he has got to pay before he begins his work. The first argument—viz., that an architect is an artist, and that he ought to be paid as such—is all very well, and no doubt he would be held as such if he confined himself to simply designing; but this is not the case. An architect always undertakes, not only the designing, but also the superintending of the erection of the building; he issues certificates, takes measurements of the work done, and calculates the value of such work—in fact, by a thousand and one acts constitutes himself nothing more or less than the agent of his employers for the special purpose of erecting a building. This being so, the custom has arisen of paying him in the same manner as other agents in business, by a percentage. As to the second argument, I do not think this a very serious contention. There is nothing in the world to prevent a man high up in his profession making what charge he likes. It is no argument to say that because a young man who has just set up is allowed to charge at the rate of 5 per cent., therefore everybody is obliged to do so. There is absolutely no reason why an architect should not charge more than the scale, and there is absolutely no reason why he should not charge less if he is so inclined, except that of keeping up the status of his profession. There is no recognised fixed scale of fees for lawyers, and those gentlemen who have risen high in this profession do not wait for the scale of fees allowed by law to be raised before they ask for better payment. Why should they? The argument that a client likes to know that he will have to pay beforehand is, in my opinion, the only contention in favour of such a scheme; but this appears to me to be a very one-sided arrangement, for to give a figure to cover everything one must include extras and numberless unforeseen occurrences, which may give the architect an enormous amount of trouble, which extra work his employer is sure to expect him to include in the fee fixed at the commencement of his work. It is impossible to foresee events, and an architect, in my opinion, ought not to be bound down at fixed charges, as it places him at great disadvantage in case of extra work. The death of an architect or engineer dissolves his contract with his employer. If he has undertaken to do the work for a certain sum, and dies before its completion, his representatives can recover nothing. But if payment for the work is divisible, then so much as has accrued due at the time of death is recoverable ("Stubbs v. Holyhead Railway Co.," L.R. 2, Ex. 3,113). This point, therefore, should be remembered in undertaking to do work for a fixed sum—viz., never undertake to complete it for a fixed sum, for in such a case you will not be able to recover any fees until you have completed the work, and in the event of your death before completion your labour will be lost, as far as you and your representatives are concerned, for they would not be able to recover a farthing, as your contract would not be complete. In such an arrangement it would always be advisable to arrange that you will do the work for a certain total sum, to be paid in certain proportions as the work progresses, and in the case of stoppage of works through any unforeseen cause such a proportion of your fee calculated according to the work executed. I should, however, advise a distinct sum to be stated for the plans. If by any means an architect's fee is divisible the law will support such, and give relief in the case of his death; so if an architect agrees to undertake the erection of a building at 5 per cent. on the outlay, he will be entitled to 5 per cent. on the amount of work done by him up to the time of his death. Again, suppose an architect agreed to undertake and *complete* a work at 5 per cent. on the outlay, according to the rules laid down in the schedule of the Institute his representative would, in the case of his death, be able to recover any instalment due at his death, although he may not have completed his contract. The reason for this is that the payment for the work is divisible. There is nothing, however, in the world to prevent a man having any arrangement he likes with his clients as to what his charges shall be, but such agreement he will be held to. That an agreement of some sort should be entered into before commencing any work is most desirable, whether it be simply to abide by the schedule issued by the Royal Institute of British Architects, or any other scheme of payment. Bear in mind that if you agree to make drawings on approval you will not be entitled to make any charge for them until they are approved of; so that although you may have made many alternative drawings for a fastidious client for his approval, you will have no remedy against him if you are not able to satisfy him, and he abandons the idea of building. This was decided in the case of "Moffat v. Dickinson," 224 I.C.P., 265. In that case the committee of visitors for erecting a county lunatic asylum authorised their clerk to write to the plaintiff architect, Moffat, and inform him "That they were ready to agree to the sum of £437 10s. to be paid to him for his services in examining the site, preparing the requisite preliminary drawings for the approval of the committee, and all other drawings and documents required (by an Act of Parliament) to be submitted to the Commissioner in Lunacy, and afterwards to the Secretary of State, &c., &c." Mr. Moffat accepted these terms, and sent in a set of drawings in April, 1848. These were not approved, and he sent in a second set in April, 1849. Again he had them returned with a request to make another set. This he did, and sent in a third set in the following June. In August of the same year the committee sat in judgment on the third set of drawings, and came to the conclusion that as they were not such as they could approve of they must reject them altogether and proceed no further with the matter. Mr Moffat was naturally much annoyed at his treatment, and brought an action for the recovery of the fees he claimed for the work he had done; but it was held that he had no remedy, and that when an architect agrees to prepare probationary drawings for approval, and all the working drawings and specifications, he is not entitled to payment until his drawings are approved. There appears to be no provision made in the schedule of the Institute for charges in connection with preliminary sketches, except that the 5 per cent. is to cover them. This latter is all very well so long as the work goes through, but it often happens that no more progress is made except the getting out of the preliminary drawings. There is nothing in the schedule to provide for such an event. I think that some more distinct rule should be laid down on this head for the guidance of practitioners, and more especially to convince their clients that sketch-plans must be paid for. I see no objection myself to basing an architect's remuneration on commission, but that it should be a fixed commission seems to me to be a great mistake. Why should a man be paid at the same rate for putting up a building utterly devoid of detail as he is for erecting such a building as a church, full of intricate and delicate detail? In the first case perhaps half a dozen drawings will be sufficient; in the second half a hundred would probably be insufficient, not to speak of innumerable attendances at meetings of the building committee and such work. Again, with reference to the drawings themselves, the schedule goes on to state that this 5 per cent. commission is to include preliminary sketches, drawings, and specifications sufficient for an estimate and contract; detached drawings and instructions for execution on one set of tracings and duplicate specifications, and so on. Now, architects always regard the drawings as their property, and that they have the right to retain them on completion of the works. Having this in mind, there was inserted into the schedule the following statement: "In respect of the ownership of the drawings and specifications, it has hitherto been the general custom for the architect to be paid for their use only, these documents remaining his property." It is there stated that no decision at law had been come to on the point at the time of compiling the schedule, and consequently it is better to have a distinct understanding beforehand. Now, of course, it is very natural that an architect should object to parting with the plans of a building to the building owner; but unless he has distinctly contracted with his employer not to do so, there is no doubt in my mind that he must do so, no matter how distasteful to him. There has been no case decided on the point that I am aware of. Some time since a case was tried at Westminster, when this point was raised, and it was sought to prove a usage that the property in the plans always remained in the architect. Now, in order to uphold a custom, there are various requisites necessary in law, one of which is that a custom must be reasonable; and as to the reasonableness of such a custom as we are considering, Baron Bramwell, one of our judges, expressed a strong and adverse opinion. Surely he who has paid for the drawings is entitled to them; there is no getting away from this fact. Again, suppose custom is pleaded in support of the architect retaining the plans. Here it is attempted to withhold from the employer the very evidence and records of the construction of his building, the position of the drainage, &c. The law would never sanction such a custom, which, upon the face of it, would be an unreasonable one. There is nothing, however, to prevent an architect from keeping copies of

the drawings he has prepared if he chooses to do so. It has always puzzled me why this point was not settled in the schedule instead of inserting a sort of saving clause, which is of no use, for it makes the very schedule in itself conflicting. In the first place, it specifies that the charge of 5 per cent. commission shall include the drawings which are therein set out, and these attempts to back out on a plea of custom. I call the schedule misleading on this point, as many architects are led to believe that the drawings are not the property of the client, no mention being made of the legal difficulty to be got over in upholding such a custom, or the remarks that have fallen from Baron Bramwell on the subject. As many clients agree with their architects to pay them according to the rules of the Royal Institute of British Architects, it would have been much more advisable, instead of relying on an alleged custom, that in Clause 11, instead of stating so distinctly that 5 per cent. included the drawings, they had stated that such charge included the preparation and use of the drawings for the purpose of the carrying out of the works, and another clause could have easily been inserted to the effect that an employer desiring to have a record of the building could have duplicates supplied to him for his own use on payment of an extra fee. The question, therefore, gentlemen, resolves itself thus: Is the method of basing the remuneration of architects on the percentage system a good one or not, and, if not, what alternate scheme can be suggested? A short discussion followed.

On Friday, the closing day, the members of the Society visited a number of the most important ancient buildings in the city. At St. Mary's Abbey they were received and conducted over the ruins by the Rev. Canon Raine, after which they were shown over the Museum and gardens and the Manor House, and thence they proceeded to the Minster, where Mr. Bradley, the clerk of the works, conducted the visitors over the building. An inspection of the library concluded the visit. In the afternoon the members of the Society visited the Mansion House, where they were received by the Lord Mayor (Sir Joseph Terry), who very kindly conducted the party, numbering about 40, over the building. Before leaving the visitors were entertained by the Lord Mayor.

Mr. Edgar Farman in proposing "The Health of the Lord Mayor," mentioned that the Society annually made visits to centres of interest in the provinces, and had selected York this year because the city abounded in an unusual number of ancient and interesting buildings of Mediæval times; and, secondly, that this year they had the honour of an invitation from the York Architectural Association.

The Lord Mayor said that it had given him very great pleasure to receive the Society on the occasion of their first visit to York. He hoped that the time was not far distant when the Society would again visit York. He himself was a staunch supporter of preserving all monuments of the past. It was through such societies as the Society of Architects that the ancient styles of architecture were perpetuated. He could not, however, but be struck with a comparison of old work with that of modern times. The ancient builders seemed to have built in a much more thorough manner than is now done. He did not say that they had better architects, but presumed that funds were more easily procurable than now. He was sorry that through pressure of business the president of the Society, Mr. J. J. Lish, of Newcastle, had not been able to stay for the latter part of the business.

The Lord Mayor then proposed "The Health of the President of the Society of Architects, coupled with the Health of Mr. W. Hepper, the president of the York Architectural Association."

Mr. Hepper, in returning thanks, said that it had given him and the York Architectural Association great pleasure to receive the Society of Architects in that city. The meetings that had been held would prove of great benefit to the architects in York through the interchange of ideas that had passed in the discussions. The Society of Architects was engaged in a great work in framing a Bill for the protection of the public from badly constructed dwellings. The system of visiting annually their professional brethren in the provinces was one which was greatly appreciated. It tended to promote professional harmony and the status of the profession, showing to the public at large the great interest that architects took in not only their own works, but in the works of the ancient masters of their profession.

The Society then left the Mansion House and proceeded to Heslington Hall, where they were received by Mr. Bateson de Yarburgh, who kindly conducted them over this very interesting Elizabethan building. In the evening the Society again met at the Church Institute, when the chair was taken by Mr. Sidney Marsland, of London, and a paper was read by Mr. Camidge, solicitor, on "Light and Air."

EDUCATION, CULTIVATION, AND EXAMINATION.*

(*Continued from page* 542.)

HAVING now considered general education, cultivation, and examination, I propose to pass to these subjects as they specially affect ourselves as students of architecture; and in approaching this division of the subject, I desire emphatically to point out that every architect ought to be a cultivated as well as an educated man. I shall have to point out later on that not a few of the studies and pursuits which to men in other stations are simply aids to cultivation, form part of the architect's special professional training; but apart from that, if he be not a man of cultivation, he will not do his duty well, and he will not properly occupy the position which a member of so liberal and responsible a profession ought to hold in society. You may perhaps remember that I said early in this lecture that "the object of education is to equip the student for the part he has to play on the stage of the world." If I can sketch for you the part which the architect should be prepared to play you will more readily comprehend the training he requires. Let us examine "the architect's part." There are three directions in which knowledge, skill, and experience are expected of him. (1) As to buildings and structure; (2) as to men and affairs; (3) as to drawings and art. And I propose to take these in their order.

I. An architect ought to be familiar with *buildings and structure*. He ought to know all sorts of buildings, their various purposes, and how those purposes are provided for—all that makes them suitable or unsuitable for use, and for any emergencies for which they ought to be prepared. He ought to know structure also—that is to say, all the materials of which buildings are usually made, their appearance, qualities, defects—the marks of goodness or badness in them, and the modes in which they are wrought, the work they will have to do in the structure, and their fitness for it. He ought to understand the sites and surroundings of buildings—drainage and sanitation, fittings and appliances, and should have mastered the scientific principles upon which such things as heating, ventilation, lightning conductors, and cooking apparatus should be arranged, as well as their practical details. He has to understand the decay and disruption of buildings, and the risks of decay and accident that beset them, and how to guard against such risks. Again, an architect ought to know something about the history of buildings, and the most important structures in the world. He ought to know the artistic principles upon which good buildings have been designed, and the forms, mouldings, enrichments, and features which have been to the great artists in architecture what the colours on his pallette are to the painter. And he ought to know by personal knowledge and experience, by measuring and drawing out in some cases, and by sketching and noting in others, a considerable amount of good architecture and good ornament, some of which ought to be from other countries than our own. And with some of this architecture he ought to be familiarly, nay, intimately, acquainted. Further, he requires to be at home upon buildings in course of construction, to foresee what is likely to be successful or otherwise, whether in arrangement, construction, or design; and to be able to correct defects and prevent mistakes, alike of design and of construction, before it be too late.

II. Again, the architect is required to know *men and affairs* as well as building. You will come to find, as you advance in life, that in every professional calling, as, indeed, in every important position in life, a knowledge of men is the most valuable of all acquisitions. Even the solitary student, or the lonely landscape painter works for others, and if he succeed it is either because his mind is so in harmony with the thoughts of his time that he involuntarily produces what others delight in, or else because his powers of calculation and observation enable him to take the measure, so to speak, of the men of his generation, and cleverly to produce (possibly without sympathy) some work sufficiently in harmony with the time to please them. Far more is it the case with ourselves, whose work is from first to last done in contact with our fellow creatures, that a knowledge of what men like and think and do is essential to success. The inception of any architectural undertaking grows out of the desire of other people to erect a building. The material carrying of it out is done by other hands than the architect's under the control of another head, often fuller of the desire to make money than to make a building; and the whole undertaking is beset by difficulties, emergencies, and varied transactions, in which the architect has to unravel one tangled skein after another with different people. In short, from that early stage in his career, when an architect has to establish his position, make a connection, and inspire confidence sufficient to induce persons to put their work into his hands, to the close of the transaction, when the last instalment of his own fees is paid him, he has need of tact, resource, a command of temper, presence of mind, good common sense, the ability to write a clear letter, and, in short, the qualities natural and acquired which enable a man to get on well with his fellow men. All this must be combined with a knowledge of affairs. All this intercourse with other people rises out of matters that have relation to the erection of buildings, the acquiring of site, or the materials of them, or the uses they are to be put to; or the laws affecting them, or the customs, or the prejudices, or conflicting interests of the folk who have to deal with them. Now, in every one of these things the architect or chief builder, if he is to be chief, must be sufficiently posted up to take the lead. He must be familiar with such of the forms of transacting business, correspondence, accounts, vouchers, &c., as are used in building affairs, and such laws, customs rights, as are incidents of, or affect his work, and, in addition, with an infinite number of things that bear on it only indirectly. Estimates, accounts, the value of the things that are used in making buildings, the value of buildings themselves, and of the land they stand on, road-making, repairs, light and air, the statute and common law as affecting buildings and property—on all these affairs he is expected to be able to give advice—and sound advice. He ought to know something about every use that a building can be put to, and though so much is almost unattainable, yet he ought to be constantly approaching to such a state of universal knowledge of what goes on under all roofs the longer he lives.

III. *Drawings and Art.* — We build our buildings on paper to an extent never hitherto practised, but rendered apparently necessary by the modern contract system; but more than this, we study with the pencil when we examine existing work. The pencil aids to develop and fix our ideas when we are designing; with the pencil we make our intentions clear to our clients, and at a later period to the surveyors who prepare the estimate, and the artisans who carry out the work. Drawing, then, is a most essential—the most essential of acquisitions for an architect. The best draughtsman may possibly never make an architect, though I do not think such a result need often occur; but no architect can hope to succeed at the present time who does not draw well, and is not familiar with all that ought to be and habitually is done in drawing out architectural designs, plans, and details, from first to last. Familiarity with plans is *not* a substitute for

* By Prof. T. Roger Smith, F.R.I.B.A. A public introductory lecture to the Classes in Architecture at University College, London, delivered on Wednesday night, Oct. 5, 1887.

familiarity with building, but it is an admirable introduction to buildings, and the best possible aid to the mastering of them. The draughtsmanship that is necessary will extend beyond familiarity with plan drawing. A good draughtsman must have so far mastered the use of his instruments as to be able to *think* through his bow pencil or his straight-edge, and he must be able to draw all the ornament in his buildings, including representations of the human figure, so that his drawings shall be serviceable guides to the workmen. He ought to have mastered perspective, and to be at home to some extent in colour. Finally, in the use of these means he should have the feeling and inspiration of the artist, and he should have sympathy with and a knowledge of other walks of art as well as his own. Art, which I have named last, on the principle on which the most famous performer is placed at the foot of a play-bill ("*and* Adelina Patti," for example) is that which determines the level at which our architect shall work. If he can be the artist in feeling and training, and in what he designs, his work may be noble architecture, and certainly will be good. Being an artist, be it remembered, relates to everything that develops a sense of beauty in form, line, and colour, and in all the allied arts as well as in our own. I need hardly point out that this considerable range of knowledge and experience will take years to acquire—in fact, it is the work of a lifetime; but what we are concerned with is that approach to it which justifies a beginning. This ideal portrait is not often, however—even if time enough be taken—carried out symmetrically and completely. Opportunity enables a man to accumulate experience, knowledge, and skill in one direction. The lack of opportunity, or of will, or of taste, cramps him in another, and so it comes to pass that most men are better in one walk of their profession than in another—fortunate if they are able to find that class of work for which they are most fit. In passing I ought to point out that more than one of the matters that figured in our enumeration of the cultivated man's acquisitions or methods are almost essential to the architect. This is especially the case with his drawing and his cultivation of the fine arts. He almost alone of all professional men should, as a matter of course, include foreign travel as a part of his training. He also, in common with all professional men, should cultivate his mind and powers by Bacon's method of reading, writing, and social intercourse. In short, he should be a cultivated man. I now turn to the standard which has been set up by the Royal Institute of British Architects as marking what they consider should be the attainments of a young architect before he is admitted as an Associate of that body. This standard we find set forth in the programme of the examination and in the specimen examination papers published, and though my statement is in less detail than the series of subjects of examination, you will find that those subjects group themselves under my broader headings perfectly well. My first heading is "Buildings." To the subjects which I embraced under this head the programme allots 400 out of the total of 700 marks, divided as under:—History of architecture, 100; mouldings, features, and ornaments, 100; sanitary science, strength of materials, shoring, 100; materials and construction, 100. You see that the largest demands—even when a deduction, which I shall come to directly, has been allowed—are made under this head. This is partly on account of the fundamental importance of a knowledge of buildings, and partly because fair opportunities for acquiring that knowledge are open to you in your student days. My second head was Men and Affairs. This comprises two heads in the examination programme, between which 100 marks are allotted. They are—Specifications and estimating, 75; professional practice, 25. The first of these two subjects most students can easily acquire, and skill in it can be readily tested by examination; but much of the knowledge comprised under the head of professional practice cannot be acquired till later in life, so but few marks are allotted to the subject; moreover, the skill, tact, self-possession and judgment needed for the transaction of business are not matters in which a candidate can be directly examined; though, as far as they come out in his *vivâ voce* examination, they will be sure to have a share in determining the result. My third head, Drawing and Art, is directly represented by one heading only, Plan, Section, and Elevation, to which 200 marks are allotted. Of course a proportion, which the programme does not disclose, of the marks allotted to the first group of subjects will be given to the sketches with which the answers are to be illustrated, and as far as they go, these marks would increase the proportion devoted to drawing and art at the expense of those devoted to knowledge of buildings; but it is not likely that this could ever take place to so great an extent as to equalise the two. This examination grows, as you know, out of the voluntary examination, which acted as a pioneeer to prepare the way. I had the honour of having some share in preparing the preliminaries of that examination, and am, alas! the only survivor of the five who acted as examiners and moderators on the first occasion, the others being Scott, Digby Wyatt, Ashpitel, and John Papworth. Some of those who organised and subsequently recast the scheme still remain, among them, I am happy to say, my immediate predecessor in this chair, Professor Hayter Lewis, to whose initiation as honorary secretary to the Institute, more than to the action of any other person, we owe it that to-day we have an entrance examination for Associates of the Institute. The advantages which it was considered that students would obtain were, first, that the programme would make it clear what direction in the opinion of persons qualified to judge an architect's studies and his preparation for the serious work of his profession, ought to take; and, secondly, that the examination itself would establish a standard of attainment which it is not unreasonable to expect that every student with the usual means of study at command shall reach before he looks upon himself as qualified to practise. The Institute by adopting this examination as the door through which every Associate must enter, has in one sense doubled the value of it, for it has added a double stimulus to work. Passing has always been a distinction; but now failure to pass entails a very serious professional disability. Of all things I should deprecate—and I think in this I should speak the feelings of the examiners and council generally—I should deprecate this examination being looked upon, or coming at any future day to be looked upon, as an arbitrary test. It is intended to be, and I think is so worked by the board who undertake it, as really to be a test of qualification. That is to say, a man is not held fit to be admitted to the Institute because he has passed the examinations, but because he has fitted himself to perform the duties of an architect, and the examiners will direct their questions so as to satisfy themselves of this fact only. Whenever, or if ever, the examination fails to keep up its character in this respect, if it admits what are called catch-questions, and sinks to the level, for example, of the Civil Service examinations, where a man is passed as a consequence of his having temporarily worked up certain subjects, it will fail of its real object. Consider, then, that your duty really is to prepare yourselves for practice, and that this examination is an incident in such preparation. And do not consider that you are to prepare yourselves for examination, and that if you can worry through you are sure to be right as far as fitness for your professional life goes.

(*To be continued.*)

THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.

THE new session of the Architectural Association was inaugurated on Friday night by a *conversazione* given by the President and Committee at the Westminster Town Hall. There was a large attendance of members and their lady friends, and the proceedings passed off pleasantly and successfully. Concerts given in the Council Chamber, and in which Miss Emily Lawson, Miss Amy Hickling, Miss Isabel Tomalin, and Messrs. D'Arcy Ferris, Malcolm Lawson, and Herbert Thorndike were the vocalists, and the string band of the 2nd Life Guards, conducted by Herr Carli Zoeller, which performed in the large hall, were the chief attractions of the evening; the precedent set in 1885 of abolishing the presidential address and prize distribution being followed, as last year. The President, Mr. John Slater, B.A., F.R.I.B.A., received his guests in the large hall, and during the evening read out the following list of awards of prizes for work executed by the members last session:—

Architectural Association Medal.—G. G. Woodward.
Architectural Union Company's Prize (for Measured Drawings).—1st, Arthur Webb; 2nd, H. P. Burke Downing.
Architectural Association Travelling Studentship.—A. H. Hart.
Aldwinckle Travelling Studentship.—W. Medlycott Duke.
Ernest Turner Prize.—H. C. A. Colvill.
Thomas Blashill Prize.—H. E. Mallet.
Lectures on History.—1st, not awarded; 2nd, F. L. Jones; 3rd, V. L. Jones.
Lectures on Construction.—1st, H. S. Wood; 2nd, H. G. Lidstone; 3rd, H. V. Lanchester; hon. mention, A. B. Yeates, H. Ermrich, and H. E. Mathews.
Class of Colour Decoration.—Prize, W. Deaves; hon. mention, H. V. Lanchester.
Class of Design.—1st, E. E. Bateman; 2nd, H. R. Applebee; 3rd, E. W. Monro.
Elementary Class of Design.—Section I.: 1st, R. D. Warry; 2nd, A. W. Jarvis; 3rd, H. Woodington; hon. mention, A. B. Yeates. Ditto., Section II.: 1st, A. W. Cleaver; 2nd, J. Ellwood; hon. mention, D. J. Blow and R. A. J. Bignell.
Advanced Class of Construction.—Prize, T. G. Aggitter.
Class of Construction.—1st, W. D. Gravell; 2nd, F. R. Oglesby.
Elementary Class of Construction.—1st, H. Ermrich; 2nd, A. W. Jarvis and L. V. Hunt, aeq.
Quantity Class.—1st, W. J. Bamber; 2nd, not awarded.

The loan exhibits of drawings and trade displays were more restricted in number than in most former years, but were of good quality. In the centre of the assembly hall was a Jubilee bust of the Queen, an excellent likeness, modelled by Conrad Dursler, executed by the Coalbrookdale Company, who also showed some gate panels designed by the late Bruce J. Talbert, a set of three panels representing the Village Blacksmith, works designed and modelled by the late Alfred Stevens, copies of the Warwick Vase in cast-iron, electro-bronzed, and other works. Messrs. Holland and Sons, of Mount-street, Grosvenor-square, exhibited also in the centre of the rooms, among other exhibits, a well-executed but somewhat heavy mahogany mantelpiece, of Jacobean character, intended for a house at Double Bay, Australia, and executed from designs by Mr. M. B. Adams; it formed the chief subject of an illustration of the entrance hall of the house in our issue of the 8th July last. Messrs. William Walker and Sons, of Bunhill-row, E.C., exhibited one of the Bloomsbury Economiser grates, constructed on the lines suggested by Dr. T. Pridgin Teale—an inexpensive form of fireplace readily adapted to the ordinary surroundings, and very saving of fuel. Messrs. Jeffrey and Co., of Islington, had hung examples of their wall papers, admirable in treatment, and specially designed. Messrs. George Jackson and Sons showed friezes and ceilings executed in their fibrous plaster, and near by were numerous cartoons for stained-glass windows, designed and executed by Messrs. Campbell, Smith, and Co., of Newman-street, W. In the gallery upstairs, which owing to the planning of the town-hall can only be reached by going through the open court at the rear, unprotected even by a verandah, were exhibits of firegrates, paperhangings and tapestries, and Mexican onyx.

The suite of first-floor rooms at the rear of the gallery were devoted to the display of drawings and designs. In the large end room and the next apartment were the premiated works executed in the several classes. Mr. Woodward's design for an entrance to a college quadrangle, to which the Association medal was awarded, was Tudor in style, and of the type familiar at Oxford and Cambridge. The measured drawings sent in in competition for the Architectural Union Company's prizes to which first place was awarded were a carefully executed set representing Buildwas Abbey, Salop, by Mr. Arthur Webb, and Mr. Burke Downing, who was placed second, was almost equal in merit in his illustrations of Lostwithiel Church. Another good set of drawings had been made of St. Mary Overie Church. Mr. A. H. Hart had deservedly gained the A.A. Travelling Studentship with a number of sketches of churches and other buildings in Bruges, Lierre, Aerschot, Malines, and other Belgian towns. The Aldwinckle Travelling Studentship was awarded to Mr. W. M. Duke, for drawings of Henry VII.'s Chapel, Westminster, and the doorway of Salisbury chapter-house. The premiated work in the Colour Decoration Class, by Mr. W. Deaves, representing the

internal treatment of a chancel, evinced a well-thought and harmonious scheme, and in neatness and in finish of execution was far in advance of the run of work executed in this class. A falling of in number of competitors is to be noted. The work to be done in the Elementary Class of Design was, as the President remarked, unusually good, especially in Section I., and it is satisfactory to hear that the attendance was the largest ever known in any class of the Association. In another room were hung numerous water-colour sketches at Mont St. Michel, Dol, Coutances, and other districts of Brittany by Mr. F. A. Masey (some of which are reproduced by us this week), Mr. W. H. Raffles' views in Norfolk, and other water-colour drawings, from Dinant and Aldeburgh, by Mr. Francis Miller; and a third room was devoted to architectural photographs, including Mr. J. L. Robinson's illustrations of the A.A. recent excursion in the neighbourhood of Bath; Messrs. Bedford Lemere and Co.'s examples of halls, and of the carvings in the Royal Architectural Museum; Mr. S. H. R. Salmon's views of Old London; and those of the Tinworth panels, shown by Messrs. Doulton and Co.

NOTES IN NORMANDY AND BRITTANY.

[WITH LITHOGRAPHIC ILLUSTRATIONS.]

LAST Easter the writer and some friends enjoyed two or three weeks' ramble in the above provinces, and were agreeably surprised to find even in the best known places much that was interesting and not hackneyed—if one took the trouble to look for it. This fact and the feeling that those who do not know the ground we covered may benefit somewhat by our experience must be our apology for perpetrating these notes.

Our programme upon setting out was Jersey, St. Malo, Dinan, Dol, Mont S. Michel, Coutances, Caen, Bayeux, Liseux, and Havre; but lack of time compelled us to finish our trip at Coutances, as will be seen. We found, however, in the first-named half-dozen places plenty to occupy our minds and pencils during the three weeks we were away.

To commence, we found little at Jersey save Orginel Castle at Gorrey, near St. Heliers. This is a fine ruin upon a rocky promontory, where the natural shape of the mount has been turned to such good account that it is hard to tell in places where the natural masonry ends and the artificial commences. It is well clothed with green, and offers a host of subjects for watercolour. (A full description of the castle may be found in Murray.)

From Jersey to St. Malo is a pleasant steamer trip of about two and a half hours. St. Malo is picturesquely situated, but there is little to note, so we crossed at once to Dinard, on the opposite side of the river's mouth, whence one can reach Dinan (eleven miles distant) either by diligence or by a steamer, which, during the summer months, ascends the river to that place.

The town is romantically situated on the right bank of a wooded gorge, and we found there enough to occupy us for several days. The church of S. Sauveur has a fine slated spire, and the Romanesque west front is interesting. It is of granite, worked in a wonderfully free manner, and has weathered beautifully in shades of pink and buff. There are two or three other slate spires in the town, all of which are graceful in form and charming in colour. That called the "Carrefour d'Horloge" is particularly fine. There are also plenty of quaint old houses on pillars, two or three of which I have sketched. The (?) 13th-century bridge crossing the river still remains. The entrance to the college is effective though Late, and if one takes the trouble to go inside there is a painted arched arcade, and a picturesque tower in the inner courtyard. In the Rue de Jerzual, which is a narrow, sleepy old street winding down from the crown of the hill to the riverside, many of the old industries, such as weaving, spinning, metal-working, &c., may be seen still carried on in a very quaint and ancient manner. Some of the original shop fronts remain, and several of the interiors reward exploration. The chimney-piece in my sketch was in the upper room of one of these. I have also noted the method of lighting in some of the streets, which, though primitive, seemed effectual, and was certainly picturesque. At the vilage of Lehon, about a mile off, were until lately the ruins of a fine 13th-century church, the doorway of which was illustrated in the A.A. Sketchbook a short time since. This church is now, unhappily, being restored, and all traces of its age are fast disappearing under the mason's chisel. The village church has a pretty flêche, and there are one or two old houses. A little further on is St. Esprit, where there is a curious Gothic crucifix granite, which I have noted. At Lamballe, 15 miles distant by rail, is an interesting church, with a wonderful porch, also illustrated some time back in the Sketchbook, and several charming old houses.

From Dinan to Dol is a railway journey of about 15 miles, occupying about 2½ hours. We found Dol a dull little town of 4,000 inhabitants, and with such a mournful and decayed appearance that, in spite of its architectural attractions, we were not sorry to leave it. It possesses a half-ruined cathedral, one or two desecrated Flamboyant churches, and a market-place surrounded by houses of almost every period from the 13th century downwards. A great many of these are carried on curiously-carved granite pillars, which apparently originally belonged to some earlier building. These pillars are to be found in many parts of the town, often beneath 15th and 16th century houses, and apparently belong to the 12th century or earlier. Those supporting the fine old house called the "Archbishop's Palace" I have sketched in detail. The "butchers'" and "haberdashers'" shops which I have also noted may serve as types of the sort of building in which Dol abounds. There is a small chateau of a common type, a few miles distant, of which the detached tower in the sketch is the best part remaining. From Dol to Pontorson is ten miles by rail, whence one takes diligence to Mont S. Michel.*

As we approached the mount from the shore its appearance in the twilight was most impressive, standing out in solitary grandeur against the evening sky. The tide being out, we had soon passed beneath its ancient gateways, and were bumping and rattling along the uneven street that led to our hotel. The street in this tiny "town" is singular in its character. It commences from the beach about 12ft. wide, but after a few twists combined with a sharp ascent it quickly contracts into steep flights of steps, each steeper and narrower than the last, until, after many turnings, it lands you at the splendid gateway so well known to most of us. My sketch is taken from the lower part of the street, just within the second gateway. It is needless to give here a detailed description of this delightful place with its almost perfect Mediæval walls and bastions, its curious and interesting houses, and, above all, the magnificent pile that crowns the whole. The exquisite colours of the granite, of which the principal buildings are composed, offer a strong temptation to throw away the pencil for the brush. The visitor is strongly advised to purchase Mr. ——'s famous book, which treats exhaustively of the place, and a small edition of which can be there purchased for a few francs. The two caps sketched occur in some vaults beneath the earlier buildings on the S. side. In each case the light is let through narrow openings in the vaulting, so that it falls upon the cap, leaving the remainder of the chamber in comparative darkness, and producing a brilliant effect of light and shade. The little church is curiously adapted to meet the necessity for economising space which here exists. One of the "streets" is carried by a vaulted passage beneath its chancel, further space being gained by the corbelling out of the east wall. A similar device is shown in the next sketch, together with a window seat in the castle, the well-house on the beach, and a corner of the "Merveille." The chimney-piece is one of two in the famous Salle de Chevaliers. For permission to sketch, a polite application to the "Gardien" produced the desired effect. After a week's stay here, we left with many regrets, and took train to Coutances, distant about 40 miles.

Coutances is finely situated on the brow of a well-wooded hill, and its cathedral and churches form a splendid group on approaching it from the railway station. We made a successful attempt to reach this place on Easter Day, and were well rewarded for our trouble, as the old town looked its best on this important occasion. Those who cared for character or colour studies here enjoyed a double treat. Inside the cathedral we looked upon an ever-changing crowd of picturesque peasant worshippers, and a gorgeous show of priestly splendour; while outside the Easter fair, in the marketplace, produced a bewildering impression, in which huge coloured umbrellas, snowy and many-shaped caps, fine bronzed faces, blouses of every hue, wooden shoes, and ceaseless chatter all played their respective parts. The noble grey towers of the cathedral made a splendid background to the scene, and the sun shone in full brilliance over the whole. The cathedral is of course the great attraction, with its unique lantern and western spires. A good view of these last is obtained in the street whence my sketch is taken. Lower down this street is the fine church of St. Pierre (M.H.), of which an able drawing by Mr. M. B. Adams lately appeared in the BUILDING NEWS. This church suffers somewhat from the proximity of its still finer neighbour, and by itself would be quite sufficient to make a town's reputation. It is principally of the 15th century; the tower and lantern are in their way superb, the source of the latter's inspiration being evident. There are also several other churches of lesser note. Of Domestic work, Coutances at first sight discloses but little, a careful search, however, revealing several interesting remains. The old houses are generally of stone, and are built around a courtyard, in one corner of which is situated a conical roofed stair turret. One of the finest of these I have sketched. In a street nearly facing the west-end of the church of St. Pierre are the two old houses with corbelled bays, and nearly opposite them that with the angle staircase turret. About two miles from the town is the small chateau of Gratôt, which is a very perfect ruin, and is not mentioned in Murray. The outer walls are nearly complete, there is a fine moat still filled with water, and gateways, residence, &c. Lack of time prevented my sketching it, and necessitated the abrupt finish of my tour, and therefore my notes, at this point.

FRANCIS MASEY.

* Illustrations and plans of the Abbey and Mount, by the late Viollet le-Duc, appeared in the BUILDING NEWS for July 14 and Aug. 4, 1871, and a sketch of the staircase to the churchyard, a general view, and plan of Mount, by Mr. E J. JACKSON, in our issue of July 25, 1884.

CHIPS.

On Friday the workmen employed on the Jubilee tower and spire at Stockbridge Church, Hants, sat down to supper at the Vine Hotel. Mr. Ernest Ware, clerk of the works, presided, supported by Mr. H. Rann, foreman. The company drank to the healths of Messrs. Colson and Sons, architects, Winchester; Messrs. J. Crook and Sons, contractors, Northam, Southampton; Mr. E. Ware, and Mr. H. Rann.

Mr. Arnold Taylor, one of the inspectors under the Local Government Board, held an inquiry at the Guildhall, Canterbury, on Friday, for the purpose of inquiring into the application of the Canterbury town council for permission to raise a loan of £5,500 for purposes of street widening at High-street, construction of a new road from Pound-lane to North-lane, and for works of flood prevention. The city surveyor (Mr. Baker), Mr. Jennings (the author of the plans for the proposed improvements), and others gave evidence in support of the proposals.

The following were the winners of the various scholarships and studentships competed for at the City and Guilds of London Institute on Thursday the 6th inst.:—Holl Scholarship: P. R. Jones, Middle Class School, Cowper-street, E.C. Saddlers' Company's Studentships: W. E. Allen, United Westminster Schools, previously educated at St. Thomas, Charterhouse School. Mitchell Scholarships: T. W. M. Bull, F. Gaywood, F. H. Hummel, J. J. Nisbet, all of the Middle Class School, Cowper-street.

Aston Chapel, near Oswestry, was reopened on Tuesday week, after restoration, at a cost of £1,400, borne by Col. R. T. Lloyd. Mr. A. E. Street, M.A., of London, was the architect, and Mr. Yates, of Shifnal, the builder. The roof was formerly slated, and plastered internally, but is now boarded, and covered with red tiles, supplied by Mr. J. C. Edwards, of Ruabon. This work was carried out by the men employed on the estate, under the direction of Mr. Higley, the bailiff.

A new Liberal Club in Buchanan-street, Glasgow, was opened on the 5th inst. Mr. Alexander Skirving, of that city, was the architect; and Messrs. A. and R. Anderson the builders.

CONTENTS.

Extras in Building Contracts 569
Works in Water.—XXXIV. 570
Improvements in Cement Burning 571
The Society of Architects at York 571
Education, Cultivation, and Examination 573
The Architectural Association Conversazione 574
Notes in Normandy and Brittany 575
Our Lithographic Illustrations 576
Corpus Christi Church, Brixton 576
Wandsworth Manor House 576
Wayside Notes 597
The London College of Architecture 597
Exhibition at the Grosvenor Gallery 597
Foundations 598
The Birmingham By-Laws 598
The Architectural Association Brown Book 598
Building Intelligence 599
Competitions 600
Engineering Notes 600
Architectural and Archæological Societies 600
Correspondence 600
Intercommunication 601
Our Office Table 602
Legal Intelligence 602
Stained Glass 602
Water Supply and Sanitary Matters 602
Statues, Memorials, &c. 603
Meetings for the Ensuing Week 603
Tenders 603

ILLUSTRATIONS.

SKETCHES IN NORMANDY AND BRITTANY.—BEDFORD TOWN AND COUNTY CLUB.—PORTLAND MANSION WEST KENSINGTON.—BYRKLEY LODGE, STAFFORDSHIRE.—MISSION ROOM AT MAIDSTONE.—CHURCH OF ST. JOHN, MIDDLESBROUGH.—THE GRANGETOWN HOTEL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SKETCHES IN NORMANDY AND BRITTANY.

For description, see p. 575.

BEDFORD TOWN AND COUNTY CLUB.

The committee for the above building some four years back advertised for architects' names willing to compete for the erection of their new premises on the bank of the Ouse, and out of upwards of 200 applications, 13 gentlemen were selected, out of whose plans those we illustrate this day were chosen. A special feature required was that ample balcony accommodation should be provided, so that regattas, &c., on the river might be viewed by the members, the site being particularly well placed for this purpose. Another difficulty in the arrangement was that no windows should overlook the Duke of Bedford's grounds to the right of site. The materials are red bricks, with Bath stone dressings, which have a very good effect, as combined with the half-timbered work in upper stages. Considerable difficulty was experienced with the foundations, they having to be taken down in concrete from 20ft. to 25ft. deep along the whole front of the building, and for a considerable distance back, the solid ground shelving towards the river, believed to be the site of the old castle moat, but more probably the former bed of the river, on which the ground had been made up. Notwithstanding the extra expense the building was finished complete for rather less than £4,000.

PORTLAND MANSION, WEST KENSINGTON, W.

This block of residential chambers has lately been erected at Portland-place, West Kensington. It contains eight suites of apartments, each consisting of four rooms, with bathroom and w.c., and has been designed to meet an increasing demand for small, self-contained residences. Each suite has a separate large coal-cellar in the basement, and a double lift for provisions is constructed from the basement to the third floor, while tradesmen communicate with the flats through speaking tubes from the basement. Lindsay's fireproof flooring has been used throughout the building, the lifts and electric-bells are by Messrs. Adams and Sons, of the Haymarket, and the wrought-iron work is by Messrs. Singer and Sons, of Frome. Although the whole building only occupies the space of two small houses, at least four times the number of people who occupied the old houses can be, and are, comfortably housed at a cheaper rate in a soundly-built and well-drained building, which in these utilitarian times is a powerful argument in favour of the foreign system of flats, and against our insular prejudice for jerry-built and uncomfortably-planned houses. Co-operation is the secret of efficiency. The front is faced with red bricks and gauged brick arches, and Doulting stone bands and voussoirs, and the roof is tiled. The building has been well built by Messrs. Stimpson and Co., Mr. Hawkins being clerk of the works, and the architects Messrs. Lewen-Sharp and Arpen, of 3, Duke-street, Adelphi, W.C. The total cost was £5,500.

BYRKLEY LODGE, STAFFORDSHIRE.

This house, now in course of building, is for Mr. Hamar Bass, M.P., on an estate in Staffordshire. The walls are of brick with stone dressings, and the roofs are covered with slates. The plans show the extent of the mansion; but we have received no descriptive particulars from the architect, Mr. R. W. Edis, F.S.A. Our illustration is from a drawing which was hung in this year's Royal Academy Exhibition.

NEW MISSION ROOM, ST. PAUL'S, MAIDSTONE.

In this wooden structure a not unsuccessful attempt has been made to compete with the galvanised iron usually employed for similar buildings, while superior artistic effect may with good reason be claimed for it. The building will accommodate 330, and the cost, exclusive of class room, was £620, the amount per sitting being thus under £2. The material employed for the framing, which shows both externally and internally, is fir, unwrought and dressed with creosote, the tenons and mortices being saturated, the panels are of plaster on laths nailed to fillets, the external work being in selenitic cement, which is of a warm tint. The roof is of green slate "ladies" size on 1¼in. boarding covered with waterproof paper, and carried by purlins about 5ft. apart. Mr. Hubert Bensted, of Maidstone, was the architect.

CHURCH OF ST. JOHN, SOUTH BANK, MIDDLESBROUGH-ON-TEES.

The design illustrated is the selected one for the above by a professional assessor out of six sets of plans sent in competition. The accommodation provided is for 650 adults. The cost is £4,000, exclusive of tower. Mr. J. Mitchell Bottomley, of Middlesbrough-on-Tees, is the architect.

GRANGETOWN HOTEL, NEAR MIDDLESBROUGH.

The village of Grangetown consists of upwards of 800 houses, occupied exclusively by the workmen engaged in the extensive iron-works of Messrs. Bolckow, Vaughan, and Co., together with the shops and other buildings necessary for such a community. The hotel, of which an illustration is given, is the only place in which any intoxicant is allowed to be sold. It has been built for Mr. James Eadie, of the Cross-street Brewery, Burton-on-Trent, from designs of Mr. J. Mitchell Bottomley, of Middlesbrough-on-Tees. The original building was erected by Mr. James Maddocks, of Burton-on-Trent, and subsequent alterations and enlargements by Mr. Thomas Dickinson, of Saltburn-by-the-Sea. The total cost, exclusive of site, has been about £5,500.

A "children's window" was unveiled at St. Matthew's Church, Walsall, last week. The window, which has been executed by Messrs. Burlison and Grylls, London, shows in the three lower lights representations of the "Presentation in the Temple," "Christ in the Temple," and "Childhood in the Carpenter's Shop at Nazareth," and the upper part is filled with presentments of the saints of children—SS. Katherine, Nicholas, John the Baptist, Christopher, and Agnes—and the patron saint of the church (St. Matthew).

Some unpleasant information as to the condition of their town hall was imparted to the Rochdale town council at their last meeting. The building has recently been surveyed, and found to require re-roofing almost at once. In other directions extensive repairs are needed; and Alderman Schofield told the council that it might be necessary almost to rebuild the hall, which was only completed sixteen years ago at a cost of over £150,000. Alderman Barron openly blamed the contractors for this unsatisfactory state of things, and said one contractor avowed that he "scamped" his work at every opportunity.

The Tunbridge Wells local board have accepted from their chairman a gift of four acres of land at the northern end of the town for a recreation ground. It will be laid out and fenced in, in accordance with plans prepared by Mr. R. Marnock, at a cost, including lodges, of £2,500.

CORPUS CHRISTI CHURCH, BRIXTON.

This fine church, of which we give a drawing to-day, has been erected on the right-hand side of Brixton-rise, nearly opposite Raleigh House. It is of red brick and stone, and the only portion now complete is the chancel, which cost £5,365. Internally, the height is about 62ft. to the crown of the vault. The ceiling is of vaulted construction, with ribs, and has a very fine effect. The Architectural Association (with the kind permission of Mr. Bentley, the architect), visited the church on March 5th last, and in our issue of March 11th we gave a plan of the church. Messrs. Lawrence and Son, of City-road, are the builders.

WANDSWORTH MANOR HOUSE.

We illustrate to-day a view taken from the garden of the above famous house which is threatened with demolition. The estate on which the Manor House stands is rapidly being developed from a speculating builder's point of view. The house was designed by Sir Christopher Wren, and was presented by Charles II. to his niece, Princess Anne of York, on her marriage with Prince George of Denmark. Beneath the centre gable are still the Royal Arms, and the staircase and hall (of which we hope to give a sketch in a future number) are of oak, and beautifully carved and panelled; Sir James Thornhill has painted many of the panels. The house is at present used as a young ladies' seminary. It is in very good condition, hardly any decay showing itself. The iron staircase to the garden is a good piece of work, and the door leading from the hall has much good detail. The screen across the hall is divided into three bays by Corinthian columns, and above this is some very rich carving in the style of Grinling Gibbons. On the first floor in one of the panels is a portrait of Anne Hyde. We believe some meetings have already been held to prevent this interesting old building from being pulled down, and endeavours are also being made to buy it for conversion into a club. There are about three acres of ground attached, and some fine old trees thereon, and we hope the promoters of this scheme may be successful, as it would be a great pity for such an historical old place to disappear.

CHIPS.

The local board of Southend-on-Sea have elected as town surveyor, Mr. Peter Dodd, for the past six years assistant surveyor to the Tunbridge Wells local board, and previously assistant borough surveyor of Blackpool.

Mr. A. S. Murray, LL.D., keeper of the Greek and Roman antiquities in the British Museum, will commence on the 21st, in Edinburgh, a course of Rhind lectures on Greek archæology.

A loan exhibition of works by Suffolk artists is now on view at the Ipswich Fine Art Gallery, and is regarded as the best local exhibition of pictures yet brought together in the Eastern Counties. Seventeen works have been lent by the Queen, and the collection includes examples of Constable and Gainsborough.

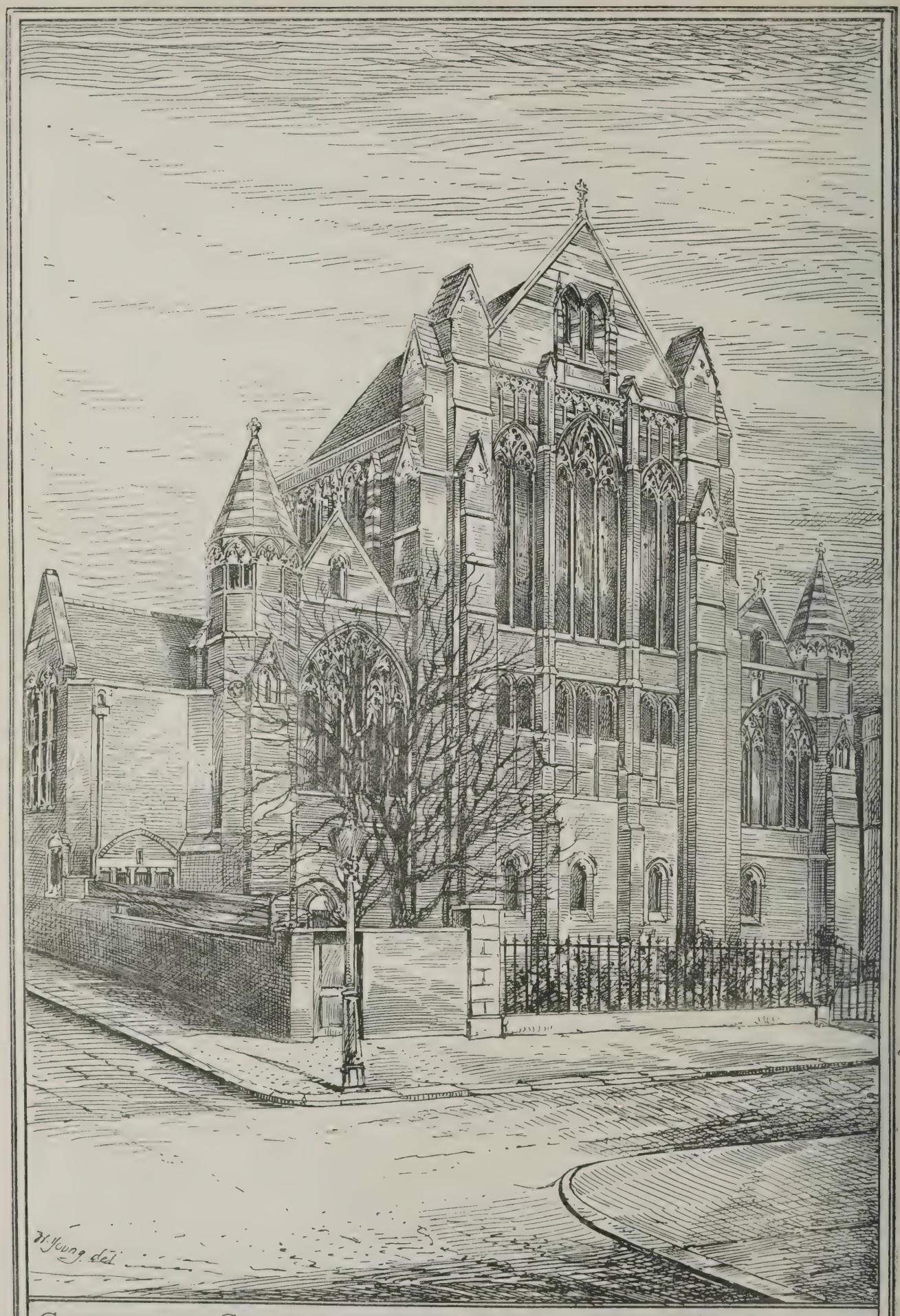
Mr. D. Cowan, manager of the Carron Iron Company, has been appointed a justice of the peace for the county of Stirling.

Ten acres of land have been acquired at Erith as a site for a factory for the manufacture of Nordenfelt guns and ammunition. The site is situate between the Erith Recreation-ground and the line of the South-Eastern Railway, the latter having a branch into the Royal Arsenal, where a large Nordenfelt shop has been recently erected. The new factory will be contiguous to, but outside the boundaries of, the Royal Arsenal.

The Dick's Royal Veterinary College, Edinburgh, was reopened by the Lord Provost of that city on the 5th inst., after having been reconstructed from plans by Mr. Morham, at a cost of £5,000.

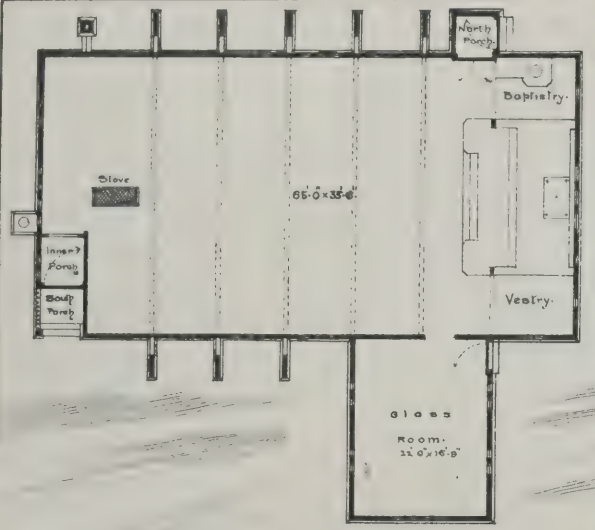
The massive terracotta ornament, representing Milo the Cretan, which has for many years hung over the entrance to the Queen's Hotel in St. Martin's-le-Grand, has been presented by the Postmaster-General to the Library Committee of the City Corporation.

The ornithological collection and library, formerly belonging to the late Marquis of Tweeddale, has been presented by Captain Wardlaw Ramsey, with additions of his own, to the Natural History Museum at South Kensington. The value of the collection is estimated at about £15,000.



CHURCH · OF · CORPUS · CHRISTI · BRIXTON · RISE. W. BENTLEY · ARCHT

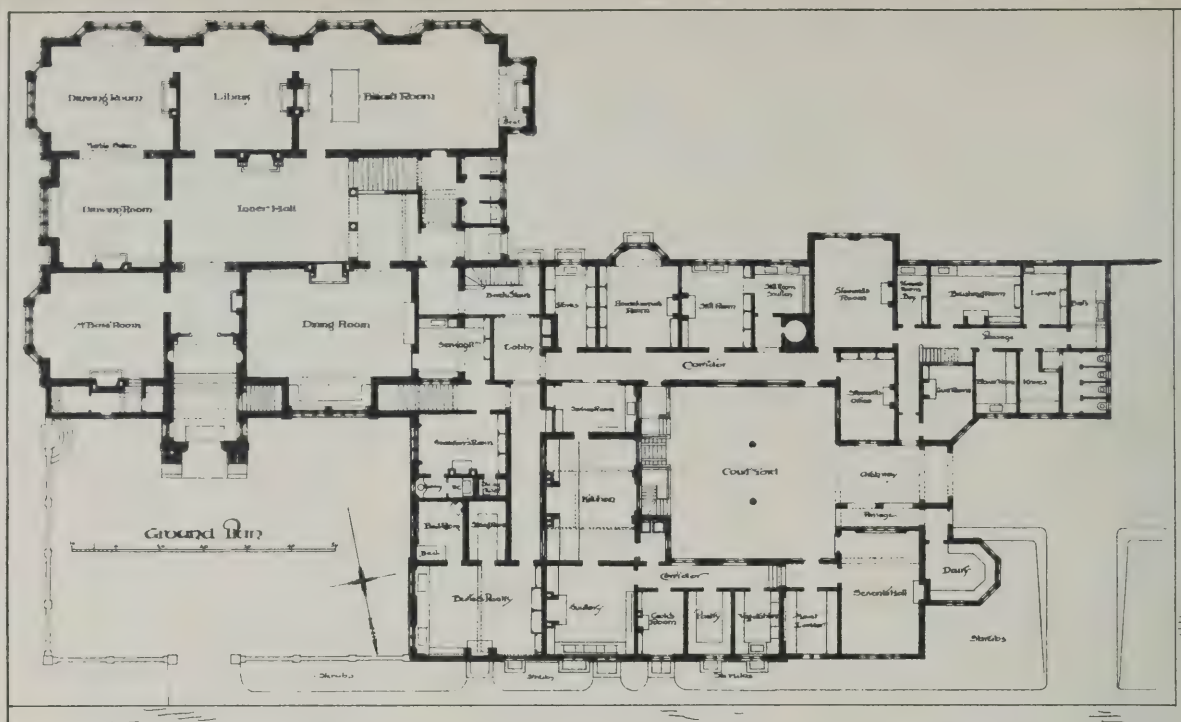
New Mission Room for the Parish of St Paul Maidstone





Hubert Bensted, Architect

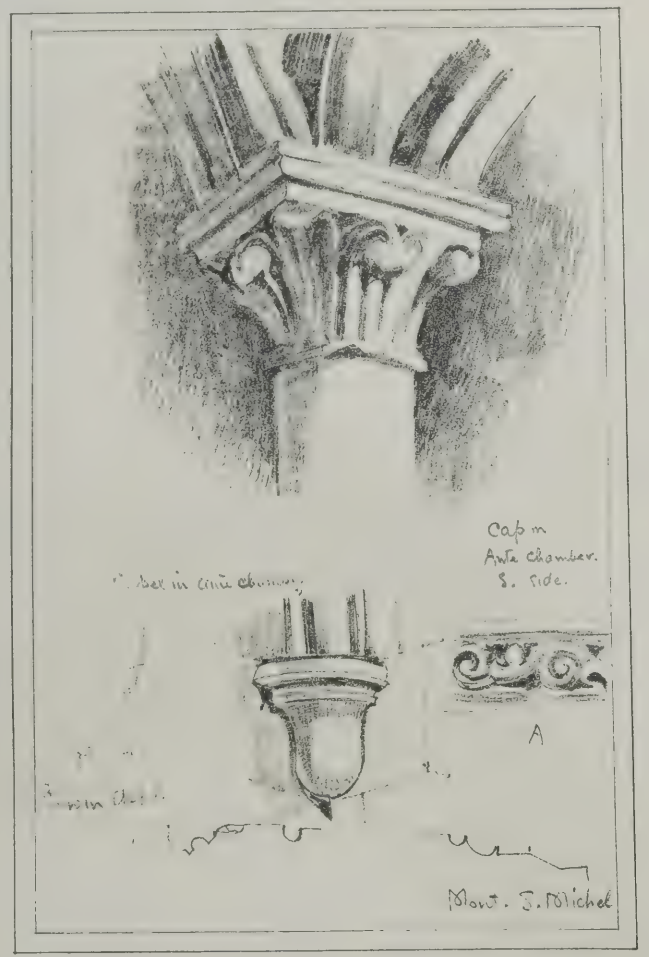
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BYRKLEY LODGE STAFFOR

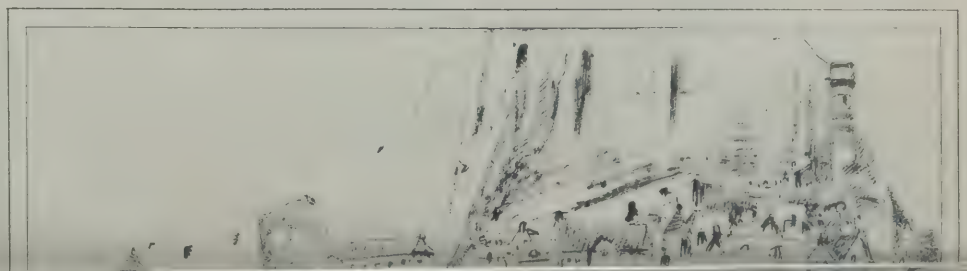
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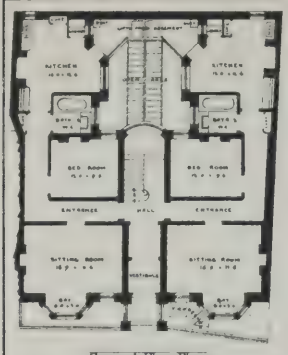

Cap in
Awle Chamber.
S. side.
A
Mont. S. Michel



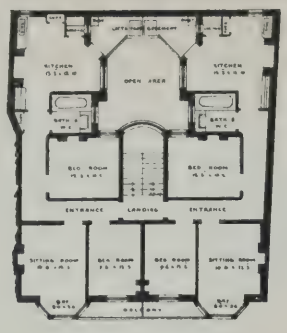

Cap in Awle Chamber
Mt S. Michel.







Ground Floor Plans



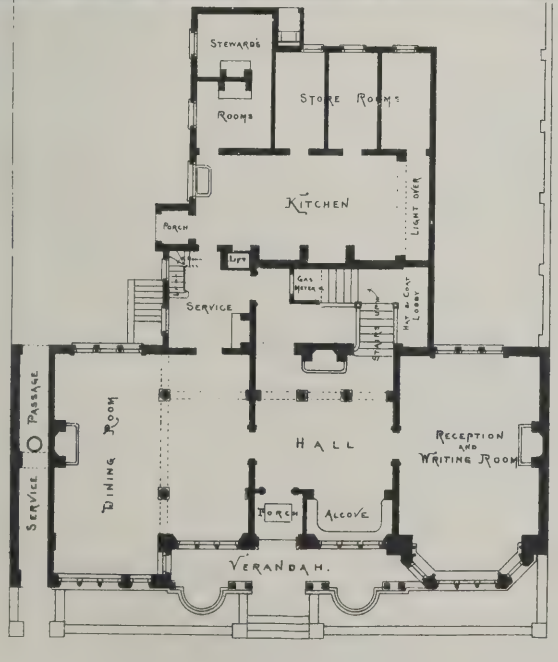
1st 2nd & 3rd Floor Plans

PORTLAND · MANSION · WEST · KENSINGTON · W

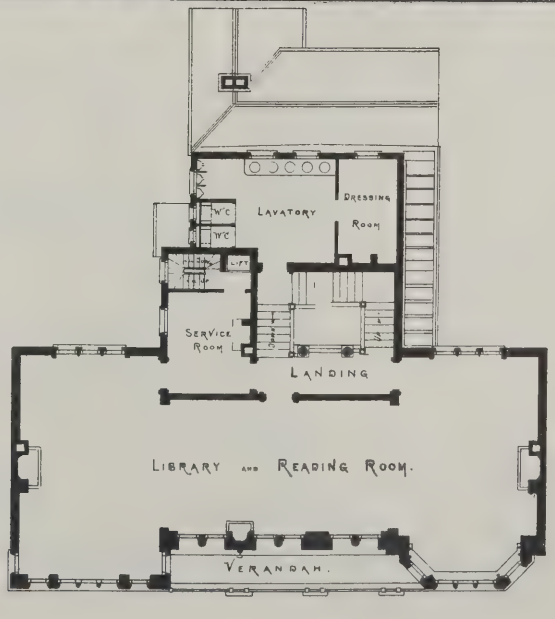
MESSRS LEWEN · SHARP & ARPEN · ARCHTS

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GROUND PLAN.



FIRST FLOOR PLAN.

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

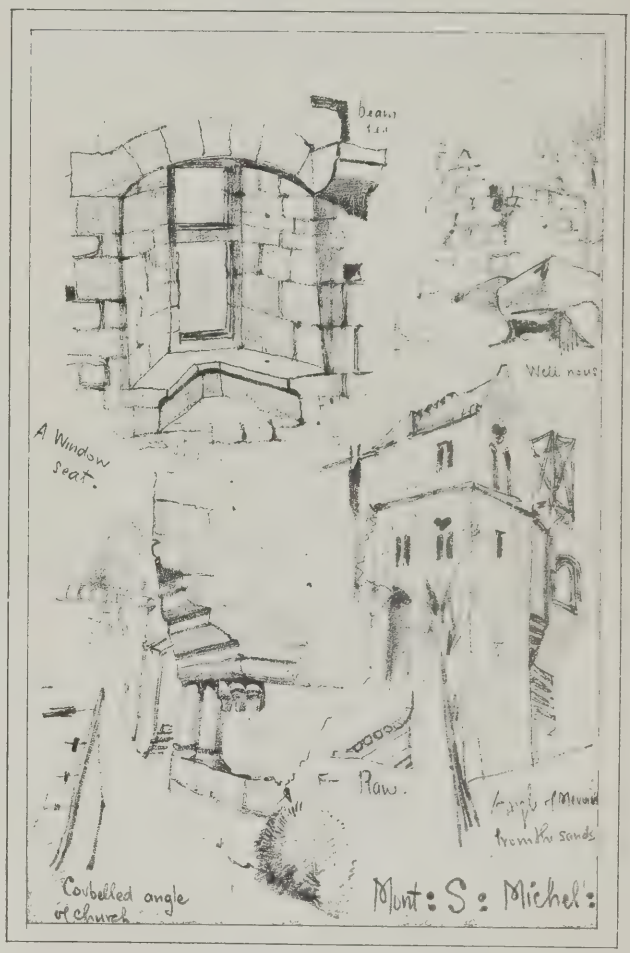
BEDFORD TOWN & COUNTY CLUB · H. A. CHEERS, ARCHT.







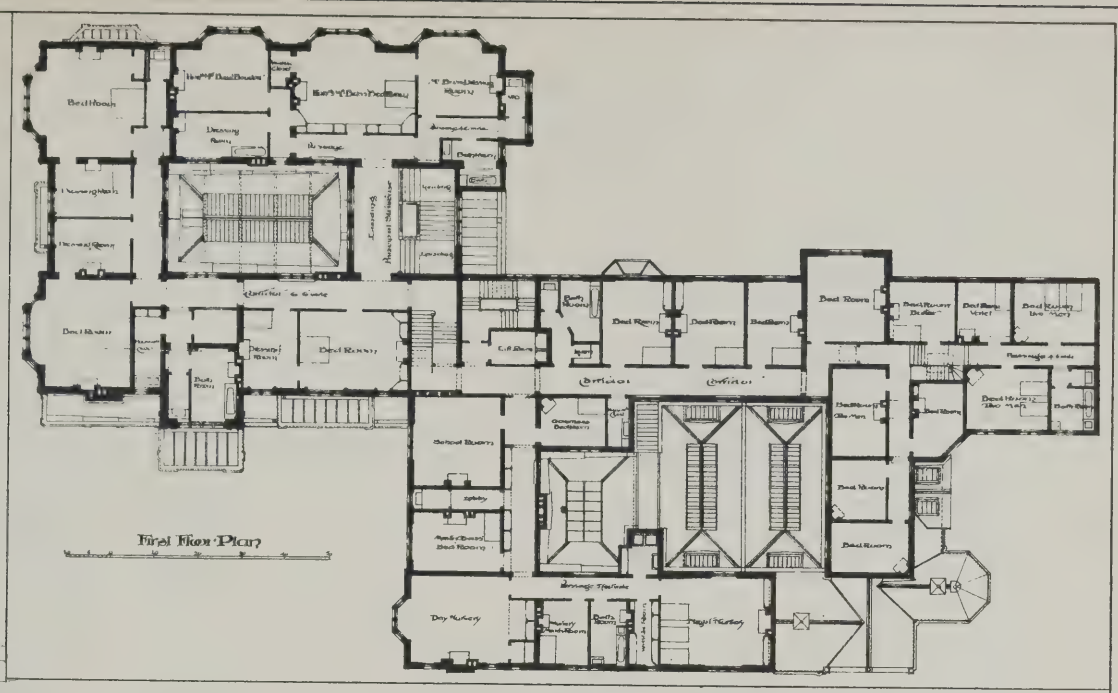




"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

NOTES IN NORMANDY AND BRITTANY

BY · FRANCIS · MASEY





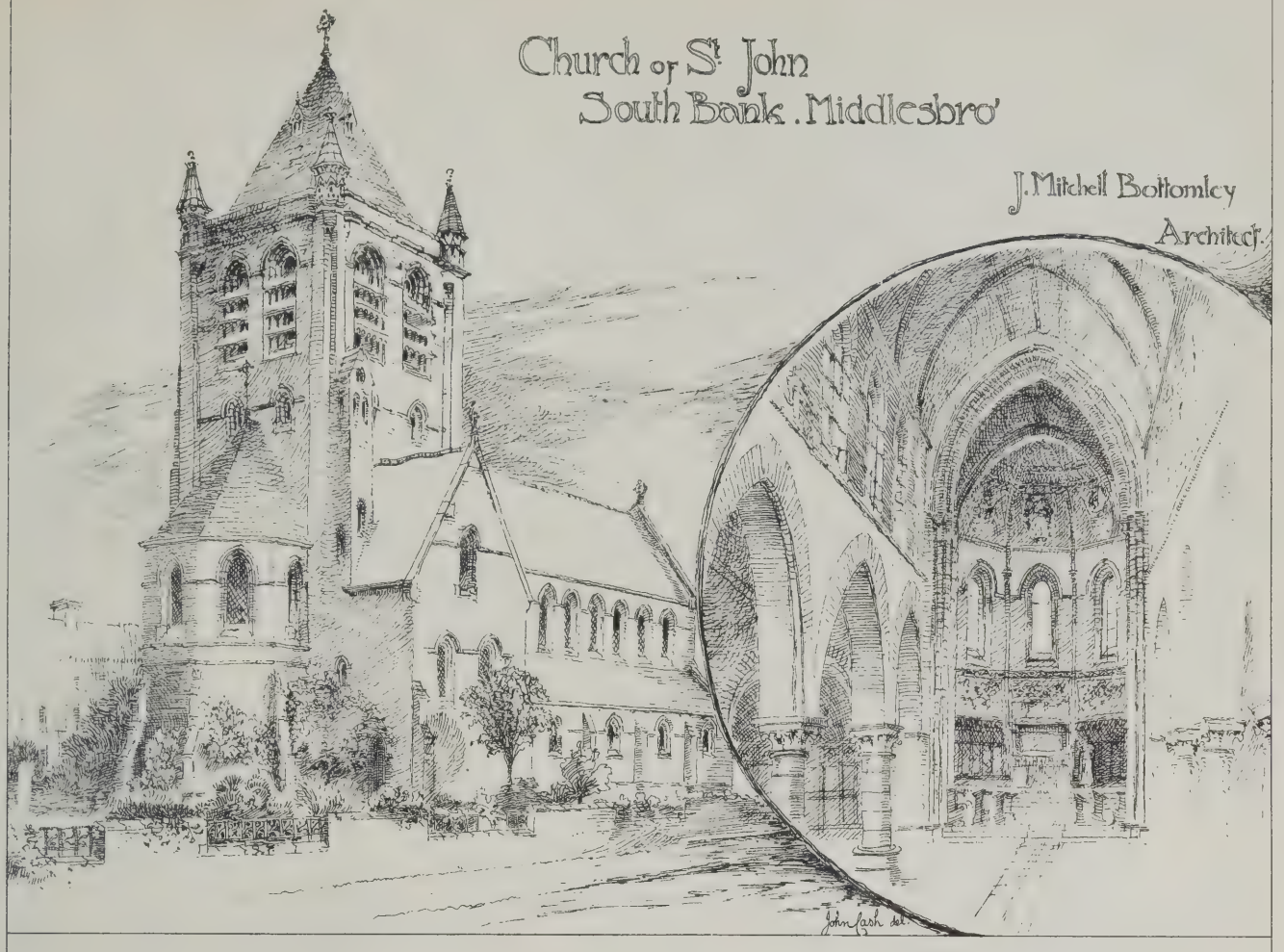
RE . NORTH EAST VIEW .

ARCHITECT

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W C

Church of St. John South Bank. Middlesbro'

J. Mitchell Bottomley Architect.

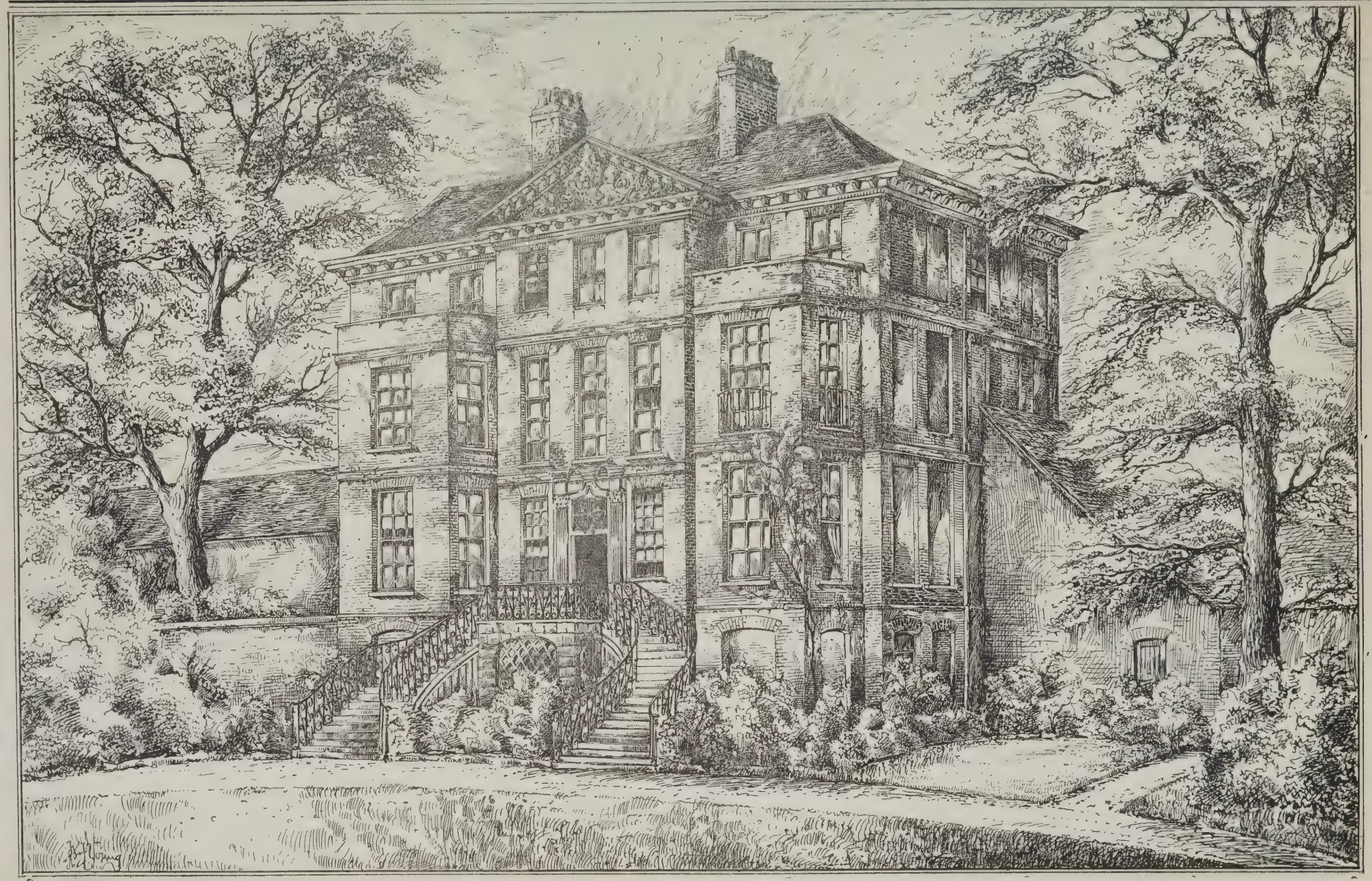


The Grangetown Hotel

J. Mitchell Bottomley Architect.



Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



WANDSWORTH MANOR HOUSE.—Sir Christopher Wren, *Architect.*

UNIVERSITY OF ILLINOIS

WAYSIDE NOTES.

THERE is nothing new on earth, it is said, and when I read the opening remarks of Professor Roger Smith on "Education, Cultivation, and Examination" I feel somewhat inclined to believe that the saying is indeed a truism, and that it is only in men's own imaginations that new facts and fresh discoveries are made. The Professor referred to some words of the recently appointed President of the Architectural Association, of this import:—"A most important discovery has been made within this last few years, that one necessity for an architect is a thorough education, and the results of this discovery must have very far-reaching effects on the profession." A very new discovery, indeed, and one made in very recent years, truly!

Was there not, at one time of the world's history, a certain architect of Italy—one Marcus Vitruvius Pollio—who left for our edification a lengthy treatise on building matters, which he, with exemplary modesty, designated *De Architectura?* And is there not therein contained a few rather enlarged notions as to the proper qualifications for the young architect? Where, then, is the newness of the discovery, seeing that the said Vitruvius is supposed to have been born about 76 or 80 B.C.?

Later in the Professor's discourse I read that it is preferable for the young architect to travel for six months consecutively than to roam afield six different times for one month each. The Professor said that he had not then time to explain the why and wherefore of this remarkable dictum. This is certainly a great pity, as the notion is so opposed to that of many architects of the present day that it would have been only just to have given us the reason. If Professor Roger Smith would kindly explain, many of us might be put right.

One would have thought that the notion of a "grand tour" was exploded long ago. To send a young student away for years at the expiration of his articles would often be ruination to him. He would be simply fit for nothing at all. He can get quite rusty enough and unpractical enough without his being sent away for years to get out of his business habits, and, moreover, to become *blasé* of all architecture and sketching, and wholly incapable of sitting still for two minutes together in an office. Far better for the young architect to run away for a *few* weeks at a time, when his occupation allows of him doing so. He will infallibly learn more, and would not get out of every valuable business habit.

Much indignation has been expressed at the proposed action of the authorities in regard to the old Millbank Prison and the consequent contemplated alterations in the arrangements at Wormwood Scrubs. As far as I understand, the later place—formerly used only for convicts—is to be in future employed as a common gaol; and the inhabitants of the district are naturally much perturbed at the idea. Meantime, it is rumoured, the forbidding mass of brickwork on the river at Millbank is to be pulled down to make way for artisans' dwellings.

It certainly cannot be very delightful for the residents in the north-west of London to have to look forward to a time when bands of short-term gaol-birds will be daily let loose in their neighbourhood. Neither, however, I should imagine, it is very pleasant for the miserable wretches themselves, who, from the confinement of dismal cells, are thrown upon an unforgiving world, to so often but find themselves once more compelled to thieve and steal to satisfy their cravings for food.

On Saturday night last, at an indignation meeting at Shepherd's-bush, a resolution was passed condemning the scheme. And it must be confessed it does seem unnecessary, and there is no doubt the proposed alterations at Wormwood Scrubs Prison would somewhat injure the immediate district. One would think there would be plenty of gaol accommodation elsewhere, even if Millbank were destroyed.

On the same day as the worthy folk of Shepherd's-bush vented their indignation in the St. Luke's Schools, the managers of the Metropolitan Asylums District held a meeting at the offices of the Metropolitan Board of Works, under the presidency of Sir E. H. Galsworthy. As may be supposed, the discussion was all anent the "epidemic" of scarlet fever. During the meeting Captain Wiltshire expressed a hope that the Board would obtain power to enforce the compulsory removal of infected children where the parents demurred to their treatment in a hospital.

"*Run 'em in*," in fact, would appear to be the motto of the asylum people; and whilst officials are ferreting about for cases, there is no doubt they will turn out a goodly number of fever-stricken individuals. This is all very right and proper, only, under such circumstances, is it fair to the public to talk about an epidemic, and thus raise undue alarm? By all means let as many fever cases as possible be ferreted for and "run in," but do not let us talk about "epidemics."

The Metropolitan Board of Works has been distinguishing itself, says the *Times*. So it has.

I tender my best thanks, and those of the readers of the "B.N.," to "One Who Knows" for his timely information about the house of Kent that so fascinated the King of the Belgians. His Majesty seems to have conceived a strong affection for modern English Domestic architecture what with this, and the reports as to his doings at Eastbourne.

I hear that the Architectural Association Conversazione was a great success: good company, good music, and liberal refreshments in fine rooms. "Circumstances over which I had no," or little, "control" prevented my attendance, so cannot enlarge upon the theme.

Fine weather appears, after all, to have favoured the Society of Architects at York. It is pleasant to follow the excursionists, in one's imagination, on the enjoyable visits. Mr. Hugh Roumieu Gough's paper should help on the Registration movement. I regret to see that the committee lack funds. Now is the time for the advocates of the scheme to show that they are in earnest.

Feeling very interested in the Celtic remains at Carnac, in Brittany, I consulted Fergusson, and find that in his "Rude Stone Monuments" there are some eleven pages of letterpress and illustrations devoted to Carnac. These curious remains are thus described:—"In a zone about twenty miles in extent, stretching from Erdeven on the north-west to Tumiac in a south-easterly direction, and nowhere more than five miles in width, there is to be found the most remarkable group of megalithic remains, not only in France, but perhaps the whole world. Not only are examples of every class of monument we have been describing, except circles, to be found there; but they are larger and finer examples than are generally to be met with elsewhere. Another point of interest also is that within the zone are found, if I am not mistaken, both a cemetery and a battle-field."

Mr. Fergusson, in considering the question of the possible age of these stones, brings forward an argument to show that they are, at any rate, later than Cæsar's time, which, if not conclusive, is, at any rate, curious and interesting. He says that "when Cæsar and his army witnessed the fight between his galleys and the fleet of the Morbihan, he must have stood, if he occupied the best position, on Mont St. Michel (a tumulus near Carnac), if it then existed, and amongst the stone avenues of Carnac." From this fact Mr. Fergusson draws the conclusion that they could not have existed at the time of battle, as, he says, Cæsar would certainly not have omitted to heighten the effect of his description of the fight by describing the appearance of the vast white monoliths surrounding him in all their solitary grandeur.

GOTH.

The City Corporation negatived, at their last meeting, a proposal made by Messrs. H. Clarke and H. H. Bridgman, F.R.I.B.A., that they should appropriate funds for the establishment of an art gallery and school of design.

THE LONDON COLLEGE OF ARCHITECTURE.

THIS college, which has just been established at 46, Great Ormond-street, for the purpose of affording to students of architecture and surveying the advantage of thorough practical, scientific, and artistic education in all the branches of the profession, seems to us likely to supply a great want if properly conducted. As the directors point out, the functions of the modern architect now require technical instruction—which has no place in the ordinary office routine—and an artistic education, which cannot be acquired in the ordinarily recognised schools of applied science. The London College of Architecture is to be devoted to securing the combination of these necessary elements. It is especially the endeavour of the directorate to systematically prepare the students for all subjects required in the compulsory examination for membership of the Royal Institute of British Architects; for district and municipal surveyorships; the architectural Governmental appointments; and for actual practice, or subordinate positions in the offices of other architects.

The curriculum provides lectures and individual instruction in the scientific section on mathematics and mechanics, plane and descriptive geometry, stereotomy, &c., surveying and levelling, chemistry (the chemistry of building materials, &c.), geology and physiography, physics, and building construction. In the artistic section the subjects taken will be the history of architecture, drawing, architectural styles, forms, and details, designing architecture, colour decoration and decorative art generally, and the study of ancient buildings.

General professional practice will embrace the principles and practice of building contracts, and the settlement of building accounts; specifications, and the drawing up of general reports; quantities and estimates; light and air, compensation, dilapidation, arbitration, and valuation; sanitation, including drainage, warming, and ventilation; the Metropolitan Building Act, and the duties of building surveyors under local authorities; dangerous structures.

Students whose time is partially occupied can attend any of the special day or evening classes they choose, either for general study or for preparation for the different architectural and surveying examinations.

Periodical visits will be made under the guidance of the principals to well-known examples of ancient and modern art. The College being in close proximity to the British Museum, the students will be enabled thereby to avail themselves of the valuable library and collection of examples of ancient art.

The terms seem reasonable; the directors, Messrs. A. Hessell Tiltman and W. Henry Wood, are both gentlemen well known in the profession, and we hope their scheme may find due encouragement as long as it is likely to improve young architects, and consequently the status of their vocation.

VERESTCHAGIN'S PICTURES AT THE GROSVENOR GALLERY.

AN exhibition of studies and pictures, chiefly of Palestine, of India, and of scenes in the Russo-Turkish War, painted by Vassili Verestchagin, a Russian painter, who has been himself a great traveller, is now on view at the Grosvenor Gallery. Those who expect to find a collection of paintings, such as the visitor to the Grosvenor Gallery is accustomed to see, will be disappointed. They must not look for the manifestations of Academical culture or of that kind of impressionism which we have been wont to see at Sir Coutts Lindsay's Gallery. Verestchagin is essentially a hard-working painter of the realistic and sterner side of nature; his great merit is his individuality. When he paints a face he gives us exactly what he sees—nothing more. The strong lineaments of character are shown in all his portraits of Arabs, Rabbis, and Greeks, as in that of a Jewish Rabbi from the western provinces of Russia, and in the series of Russian types in the smaller gallery. When he paints a battlefield he does not throw a veil of smoke over the combatants nor group his masses for effect, but he details with almost photographic minuteness the agonies of the

wounded and the dying. He tells the whole truth of the "bloody sport of Kings." We, however, turn first with more interest to some congenial subjects in the large gallery, among which we must notice "The Gate of Allah-Uddin in Ancient Delhi," a red sandstone gateway with a group of court attendants; also a large view of "The Window of Akbar's Monument," a remarkable and delicate piece of white marble tracery; some striking evening views of the Taj, a monument well known as an erection by the Great Mogul Shah Jihan, over the grave of his favourite wife. It is entirely of white marble, enriched with inlays of lapis lazuli, malachite, cornelian, and other precious stones. The dazzling whiteness and splendour of its architecture is contrasted by the dark cypress and other foliage. In one view the dome is reflected in the still water of the river; in the other, the artist has shown the view of the Taj from the garden. The "House of Raja Berbue, near Agra," and the "Chief Mosque in Futtehpore Sikri" (56) are elaborate studies of the delicately-carved architecture of India. With their shortcomings as works of the painter, we must allow that the artist has given us impressions fairly accurate in the details of these wonderfully-wrought examples of architecture.

M. Verestchagin is even stronger in his battlefields. The pictures illustrating the Russo-Turkish war are powerful as technical representations. He followed the armies to the field, and as a soldier-artist has rendered what he saw. The artist, it appears, was wounded in the war; but has, nevertheless, shown great perseverance, and one must credit him with indomitable energy, at least. The principal scenes he has depicted are "Skobelef at Shipka" (75) in the small room. Skobelef is galloping down the line of his soldiers, thanking them for the victory. M. Verestchagin has painted with realistic power and a wonderful technique the snow-clad scene with the heaps of dead before the Turkish forts. No. 79, "Before the Attack," is another touching incident of the storming of Plevna—the troops lying down waiting the order for the assault, a more solidly-painted work. The Turkish Hospital at Plevna, a dark interior, with the ghastly forms of still breathing and wounded men (83), is painful in its reality. "After the Battle" (81), "Alexander II. before Plevna," and the figure-studies and incidents, are interesting records of a miserable war. Sometimes there is a likeness to the work of Meissonier; occasionally we see Courbet; but on the whole, Verestchagin's work is eminently characteristic of the painter himself.

FOUNDATIONS.

THE first lecture of the session at the City of London College in Civil Engineering was given by Mr. Henry Adams, M.Inst.C.E., on Wednesday last, upon the subject of foundations. He said that when it was necessary to spread the pressure at the base of a wall, in order that some less resisting material below might support the weight of the superstructure, it would at first sight appear that, by using the bricks as all headers, footing courses with projections of 4½in. might be adopted; but these would be apt to break off, a brick being most easily broken across its middle, and it was found that not more than a 2¼in. projection of each course beyond the one above it could be adopted as practically safe, and at the same time convenient. This gives an angle of 53° 3′ from the horizontal for the line of transmission of the pressure, and shows that the ordinary allowance of 60° in calculations leaves a slight additional margin of safety. Concrete has less "bond" than brickwork, and hence in lime concrete the projection beyond the base of the footings should not exceed ⅔ of the depths in running lengths; but in a square bed, as at the base of a factory chimney, additional support is derived from the corners, and the projection may be made equal to the depth; less than this is liable to have a hole punched through it by the brickwork. In cement concrete the mass may be looked upon as homogeneous, and the projection made equal to the depth for running lengths, or 1⅓ times the depth for square beds. The least depth of foundations below the surface should be 3ft. in sand and 4ft. in clay, to avoid the effects of frost. The following list was given showing the maximum safe loads per square foot in foundations under ordinary circumstances — viz., stock brickwork in mortar, 6 tons; cement concrete, 6 tons; hard gravel and deep solid clay, 5 tons; lias lime concrete, 4 tons; stone lime concrete, 3 tons; good gravel soil, 3 tons; ordinary solid earth, 1½ ton; bad ground, ¾ ton.

The subject for next week is "The Use of Piling in Foundations."

THE BIRMINGHAM BY-LAWS.

AS we hinted last week, the Town Council of Birmingham have adopted the new code of by-laws with respect to new streets, courts, and buildings, upon which they have been for some time engaged. For a considerable time past Birmingham has suffered from imperfect building legislation. Many of the old by-laws were badly framed; others were not clear; and the rest were obsolete or contradictory. Such a state of confusion could no longer be endured, and we must congratulate the authorities on having accomplished so necessary and urgent a measure of reform. When the Consolidation Act was framed, powers were given to make new by-laws in substitution of the old ones, and these refer to courts, unhealthy sites, dangerous staircases, chimney-stacks, the thickness of the walls of ovens and furnaces, and the prohibition of the use of rooms over privies. We have always urged the desirability of provincial towns framing their by-laws to meet local peculiarities and conditions, and the public works committee intrusted with the preparation of the code have found it necessary to frame the new by-laws independently of the Model By-laws of the Local Government Board. That authority, after a little consideration, agreed to most of the clauses. The new code has also been discussed by the Birmingham Architectural Association and the Master Builders' Association, who were consulted, so that it may be said to embody the requirements of all concerned.

As we have received a draft copy of these by-laws, it may be of interest to refer to some of the clauses, pointing out a few of the special features. The first of importance relates to foundations. By-law 5 says: "A person who shall erect a new building shall not construct any foundation of such building upon any site which shall have been filled up with any offensive or unwholesome waste or refuse, or with any material impregnated with fæcal matter, &c., &c." This clause in the main reads the same as that in the Model By-laws, though it is amplified in one or two points. The words, "any offensive or unwholesome waste or refuse" are an addition, making it more general in its application. In the report of the committee's discussion on these by-laws, one member asked whether this meant that the whole piece of ground should be excavated, or that only the refuse should be properly removed from such site, and Mr. Parker said that it was only the foundation which was affected by the by-law. If by the word "foundation" he meant only the trenches for the footings, it would be optional for any one merely to remove the injurious soil from the trenches, and to allow the site below the living rooms to remain hotbeds of disease, covered only by a layer of concrete. We presume this construction can never be intended, and if not, the clause is by no means clear. The building sites in Birmingham have all been at one time or another covered by refuse or fæcal soil. On this ground it is more necessary that a comprehensive and stringent by-law be passed, for as Alderman Avery pointed out, there have been numerous cases of disease having broken out in houses which were found to be entirely attributable to the unwholesome condition of the soil. There is a qualifying condition in the next by-law which destroys its power for good. The Model By-law is to the effect that every site is to be covered with concrete or asphalted; but the new by-law reads "in every case in which the dampness of the soil of the ground or the ground surface shall render this precaution necessary." This qualification is, to our mind, weakening, and renders it possible to evade the true intention of the framers. How is the "dampness of the soil" to be judged? It may look dry on the surface, but be sodden beyond. When is the precaution to be deemed necessary? As it stands, the clause courts difference of opinion, and seems to have been framed to meet the old order of things. A layer of concrete, or of asphalte, seems to be imperatively required, when we consider that only foundations of new buildings are to be excavated. We fail to see under the provisions for external walls any reference to hollow or half-timber walls, though in Birmingham there is less need for them. The by-laws as to cross walls and the materials to be used are taken from the model code. Clause 9 restricts all projections, even those intended for the purpose of architectural ornament, to 12in. By-laws 10, 11, 12, 13 agree with Nos. 14 to 17 in the model set, referring to the bonding of return walls, footings, and damp-courses. The rules as to heights and lengths of walls, and of thickness of walls with respect to domestic buildings conform with those of the Model By-laws; but the rules for buildings of a public or warehouse class show some deviation with regard to the lengths of walls of buildings of 40ft. high, 50ft. and 60ft. We may quote the rule for thicknesses up to 40ft. "If the wall does not exceed 30ft. in length, it shall be 13½in. thick at its base. If the wall exceeds 30ft., but does not exceed 60ft. in length, it shall be 18in. thick at the base. If the wall exceeds 60ft. in length, it shall be 22in. thick at its base." In the Model By-laws the limits of length are 35ft. to 45ft. The same increase in the limits of length is made with respect to walls up to 50ft. high and 60ft. In the latter case, the 45ft. length of the model rules is reduced to 35ft. for 22in. walls. Referring to the construction of staircases, by-law 32 prescribes that the stairs in every new domestic building shall "have a tread of not less than 8in. in width, and with a rise of not more than 8½in. for each step. The width of the tread in winding staircases shall be measured in the centre of the tread, and every person shall construct such stairs with a proper banister handrail or balustrade of a height of not less than 2ft. 6in. measured perpendicularly at right angles from each step." This clause is not introduced in the Model By-laws; its omission is a defect in most by-laws, therefore the Birmingham authority have done right in inserting a clause on staircase construction, as numerous fatal accidents occur from want of properly planned staircases. We fail to see the clause as to open spaces at the rear of new buildings, provided for in the Model By-laws—which is a very necessary rule in the building by-laws of all great towns. Time does not allow us to compare other clauses with those of the Local Government Board. On the whole, we think the new by-laws are pretty complete, with the exception of those points to which we have alluded.

THE ARCHITECTURAL ASSOCIATION BROWN BOOK.

THE tendency of reports and kalendars of societies and public bodies is to increase in bulk year by year, and that of the Architectural Association, familiarly known as the "Brown Book," is no exception to the rule, for this year it shows a further enlargement, and now numbers 168 pages. The committee's annual report is, as usual, of a highly satisfactory character, and in their opening sentence they express their pleasure in recording the continuation of the Association's career of usefulness and prosperity. During the past year the machinery of the Association has, it is stated, been actively maintained in full working order, and has been extended in several directions. The gradual increase in the number of members, and the large attendance at the ordinary meetings, has forced the Committee to consider the necessity of providing better accommodation, and they announce that, by the courtesy of the Council of the Royal Institute of British Architects, the ordinary meetings will, during the ensuing session, be held in the meeting room of the Institute. The classes have been well maintained in numbers and work, with the exception of that for the study of colour decoration. A new feature in the curriculum has been the series of lectures on "Graphical Statics," by Mr. Frederic Quick, which have been well attended. This course of lectures will be continued during the coming session. By the liberality of Mr. T. W. Aldwinckle and Mr. T. Blashill additional Travelling Studentships have been offered for competition; and

through the kindness of Mr. Arthur Cates, an annual prize has been instituted to be awarded to that member who, in his preparation for the examination in architecture of the R.I.B.A., has made the best use of the classes of the association. Papers were read during the session by Messrs. Aston Webb, J. D. Sedding, T. Pridgin Teale, M.A., F.R.C.S., H. Longden, T. M. Rickman, F.S.A., Professor Corfield, M.A., M.D., Walter Crane, A. Baker, H. Lovegrove, G. Aitchison, A.R.A., J. L. Robinson, R.H.A., and R. W. Paul, and were all reported in our columns. The following buildings and works were inspected during the usual fortnightly visits on Saturday afternoons:—Church of the Sacred Heart, Wimbledon; New Sion College; St. George's Schools, Westminster Bridge-road; Church of St. Mary, Clapham-common; Church of Corpus Christi, Brixton-rise; the National Gallery; Houses of Parliament Drainage Works; Lambeth Palace; Dent and Hellyer's Works; Church of St. Bartholomew the Great, Smithfield; National Liberal Club; St. Thomas's Seminary, Hammersmith, and Chiswick Church. "Vacation Visits" were paid to "Woolpits" Mansion, Banstead Park, Cambridge, Sutton-place and Loseley Park, Churches at Streatham, "Ascott" and Leighton Buzzard, Minley Manor, "Bramshill," and House in Cadogan-square. An excursion to Italy was made at Eastertide by a small party of the members, and the annual summer excursion was held in August, the city of Bath being the centre from which trips were made. The following are among the honours taken by members during the past session:—At the Royal Institute of British Architects, the Owen Jones Travelling Studentship was taken by S. Vacher; Pugin Travelling Studentship, T. Maclaren; Medals of Merit, A. B. Mitchell and E. H. Selby; Certificate of Honour, R. W. Paul. Tite Prize: Certificate of Honour, W. Stirling; Soane Medallion and £50, F. E. Masey; and Certificate of Honour, A. Sykes; Essay—Silver Medal and £26 5s., R. E. Smith. Twelve members passed the Institute Examination in Architecture, and four passed the Statutory Examination for District Surveyors. At the Royal Academy, Silver Medal for Measured Drawings, G. T. McCombie; and at University College, London, Donaldson Silver Medal (Construction), second prize, R. S. Maynard. The list of members shows a slight increase, being 993, against 972 last year; but in 1885 the numbers were 1,013, and in 1884, 995. With the exception of the two last named years, the present is the highest total of membership recorded during forty-five years of existence.

CHIPS.

Charles Lailey, district surveyor to the Acton Local Board, appeared at the Hammersmith Police Court, on Saturday, to answer a summons for maliciously damaging the greenhouse of Mr. John Hibbert. It appeared that he had pulled down the greenhouse by orders of the local board, and it was stated that they had a right to demolish a building not erected in conformity with the by-laws. Mr. Paget said it was a most high-handed act, and said he would not decide as to its legality. He refused to allow costs, the summons, on his advice, being withdrawn.

The Walsall town council have appointed Mr. C. L. Marston as assistant to the borough surveyor, at a salary of £150 a year.

The local board of Sandown, Isle of Wight, are about to build themselves offices from plans by the architect and surveyor, Mr. J. Newman. Mr. J. Ball is the builder, and the cost will be about £600.

The infirmary at Northampton is being enlarged from plans by Mr. W. Hall, of that town, at a cost of £3,700. Mr. H. Martin is the builder.

The Corps of Royal Engineers have decided to erect a monument to General Gordon in front of the Royal Engineers' Institute at Chatham.

The partnership heretofore subsisting between Messrs. Best and Commin, of Exeter, architects, surveyors, and auctioneers, is announced to have been dissolved.

At the inquest held on Tuesday on the youths burnt to death by the fire which recently occurred on lath and timber-built premises situate in the narrowest part of the Strand. The jury returned a verdict expressing their opinion that there was not sufficient evidence to show how the fire was caused, and adding a rider suggesting that legislation should be brought into operation providing for periodical inspections of buildings not protected with party walls.

Building Intelligence.

Bournemouth.—On St. Michael's Day, after service at St. Michael's Church, Bournemouth, the clergy and choir went in procession to the new Mission Hall, where prayers were said and the building declared open by the vicar, the Rev. F. E. Toyne. A large number of the congregation came from the church, and the workmen who had been employed on the building attended. The architect is Mr. Reginald Pinder, F.R.I.B.A., M.S.A., and the builders are Messrs. W. E. Jones and Son. The cost is about £600.

Bristol.—The Castle Green Board Schools were opened on Monday. The School Board advertised for designs in the spring of 1885 for a school capable of accommodating 1,050 children in three departments, the site being that of the ancient castle at the end of Castle Green. Out of upwards of forty plans, those of Mr. Stuart Colman, of London and Bristol, were selected, and these were subsequently altered to give an increased accommodation, 1,230 children being provided for. A principle new to the West of England was adopted by the architect in his design, the school being made to consist of a large central hall, surrounded by classrooms shut off from it by movable glass partitions. These divisions can be removed, and the whole space thrown into that of the large hall. A large swimming-bath forms an important part of the school, and will doubtless be much used and appreciated by the scholars. The style is a free treatment of Queen Anne; the building is of brick, with buff terra-cotta dressings. A residence, containing a cookery classroom, has been erected on one side of the school, and forms a prominent feature in the front elevation. The general contractor was Mr. A. J. Beaven, of Bedminster.

Bradford.—A new school which has been built by the Bradford School Board in Drummond-road, Manningham, was opened by Viscount Cranbrook, Lord President of the Council, on Monday. The site of the new building embraces an area of 12,635 square yards. The school is formed on the class-room principle, and includes two main buildings, one for the mixed and the other for the infant department. The former consists of a large room, 96ft. by 50ft. and 30ft. high, with eleven class-rooms, accommodating from 56 to 90 children each. The infants' department has also a main room, 52ft. by 35ft., surrounded by five classrooms. The total accommodation provided is for 1,169 children. Mr. E. Peterson, Thornton-road, Bradford, designed the building, which is in the Domestic Gothic style. The contracts were let for £11,406, and the land was purchased for £5,946, the total cost of the school, including furnishing, amounting to about £19,000. The cost per scholar was £9 5s. 4½d.

Exeter.—The corner stone of the Cathedral cloisters and library will be laid on Wednesday next, with public ceremony. The cloisters and library will be a restoration of the ancient buildings. During the excavations the whole of the ancient foundations have been found, together with a very large quantity of moulded and sculptured stonework. Careful drawings of these remains have been made, and the design of the new work is taken from these fragments. The sections of the work now in progress, and which are rapidly advancing, are the south-east angle bay, with two bays of the east cloister and two bays of the south cloister; the staircase to the library over the eastern cloisters and the lavatories; also the library over the five bays of the cloisters now being built. There will be arcaded and vaulted cloisters on all four sides of the quadrangle, which will extend from the tower over the south transept to the west front of nave, and will have a cross in the centre of the garth. The whole of the work is in selected oolitic stone, from the quarries at Doulting, near Shepton Mallet. The whole building will be fireproof. The floors of the library will be executed in solid oak parquetry, bedded on the stone groining of the cloisters below; the roofs of library and staircase of solid oak, with trussed rafters and beams, carved and elaborately moulded. The architect is Mr. J. L. Pearson, R.A., and the outside roof will be covered with heavy cast lead. The whole of the works are being executed by Messrs. Luscombe and Son, of Exeter. Since the commencement of the works at the cloisters, Mr. Pearson has intrusted to Messrs. Luscombe and Son the making and sculpturing of the Bishop's Throne; the frontal chest for Truro Cathedral, and sculptured oak stalls for Shrewsbury Abbey; the building and sculpturing the new University Library at Cambridge, and the erection of a house at Spurfield, Exminster.

The Imperial Institute.—The Building Committee having made a selection from a list of 46 applicants to tender for the first portion of the foundation contract, received offers from the following firms: J. and J. Greenwood, Brass and Son, Thompson (Peterborough), Lovatt (Wolverhampton), Dover Bros., Lucas Bros., Macey and Son, Barnsley (Birmingham), Kirk and Randall, Munday and Sons, Higgs and Hill, Trollope and Sons, and Mowlem and Co. The tender of Messrs. Mowlem, Burt, and Co. being the lowest, and their schedule of prices comparing favourably with those of other firms, their tender has been accepted by the committee, and the work will commence very shortly. Mr. G. Wallis, who was formerly chief clerk of the works in the construction of the Royal Courts of Justice, has been appointed clerk of the works for this contract.

Liverpool.—The memorial stone of new engineering laboratories now being added to University College was laid by Earl Derby on Saturday. They are being built at the cost of Sir A. B. Walker, from plans by Mr. A. Waterhouse, R.A., the architect of the college, and consist of a building in terracotta and grey brick fronting Brownlow-hill. The main part of the edifice will have three floors, with a frontage of 60ft. Between this front and an adjacent lying-in hospital will be a wood-working shop which will contain 30 or 40 benches and 20 lathes, together with a circular saw, a "universal joiner," and other tools. This shop will be a one-floor structure, with a frontage of 110ft. and 20ft. in width. There will be also an annexe on the side of the main building, comprising the boiler-house, a smith's shop, and a small foundry. In the main building there will be on the ground floor the main laboratory, testing-house, and machine shop, which will be all in one, and have a clear height of 22ft. In this there will be a large testing machine, a triple-expansion marine engine of at least 100H.P., besides numerous testing machines. On the first floor there will be a museum for engineering models and specimens, a lecture hall to seat 120 to 140 students, lavatories, the professor's and his assistants' room, a room for the preparation of apparatus, and a smaller lecture room. There is to be a mezzanine floor between this and the top floor for the preparation and storing of diagrams. On the top floor is a drawing hall, 60ft. by 50ft., classrooms, and students' rooms. Finally, there will be a photographic room for the reproduction of engineering drawings, and atank to give a head of water for hydraulic experiments in the laboratory below, and an anemometer turret for experiments on the pressure of wind The cost of the buildings will be about £35,000.

Paisley.—A new Congregational church, erected from designs by Mr. J. B. Wilson, A.R.I.B.A., Glasgow, has just been opened at Paisley. The church is in Early Gothic style, and has a tower and spire of 100ft. high. Sittings have been provided for about 500 people, and there are also a hall seating 200, classroom, vestry, ladies' room, &c. The total cost is under £3,000. The church was illustrated in the Building News of September 10th, 1886.

Pearston, Cape Colony.—The new Dutch Reformed Church at Pearston, between Somerset East and Graaff Reinet, was opened on July 30th. The building has been 23 years in the course of construction, having been abandoned since 1864, when it had been partially built. Mr. Arthur H. Reid, A.R.I.B.A., of Port Elizabeth, was instructed to make the best he could of the walls. The work has been carried out by Messrs. Thomson, mason, and Isacke, carpenter, of Graaff-Reinet. The old walls were disturbed as little as possible, and, being of brick, are necessarily plastered with

Portland cement outside and lime inside. The floors are of wood, and the roof covered with galvanised corrugated iron, painted outside. The ceiling is of wood, semi-hexagonal in form, following the form of principal roof timbers which are wrought. All outside mouldings and ornaments are in Portland cement, and the inside in plaster of Paris. The outside doors and all windows are of teakwood. The pews, which accommodate 550 persons, are of deal, with panelled backs and ends. The cost has been £5,000.

Sutton, Surrey.—Christ Church has just been opened at Sutton. The church is designed in the Early 13th-century style, and when complete will accommodate 1,000 worshippers. The work included in the present contract consists of nave 92ft. by 30ft., and 48ft. in height from the floor to the semicircular barrel-vaulted ceiling; north and south aisles of the same length as nave, 15ft. wide and 14ft. in height; chancel with apsidal east end 40ft. by 28ft., and ceiled at a height of 40ft.; clergy vestry, choir vestry, organ chamber, furnace room, and lavatories. Accommodation will thus be afforded for 900 persons, inclusive of choir. The tower and spire, which will be 160ft. in height, the northern baptistery, south chapel, and south porch are intended to be dealt with in a future contract. Local stock bricks are used for walls, faced internally and externally with local red bricks, Bath stone for columns, caps, and bases of interior and for external weatherings, and Broseley pressed roofing tiles for roof coverings. Internally the floors will be paved with wood blocks, with the exception of the space within the Communion rails, where Broseley pressed tiles will be used. The warming is to be effected by means of hot water on the low-pressure system, and ventilation is provided for by controllable air inlets through the hot-water pipes and in the sills of windows, and exhaust ventilation through the ceilings. The seating, choir stalls, and most of the furniture and fittings are included in the present contract, amounting to £6,788, which is being carried out by Messrs. T. Gregory and Co., from the designs of Messrs. J. T. Newman and William Jacques, of 2, Fen-court, E.C., and Sutton.

COMPETITIONS.

Gloucester Baths.—In the competition for a group of swimming, private, and Turkish baths, instituted by the corporation, 60 sets of designs have been sent in, and were opened and examined before a committee on Monday. Premiums of £50 and £25 were offered, the two premiated designs to become the property of the corporation. The following are the mottoes of the designs:—"Glo'ster," "£5,680" (in two circles), "Maltese Cross," "Plan," "Aqua," "Experience" (in circle), "Echo," "Lavo," "Sanitas," "1887," "Sagittarius," "Try Again," "Severn," "Leander," "Aquarius," "Sanitas," "Jordan," "Jubilee," "Verdoyant," "Experientia," "Health," "Lucia," "Perseverance, Red Crescent, 1887," "Fontes Sanitatis," "Glevum," "New Moon" (device), "Patientia Vincit," "Axiom," "Dum Spiro Spero," "Dignum Est," "Aqua Pura," "Practical Experience," "Veni, Vidi, Vici," "A Native's Notion," "Aqua," "Be-clever," "Health," "Truth," "Scale," "Economy," "Utility," "Latin Cross" (device), "Bon," "Polo" (in circle), "Forward G.," "Dum Spiro Spero," "Au Bon Droit," "Unitas," "£6,000," "Corridors," "Fides Invicta Triumphat," "Faith," "Neptune," "In Great Haste," "± Experience, 1887 ±," "Lavo," "Alga," "No," and "Spica." Two other plans were received too late. We understand that the committee have rejected forty of the plans, reserving the other twenty for further consideration.

Swinton.—The design of Mr. F. H. Oldham, F.R.I.B.A., of 23, John Dalton-street, Manchester, has been selected in open competition for the intended public baths for Swinton and Pendlebury Local Board district.

Major-General C. Phipps Carey held an inquiry at Redcar on the 6th inst., in response to an application from the local board to borrow £1,500 for laying out pleasure gardens. Mr. James Howcroft, their surveyor, presented the plans which he had prepared, and explained the mode of carrying out the proposed work.

Engineering Notes.

Association of Municipal and Sanitary Engineers.—This Association, which has now a membership of about 350, held its fourth examination for certificates in the Town Hall, Manchester, on Friday and Saturday, when ten candidates entered. The Examiners were Mr. Cordon, M.I.C.E., Leicester borough engineer, president of the Association, who examined in sanitary science; Mr. Laws, M.I.C.E., Newcastle-on-Tyne city engineer, who examined in building construction; Mr. Ellice Clark, M.I.C.E., London, county surveyor, Sussex (West), who examined in engineering as applied to municipal work; and Mr. H. P. Boulnois, M.I.C.E., borough engineer, Portsmouth, who examined in public health law. Mr. T. Cole, Westminster, the secretary of the Association, was also present at the examination. These examinations are held twice a year, the first always taking place in London in April, and the second, which is fixed for October, it is intended to hold in different centres in the country to meet the convenience of local candidates.

Lynmouth. — The favourite little North Devon seaside resort, Lynmouth, was, on the 27th ult., the scene of a very interesting ceremony—viz., the opening of the first section of an esplanade, which is a portion of an important scheme for the improvement of this resort. The scheme is the construction of an extensive promenade running from the old tower on the quay to Riddiball, a point on the other side of the bay, and from this point it is intended to construct a pier. A lift for conveying people from Lynmouth to Lynton is proposed to be constructed, which will be a counter-balance one worked by water-power. The wall protecting the walk from the sea is 7ft. at the base and 4ft. at the top, and in some places is 27ft. deep, with counter-forts, and is built with local stone. There is a footpath 12ft. wide, and a roadway 30ft. wide. Outside the wall the local board contemplate constructing a bathing place. The contractors are Messrs. Jones Brothers, of Lynton, and the engineers Messrs. Davison and Davison, of Windsor.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Glasgow Architectural Association.—At the last meeting of this body a paper was read by Mr. Henry Baldie on "Scottish Domestic Architecture." He excluded from notice the important and better known examples described and illustrated in various books, confining attention to the more ordinary type of dwelling-house prevalent during the latter part of the 16th and two succeeding centuries. Of these the best existing specimens were, he said, to be met with in Edinburgh, though there were several good examples of the later periods in Stirling, and, scarcer still, in Glasgow. A collection of some of the most characteristic features of Scottish work was shown by drawings—crowsteps, scrolled terminations of gables, dormer windows, plaster ceilings, rain-water pipe heads, and wood wall-linings of rooms. Of each there was a marked variety of treatment in different localities, for Glasgow possessed a form of roof found, he believed, nowhere else; while the old piazzas were noted by visitors as peculiar to that city.

New premises have just been erected on the site of Nos. 104 and 105, Bishopsgate-street Within, for Messrs. Moore and Moore. They are Italian in type, and are faced with red bricks, red Mansfield stone being used for dressings. Messrs. Chatfeild Clarke and Son, of Bishopsgate, were the architects, and Mr. B. Nightingale the builder. The hydraulic lift was constructed by Messrs. Archibald Smith and Stevens. The lighting was by the Wenham Light, and the floors have been laid with terrazzo marble by Messrs. Burke and Co., of Newman-street.

At a meeting of the Royton Local Board the plans prepared by Mr. R. Vawser, C.E., Manchester, for the main drainage of the district and the purification of the sewage thereof, at an estimated cost of about £27,000, were unanimously adopted, and the clerk was directed to submit the same to the Local Government Board for their approval.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Correspondence.

BIRTLEY CHURCH.

To the Editor of the Building News.

Sir,—In last week's "B. N."—"Wayside Notes"—I see that I am requested to give some dimensions of Birtley Church, Northumberland, for the restoration of which I was architect. The inside dimensions of the chancel are 16ft. 3in. by 14ft. 6in., and of the nave 44ft. by 18ft. 3in. The height of the springing of the chancel arch from the present nave aisle floor level is 7ft. 6in., and to the crown of the arch 10ft. 10in.; the width is 6ft. 8in.; the walls are 3ft. 3in. thick. Any further information may be obtained from a work to be published by the vicar, the Rev. G. Rome Hall, F.S.A., upon "Birtley Church and Parish, Northumberland."—I am, &c., Arthur B. Plummer.

46, Cloth Market, Newmarket-on-Tyne,
Oct. 8.

A PROVIDENT FUND FOR ARCHITECTS' ASSISTANTS.

Sir,—It is natural to suppose that architects' assistants occasionally fall ill. They are not, as a rule, rich men, and yet they have no fund at their disposal to tide them over a period of sickness. Why are they so improvident? Surely it would not be a difficult matter to start such a fund. Other men see the necessity of it: Why do they not? At first it would be but a simple affair, yet in time it might become a big undertaking—possibly a home in the country, to which sick assistants could retire to recuperate their health. This is merely a suggestion. Will not one of the organised bodies of the profession

move in the matter? It would be a popular step, and they would earn the gratitude of many a poor assistant.—I am, &c.,

PROVIDENT.

PLAGIARISM.

SIR,—Though rather late in the day, may I be permitted to call your attention to the fact that the paper on "Architectural Draughtsmanship," signed by Mr. Chas. T. Taylor, and published in your issue of the 15th of July, almost entirely consists of extracts from my little book on the same subject, which, you will remember, was reviewed at some length in your columns at the time of publication?—I am, &c., G. W. TUXFORD HALLATT.

15, York Buildings, Adelphi, W.C.

DRAIN TRAPS.

SIR,—I see in your issue for this week, in the Correspondence column, a letter from "Clerk of Works" respecting an accessible drain trap, accompanied by illustration. Your correspondent must be in error as to the time the traps have been in use at the place he refers to, as it was patented by me in 1878, and is manufactured by Ingham and Sons, Wortley, near Leeds. The opening at the bottom of the trap taken vertically is about 4in., and the dip, or water seal, about 2in. The loose lid, or cover, at back of trap is luted with clay, and gives access for cleansing purposes. They are provided with a 6in. vertical opening and socket end for a ventilating pipe, which can be taken to surface of ground or carried up the wall side to any required level.—I am, &c.,

WM. BROWN, Architect.

Clifford-street, York, Oct. 8.

THE WEST OF SCOTLAND SANITARY ASSOCIATION ON HOUSE DRAINAGE.

SIR,—Mr. Paul Rottenburg, of Messrs. Leister, Bock, and Co., Glasgow, has left me to call attention to the following, believing it to be of public interest:—

In 1881 I was engaged by Mr. Rottenburg to improve the drainage of his house, "Holmhurst," in the suburbs of Glasgow. The work was done on the sectional system, a disconnecting trap being placed on the main drain between the house and the sewer, and all the branch pipes—rain, soil, and waste—delivering into said main drain, were again trapped off it and ventilated separately, so that neither sewer nor drain air could get access to or up any of the rain, soil, or waste pipes. To ventilate the drain a special 4in. iron blow-off pipe was put up outside to above roof of the house with a fixed exhaust ventilator on its top, the fresh-air inlet being near the manhole of the main disconnecting trap.

This system has been working well enough since, just as it is doing in hundreds of other gentlemen's houses and mansions throughout the country.

A few weeks ago Mr. Rottenburg got the West of Scotland Sanitary Association to inspect the drainage of his house, and after getting the report he asked me to meet him and the Association's engineer at his office about it. I went and met them, when Mr. Rottenburg read over the report, and asked specially what I had to say in regard to the following words in it:—

"Several desirable improvements might be made on the system, due to the advancement of sanitary knowledge, such as the removal of the traps presently at the base of the soil-pipe and at the servants' closet. It is now generally acknowledged that no traps should intervene between the trap on the main outlet and the soil-piping."

To this I replied to the effect that I considered the proposed alteration would be the exact opposite of an improvement and a pure waste of money. It would be equivalent to taking out the watertight divisions in a ship and asserting it was thereby made safer. And as to the "generally acknowledged" assertion, that, in my opinion, was a falsehood, as both Mr. S. S. Hellyer, of London, and myself practised, and in our textbooks advocated, the use of traps at the foot of soil-pipes where practicable, and many architects carry out first-class drainage work in this style.

The engineer then said—"Surely you will allow that, as the soil-pipe is already dirty, it is the natural ventilator for the drain?"

I could not admit this, more especially not in this case, as the drain had a special blow-off pipe for itself outside of the house, while the soil-pipes here were inside of the house, and each had enough to do with its own smell, &c., without having smells and disease germs from the drain sent up or through them.

The upshot was that Mr. Rottenburg declines to make the suggested alterations until it can be shown that, allowing the air of the drain to go up the soil-pipe inside, his house would be better than making it go up the special pipe outside of it.

He also asks, Who is the highest authority to settle this?

In reply to this, I would observe that the matter is a question of sanitary plumbing, and should be decided by a specialist or specialists. Desirous of educating the public in sanitary plumbing, the National Health Society, London, got up some lectures at the Society of Arts room on the subject some years ago, and the gentleman appointed to give these lectures was Mr. S. S. Hellyer, a practical master plumber in London, and in his lectures and elsewhere he advocates the trapping of soil-pipes at foot to lock off the drain air from them.

The reason for this is to prevent one soil-pipe which may have disease germs in it from contaminating the other soil-pipes, and so that when disease breaks out in a house it can be the more easily isolated. This is all the more necessary now when so many of the water-closets are made wholly of earthenware, and so liable to be broken at any moment and pollute the whole atmosphere of the house with foul air from the main drain if the soil-pipe is not trapped off at its foot.

If those parties who have their water-closet soil-pipes ventilating the drains understood this properly, I believe many of them who can afford it would have them altered as soon as possible. This is a case where prevention is better than cure.

In the article on "Sewerage," in the new edition of the "Encyclopædia Britannica," by Professor Ewing, the author illustrates the water-closet soil-pipe trapped at foot, and says:—"The form of disconnecting trap shown in Fig. 6 is that of Mr. W. P. Buchan, of Glasgow, who has done excellent service to the cause of sanitary reform by practising and advocating the disconnection and ventilation of house drains and soil-pipes."

Now, if the disconnection of the soil-pipe is really excellent sanitary work, the public or, at all events, the members of sanitary associations are entitled to pause before they alter this in the face of such men as Mr. Hellyer and Professor Ewing, merely at the dictum of a young and unknown sanitarian, even although he should hold the post of engineer, or "assistant engineer" to a sanitary association.

One effect of removing the traps from the foot of the soil-pipes would be to enable them to be the more easily tested—viz., by the same application of the smoke test (which test, by the way, now so universal, was not invented by any of these associations or their engineers, but by the writer hereof) which is applied to the drain; but although that may save time and trouble to the "engineer" in testing, it is the opposite of extra safety for the house.

If it be that the fee charged from the members is too small to allow time for properly testing houses fitted with a series of traps, then, in my opinion, it would be more in the public interest to raise the fee rather than condemn first-class work, and put the members to the expense of turning it into second-rate for some sanitary *plumber* to afterwards improve.—I am, &c., W. P. BUCHAN.

21, Renfrew-street, Glasgow, Oct. 10.

The improvement committee of the Newcastle-on-Tyne Corporation having declined to pass a plan by Mr. Stockwell, architect, for the erection of house property in flats on Rye Hill, have received a letter from Messrs. Hodge, Westmacott, and Robsons, solicitors, threatening to apply for a mandamus to compel the corporation to pass the plan. The town clerk has been instructed to make the necessary appearance in defence, so as to test the powers of the corporation in reference to the passing of property plans.

The town council of Dewsbury have raised the salary of Mr. H. Townsend, their gas and water manager, from £250 to £300 per annum.

Intercommunication.

QUESTIONS.

[9423.]—**Expansion of Portland Cement Concrete.**—We have authorities for the expansion of many solids by heat—e.g., Hurst says that ordinary brick makes a linear expansion from 32° to 212° of one part in 1818 and Roman cement of one part in 697. Could any of your readers give me trustworthy data of the expansion of Portland cement concrete due to increase of temperature, giving at the same time the composition of the concrete?—R.

[9424.]—**Gable Ends.**—A. is the owner of a freehold piece of land, and has built some cottages thereon. He has left two gable end walls 9in. thick. He was compelled by the building by-laws to have 9in. walls between the houses, and to leave 9in. gables, as there was no building on that side of the street previous to A.'s. B. has purchased a piece of freehold land adjoining one of A.'s gable ends, and has built some property, but has only put up a 4½in. wall against A.'s 9in. The local authority waive their building by-law when a 9in. wall is up, and another person adjoins by only putting a 4½in., as the thickness of the wall between A. and B.'s property is actually more than required by them. B. has not tied into A.'s wall, and has put his 4½in. wall on his own land, but close up to A.'s wall. By reason of A. having been the first to build, B. saves a 4½in. wall. Can any of your readers say if A. has a claim for compensation against B.? If A.'s wall had not been built, then B. would have had to build a wall 9in. thick to satisfy the local authority. Please quote cases on the point, if any.—ENQUIRER.

[9425.]—**Cement Concrete Footpaths.**—Some footpaths were laid to the following specification:—On a foundation of broken bricks and stones 6in. thick was laid cement concrete 2in. thick, consisting of 2½ parts of crushed bricks to 1 part of Portland cement, except the surface, which consisted of 2 parts of crushed granite to 1 of cement. The surface portion was ¾in. thick, and laid at same time as the lower portion, so that the whole should set solidly together. The cement was used cool. These footpaths have failed owing to the substratum done with crushed bricks having expanded and disintegrated, cracking up the granite surface, which has otherwise remained sound and good. Some blocks made by a neighbouring builder with the same crushed bricks, but different cement, have also failed by bursting and cracking in all directions. All this appears to point to something deleterious existing in the crushed brick. A sample of the latter was washed, and the effluent water roughly analysed and found to contain sulphur, manganese, and cobalt or nickel. Can any correspondent say whether these matters are deleterious, or suggest the cause of what has happened?—CASTRUM.

[9426.]—**Arch in Lincoln Cathedral.**—In Britton's description of this cathedral, he refers to Ware's work on "Vaults and Bridges." On referring to this work of the date 1822, he says: "It is impossible here not to call to recollection of the enlightened antiquary that unknown wonderful arch, above the vaulting and between the towers of Lincoln Cathedral. . . . The horizontal extrados of the arch between the towers of Lincoln Cathedral is 28ft. in length, 11in. thick in the middle, 20in. thick at one extremity, and 28in. at the other. The extrados is about 15in. wide. It resembles a wooden beam rather than a stone arch composed of voussoirs." In Plate 9 of this work he gives a transverse section of the cathedral, showing the groining and roof-timbers, and at top of plate a diagram at larger scale showing the arch. Perhaps some of your numerous readers might give some information about it, or possibly a sketch showing its position above the groining. I visited the cathedral a few years ago, but was not then aware of this arch.—BELFASTIENSIS.

[9427.]—**Cheap Public Baths.**—In your Correspondence Column a few weeks ago I observed an inquiry as to cheap public baths, but so far as I saw, it elicited no reply. I am personally interested in this subject, but have had no experience of this special subject, and shall be glad of any hints, or to be referred to any work on the subject.—ENQUIRER.

[9428.]—**Architect's Sector.**—Would any of the readers of your valued journal enlighten an inquirer as to the use of the lines and figures on an ordinary architect's sector?—DANNIE.

[9429.]—**Building Estates.**—Will any of your readers be kind enough to state what are the usual surveyor's charges for managing building estates—viz., staking out the building plots, making plans for conveyance, making plans for estate, also writing out and computing valuation of the property for the trustees of the estate?—SET SQUARE.

[9430.]—**St. Alban's Abbey—The High Altar Screen.**—In "Notes and Queries" column of the *Herts Advertiser and St. Alban's Times* (Oct. 8th) occurs the following:—"HIGH ALTAR SCREEN IN ST. ALBAN'S CATHEDRAL.—In 'Observations on the Abbey Church of St. Alban,' published by the Society of Antiquaries in 1810, and illustrated by Carter, there occurs a large measured drawing of this screen. It is noticeable, however, that he draws the thirteen niches, immediately over the altar, each one precisely the same size as its fellows; although, as a matter of actual fact, the central one is considerably wider than the other twelve. Nash's drawing of the same screen, published by Nichols, Son, and Bentley, 1815, is still more inaccurate, for he omits the central niche and shows a row of twelve only. But the strangest thing of all is that in the expensive and otherwise exhaustive volume published in 1877, by James Neale, F.S.A., Associate of the Royal Institute of British Architects, and entitled 'The Abbey Church of St. Alban,' the sixty sheets of illustrations do not embrace among them a single reference to this screen. This extraordinary omission has been frequently commented upon, but never explained. Can any reader give a reason for this oversight?—AMPHIBALUS" Does any correct illustration of this screen exist? If so, where can it be found?—SCULPTOR.

[9431.]—**Water Stains in Mezzotints.**—Can any reader inform me how water stains can be removed from old mezzotinto without injury to the prints?—COLLECTOR.

[9432.]—**Black Stains in Varnished Stained Deal.**—I put a dado in deal, stained light, and varnished, in a billiard-room about three years since, and recently some black stains have appeared on the wood. Could any reader explain the cause? It is well ventilated at back.—H. H.

REPLIES.

[9411.]—**Flue Linings or Tubes of Glazed Fireclay.**—As to their liability to crack, I have spoken to a foreman of some experience in building, and he said salt-glazed pipes are given to splitting when used for flue linings, or subjected to much heat or pressure. I have also seen a pipe-maker of long standing, who said that, although the glazing is done at a time when the heat in the kiln is most intense, yet in cooling down the glaze contracted, and would not allow for expansion on the pipes being reheated; but that unglazed tubes were not subject to this defect. I have used glazed socketed fireclay pipes for flue linings for houses during the last ten years without a single complaint, and I have recently had some 12in. ones fixed to a smithy fire, where they are exposed to view for some 15ft. at the lower end, and as yet there is no sign of cracking, although they are subject to sudden heating and cooling.—Tolop.

[9418.]—**Ventilating Small Room.**—J. Marshall should carry a 4in. dia. pipe from ceiling of sitting-room to the roof, and fix thereon a small Boyle's air pump or other ventilator. For admission of air, a vertical tube fixed in a corner of the room is the best and simplest arrangement.—J. C.

[9419.]—**Waterworks.**—I have invented and patented an electro-mechanical apparatus for indicating the rise and fall of water in reservoirs at any distance from the point of observation, and if the inquirer will put himself into communication with me I shall have much pleasure in furnishing him with all the information on the matter, as well as probable cost. In answer to his second inquiry, I may say that the pressure is the same, whether the sluice valves are partially or fully opened.—George Jennings, Palace Wharf, Stangate, S.W.

CHIPS.

The new church, organ chamber, and vestries just added to St. Michael's Church, Stone, were consecrated last week by the Bishop of Lichfield. The additions are the gift of Lady Forrester, in memory of her nephew, Viscount St. Vincent; the style adopted is Late Perpendicular, carried out in Westwood stone. The floor has been laid with tiles by the Campbell Tile Co. The contractor for the general works was Mr. N. Barlow, of Stoke, and the architects were Messrs. R. Scrivener and Sons, of Hanley.

A new reredos has been erected at Binstead church, Hampshire. The work is in Bath stone, and has been erected by Messrs. J. and T. Ellery, of Ryde. A new pavement has also been laid inside the altar rails of the same church.

A new Wesleyan chapel at Hollingbourne, Kent, was formally opened last week. The chapel affords accommodation for 200 persons, and is built of Kentish rag stone, the interior woodwork being of plain deal wood. The total cost was £620, including the site. The architects were Messrs. Ruck, Son, and Smith, and the builder Mr. J. C. West, of Maidstone.

Amongst the recent evidences of the progress and development of Peterborough are the completion of the new church of All Saints', in Park-road, designed by Mr. Temple Moore, of Hampstead, which will be opened on November 1, and a large steel factory erected for the G. N. R. Company at a cost of £4,000. There is also in prospect a G. E. R. station, and the Co-operative Society have decided to expend £7,500 on a new set of buildings in Houghton-street.

Operations will be commenced next week in building the Jubilee Hospital at Gateshead-on-Tyne. The architect is Mr. W. H. Dunn, of Newcastle, and the tender of Messrs. Haswell and Waugh has been accepted at £2,056 for the erection of the building, the site of which is a plot of two acres on Shipcote Farm.

A new Roman Catholic school is being erected in Portugal-street, South Side, Glasgow, in connection with St. John's Chapel. Designed by Messrs. Pugin, London, the building is estimated to cost £4,000, exclusive of furnishings.

The Lord Mayor will formally open the new park at Kilburn, which the Ecclesiastical Commissioners have conveyed to the corporation to be maintained by them in perpetuity, for the use and recreation of the public, on the afternoon of Saturday in next week, the 22nd inst.

New police barracks have just been erected at Andersonstown, near Belfast, for the accommodation of 20 men. Messrs. Young and Mackenzie, of that city, were the architects, and Mr. Keith was the contractor.

At the Middlesex Sessions on Thursday in last week, Jabez Reynolds, master builder, residing in Cambridge-road, Kilburn, who was indicted for a malicious assault on a boy named Moore, was found guilty of a common assault only, and was ordered by Mr. Edlin, the assistant judge, to pay the lad £10 as compensation.

Our Office Table.

Mr. John Robinson Botham, F.R.I.B.A., formerly well known as a Birmingham architect, died on Tuesday, the 4th inst., at Mount Pleasant, Lichfield, in the 76th year of his age. For some years past Mr. Botham had retired from practice, and removed from his residence at Erdington to Lichfield. Mr. Botham will be remembered best as the original designer of the Mason Orphanage at Erdington. He was also the architect of the Presbyterian Church in Broad-street, Birmingham, and was for many years largely engaged in private work in that town. Mr. Botham belonged to the old class of life members of the Royal Institute of British Architects, of which he had been a Fellow for a quarter of a century. He was not, however, in any sense a public man; his life was wholly spent in the practice of his art and in the society of a few friends who knew how to value the sterling qualities of his mind and heart.

The Kyrle Society is promoting a systematic effort to preserve the lanes and field-paths which still exists in the suburbs of London, especially such as form a means of access to commons, village greens, public parks, and other open spaces. The committee point out that the open spaces preserved for London will be shorn of much of their value if they are approached only through miles of close-built streets or dusty roads. While it is admittedly impossible to preserve intact the country in the town, something might be done to maintain green ways from point to point, and, especially, as approaches to the larger open spaces, if public opinion be aroused on the subject and timely steps be taken. There are still pleasant by-ways, partly lane and partly field-path, in the near suburbs; and further afield the number increases indefinitely. The aim of the Kyrle Society is to convert such ways, as opportunity serves, into broad strips of green sward planted with trees and traversed, where necessary, by gravelled paths. Where it is not possible to preserve grass avenues, negotiations with the landowner and builder might, in some cases at least, result in the formation of a boulevard with lines of trees and walking and riding ways, in addition to the carriage road—such avenues as are by no means rare in Paris or Brussels, but which are not at present to be found anywhere in London. In order to give practical form to their suggestions, the committee are sending out a form asking for particulars as to all lanes and field-paths in the Metropolitan suburbs, and asking that all information may be sent to the Hon. Secretary, Mr. F. J. Drysdust, 14, Nottingham-place, W.

Dr. Alfred Carpenter complains that the state of the river Cam within Cambridge grows worse every year, and that it is gradually being more largely used as a common sewer for the borough. He warns the authorities that a catastrophe will be the inevitable consequence unless they do their duty at an early date. As he cannot think that a University which is doing more to promote sanitary science than all the other examining bodies in the United Kingdom put together, by its liberal policy in granting diplomas in public health to all medical practitioners qualified to obtain them, can be blind to the dangers which threaten the frequenters of the banks and surface of the river within the jurisdiction of the Cambridge authorities, Dr. Carpenter concludes, therefore, that there is some local cause for the continuance of the nuisance which the University is unable to remove, and that the impediment to the purification of the Cam rests with the sanitary authority. He therefore urges that all sewage should be kept out of the river and applied to the land as near to the outfall as possible. Dr. Carpenter's appeal deserves, and indeed demands, the early attention of the Cambridge town council.

It is astonishing how contented people are to go on living in daily danger of serious accident from imperfect and obsolete household appliances. Last week, for instance, the Earl of Enniskillen met with a painful accident at Florence Court Castle. His lordship was in the act of lowering a metal skylight in the bath-room, when it fell and almost cut off the fourth finger of his left hand, the bone being completely shattered. A portion of the finger was amputated, and the Earl is now making favourable progress. Now, such a catastrophe would have been impossible with a proper appliance—such, for instance, as Verity's patent skylight lifter, with which most readers are familiar, and which, we notice, has just gained the highest award at the Adelaide Exhibition. Such matters should really receive more careful attention at the hands of architects when specifying for new buildings.

LEGAL INTELLIGENCE.

Alleged Misappropriation of Building Fees.—Cecil Richardson, 36, accountant, of 61, Mark-street, West Ham, was charged on a warrant before Mr. Partridge, at Westminster Police-court, with embezzling the moneys of his employers, the Vestry of St. George, Hanover-square. It was alleged that the prisoner, employed as ledger clerk and accountant at the Vestry Offices, had been in the habit of misappropriating fees which he received from builders requiring licenses for hoardings and the erection of buildings. It was said that proof would be given that prisoner entered very much smaller amounts than those paid to him. For instance, he received £2, and in his account put down 10s. Prisoner was remanded.

STAINED GLASS.

Leeds.—A stained-glass window has been presented to the Classical church of the Holy Trinity, Leeds, in memory of some teachers in the Sunday-school. It was subscribed for chiefly by the school children. Messrs. Powell Bros., of Leeds, were the artists.

Wakefield.—The west window of St. Mary's Church, Wakefield, has been filled with stained glass by way of memorial to the late Misses Scott. Moses, David, Elijah, and Isaiah occupy the chief lights, together with suitable canopies and other ornamentations; and the tracery lights contain the patron Saint St. Mary the Virgin and Angels. The work is in the style of the 15th century, and is from the studio of Messrs. Powell Brothers, of Leeds.

WATER SUPPLY AND SANITARY MATTERS.

Leamington.—In order to economise the use of the water pumped from the deep wells in Campion-terrace, the town council, some months ago, decided to pump water from the River Leam for street watering. For this purpose new mains have been laid through the greater portion of the town, reaching as far as Beauchamp-avenue, Ranelagh-terrace, Lansdowne-street, and Portland-street, respectively. The pumping engine is placed in the boiler-house at the pump rooms, and is capable of delivering 500,000 gallons of water per day in the highest part of the town, equivalent to filling 4 vans at one time In lieu of a storage tower, an automatic cut-off gear has been schemed to meet the requirements of an intermittant demand. The pumping engine has been made by Messrs. J. Evans and Son, of Wolverhampton. The quantity of well water saved by this scheme will, in dry weather, fall little short of 100,000 gallons; whilst when the two neighbouring parishes water their streets from the same source, as they intend to do, the daily saving will be increased by some 20,000 gallons.

The topmost stone of the Glasgow Municipal Buildings, the apex of the tower, was laid on Friday, the fourth anniversary of the laying of the foundation-stone. The tower is 220ft. in height. The internal arrangements are now in a condition which will enable operations to be carried on without interruption throughout the winter. The stone stairs are being built throughout the structure, the ornamental ceilings are being fixed up, and the plasterwork is in a forward condition, while a large part of the woodwork has been manufactured for the principal rooms. Mr. William Young, it will be remembered, is the architect; and the contractors are Messrs. Morrison and Mason.

The opening of the "George Williams" Young Men's Christian Association Memorial Hall, which has been erected in Bridgwater at a cost of nearly £4,000, provided by subscriptions from various parts of the country, took place on Friday. The style is Classic, freely treated. Messrs. Habershon and Fawckner, of Bloomsbury and Newport, Mon., were the architects; and Mr. W. H. Pollard, of Bridgwater, was the builder.

The partnership between A. and F. Culverhouse, of Purfleet, Camden Town, and Hampstead, contractors and brickmakers, has been dissolved.

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ARCHITECTURAL LECTURING.

A FEW years ago the architectural lecture consisted mainly of theories and critical disquisitions on style and buildings. The subjects were often chosen with a view of instructing the student upon the development of style or of some particular phase of architecture, and amongst them the admirable lectures delivered by the late Prof. Cockerell and Sir G. Gilbert Scott respectively on Classical and Mediæval Architecture must be mentioned as model compositions in their way. The lecturers were learned in their respective branches, and were bent upon showing what architecture was, and how its study and spirit could be best undertaken and acquired. The burden of these discourses was to point to the past, to some particular style, and to tell the student to go back to study it deeply, and imbibe its spirit. We seem now to be turning away from this view of art, and to have entered upon a transitional stage of study, as unlike the old as our requirements are different. The burden of the recent lectures and addresses to architectural students is educational—how to train and fit the student for his profession. From the past and its ideals, professors and teachers are turning to the present, and are beginning to examine their ground, and to inquire how the English architect stands amongst the profession in other countries and those surrounding him at home.

One decided gain in this new stage of self-examination and inquiry is the broadening of the architect's ground. For a long time he has been satisfied to become a kind of recluse to the world, its science, and opinions. He was satisfied with getting a reputation as an artist, an ecclesiologist, or an antiquary. His researches into Greek art and architecture went a long way, he thought, to obtain him recognition; or his inquiries into such recondite subjects as church orientation and symbolism, or into polychromy, or precedents as to the position of the pulpit and prayer-desk in old churches. A passport to the architect of the last generation was the authorship of a work on old examples, specimens of the architecture of Rome, of Ravenna, or of some French district. Now it is far otherwise. Illustrations of old work are almost overdone, and photography has rendered the labour less necessary than it was. The novelty and interest of sketching a cathedral have gone, at least from this point of view—it has been done so many times. So the architect has fallen back upon other resources; he has, in fact, been compelled to do so. His former narrow view of the world and things outside his art has been opening by the force of circumstances. "Art is long, life is short"; all at once he begins to discover that he must know something besides his art if he desires patronage. Society—by that complex term we mean the occupations and amusements of men and women; music and the drama, doctrinal and scientific controversies, hunting, shooting, riding, country sports, and a host of other games and vocations—must be studied and watched closely by him if he wishes to obtain a good or lucrative *clientèle*. This widening view of his business has been the result of the various influences of society reacting upon it. Besides society, he must know men and manners of every grade, or he cannot possibly design with knowledge; or become successful as an architect. Each class of building requires some information beyond the immediate knowledge of the architect and builder. The usages of society, the way people of different positions live, the requirements of the wealthy, and individual accomplishments have to be regarded in every plan for a residence. Schools and colleges, laboratories, rooms for science and art teaching, museums, hospitals, amongst various buildings, call to the task of the designer a large and miscellaneous variety of knowledge, which would have fairly been thought superfluous fifty years ago. This view is being taken up by professors of architecture. Prof. T. Roger Smith, in his useful introductory lecture to the architectural classes at University College, expressly spoke of the architect being expected to know "men and affairs" as well as building and art. There are few professions which call for more contact with other men than the architect, and yet experience has shown that a very few of those who enter the business are equipped or trained for such contact, and the explanation is that draughtsmanship, pure and simple, has absorbed all the attention and powers of the student. Or he is absorbed in art, and has no desire for anything beyond, particularly anything so distasteful as business. A few years ago preparation for professional practice was not thought of; each pupil in an office was supposed to pick up enough in his five-year term of apprenticeship to fit him for after life. The specification and estimate were looked upon as drudgeries; but of late architectural instructors have given particular attention to these branches of an architect's instruction.

Everywhere we find the lecturer telling the student to equip himself by study, though the condition of those who enter the profession upon the old lines has rendered him very far from being studiously inclined. The architect's pupil, taking him all round, is unfortunately not addicted to reading or much mental effort. We know many young men who take the professional journals simply to obtain examples of buildings, but who seldom read the columns or take any interest in the literary and scientific questions of the day. They must unquestionably take inferior places, for they are not seeking to be men of general information and culture, or preparing themselves for the examinations of the Institute and other bodies. We cannot be surprised at the difficulty experienced by the Architectural Association, which has been doing such good educational work in the past, in trying to create a studious habit amongst the students attending the classes. Various expedients are being put forward to endeavour to enlist their attention. The experience of teachers has shown, however, the futility of attempting to promote an intellectual aptitude where the mind is not favourably disposed. Hitherto, the chief ambition of the young architect has been to compete for the Soane Medallion or the Pugin Travelling Studentship, and it is the feat of draughtsmanship that has been the one aim. A very different ideal is now being put before him by the modern instructor. Draughtmanship *per se* is being placed in a secondary and subordinate place; the student has now to show that he is a master of his art in a literary and scientific sense, that he can design, understands something of the technical or workshop knowledge of the building trades, can write specifications and prepare quantities. With much natural distaste for reading, the young candidate for the profession has to study books he would never otherwise open; he has to renew his acquaintance with mathematics, languages, and history. France and Germany have been a long way ahead of us in the theoretical and literary knowledge of art. Their researches and treatises on the history of architecture are more numerous and superior to our own, which have been confined chiefly to works of delineation. All this effort to restore the position of the profession amongst others has been mainly due to external pressure. The public who employ the architect look to him for advanced ideas and knowledge of facts; if he does not bring science to bear on the plan and construction of a building, the engineer will in time take his place. If he fails in art knowledge he suffers the contemptuous smile of the amateur, who to-day is often better informed and read than himself.

We see, too, that a prominence is given to technical courses of instruction. The programme of the Architectural Association for the ensuing session contains two or three papers on practical questions, such as Hydraulics for Architects, by Professor Cawthorne Unwin; the Use and Abuse of Materials, by Somers Clarke, F.S.A.; and the classes are even more significant of the change in the studies of the young architect. The subjects comprise construction, graphic statics, quantities, surveying, design, and colour decoration. The provincial societies—the Manchester Association, for instance—have also awakened out of the dilettantism which a few years ago they indulged in. Practical questions of an uncompromising kind, relating to materials and construction and sanitary matters, are being threshed out with an earnestness and thoroughness which would have surprised the student of the profession thirty years ago. America, with its colleges of architecture and technical schools, is close on our heels, and the English practitioner is obliged to advance if he does not wish to be overtaken. Materials and inventions have received a great impulse in America, and the study of the utilitarian branches have produced a healthful reaction from the archæological torpor which once fell upon the States of the West.

ALTERATIONS IN OXFORD-STREET AND LINCOLN'S INN-FIELDS.

AN awkward and bewildering convergence of streets is to be met with in Oxford-street at the intersection made by the Shaftesbury-avenue with that thoroughfare. The new avenue cuts obliquely across Bloomsbury-street, entering Oxford-street at a sharp angle. Close to this junction we have Museum-street, Hart-street, and Duke-street. Yet not one of these cross streets has helped to open the very secluded precincts of the British Museum, which is still cut off from the main thoroughfare. So spacious and important an edifice might have been easily approached if the avenue had been planned on rather different lines. Museum-street is narrow and dingy, though not without its associations. But we are rather concerned with the awkward junction of the avenue with Oxford-street, and the effect of this centre of traffic. One result of the change has been to bring the front of Broad-street Baptist Chapel, with its flanking towers and low spires, into view from Hart-street and High Holborn. But this view is more than spoilt by the jutting out of the block of buildings cut off by the new embouchure and the very awkward angles made, which might have been obviated if, instead of the detour to the right, the avenue had been turned into Bloomsbury-street, and had terminated at the Broad-street end. We do not say that this would have given the continued line with Hart-street that was kept in view in the laying out of Shaftesbury-avenue; but it would at all events have spared the demolition of several properties, and have avoided the very clumsy arrangement that it now presents in Oxford-street, and without any practical gain. The acute angles made by Hart-street with Oxford-street on one side and the avenue with the latter on the other are very disagreeable to the eye, and more

objectionable for traffic. In fact, as a business centre, the arrangement of streets at this point is extremely unfortunate, and many dangerous and awkward crossings are formed. The whole of the triangular space inclosed by Bloomsbury-street on the west, the avenue on the East, and Oxford-street on the north, ought to have been cleared and laid out, and the frontages ought to have been rearranged. But any suggestions on these points appear to be too late. Architecturally there is yet nothing done to redeem the awkwardness of the new approach from Piccadilly Circus. A much more sweeping and useful thoroughfare would have been to have carried it through Seven Dials across Drury-lane into Great Queen-street, which could have been widened at its eastern end into Lincoln's Inn-fields, thus skirting the Fields on its north side, and entering Holborn at the junction of Gray's Inn-road. Anyone who cares to trace this line upon a map will see that it would open up a now very closed neighbourhood, and would give a better approach to Lincoln's Inn-fields. That inclosure suffers from the same inconvenience of want of access which the British Museum has done; in fact, it is worse, for, as we have before hinted, there is no good access into it either from Holborn or from the Strand. One result from this seclusion has been that Lincoln's Inn-fields has been hopelessly left out of sight. The one redeeming feature is its quiet and suitability for hotels and lawyers' chambers. It has changed very little its aspect. On the west side of the square is a new very lofty stone building, for offices, of seven stories, which overtops the old adjoining premises, but is certainly no improvement to the architectural character of the locality. On the south side the College of Surgeons is the most important building, and this has been undergoing additions. A new attic has been added above the cornice, increasing the elevation of the façade. We may mention that the original college was designed by G. Dance in 1800; but the present building was remodelled by the late Sir Charles Barry in 1854, when the Ionic portico was added. As many of our readers know, it is a plain Classical structure with a well-proportioned cornice and Ionic prostyle. Mr. S. Salter, the architect, has done much to relieve the former severe plainness of the façade by placing angle pilasters at the ends of front, and by the addition of architraves to all the windows. It may be mentioned that the old front of the building is constructed of concrete blocks, and this has been refaced with cement, and the stone entablature and columns rubbed down. This process of refacing was necessary in order to make the new story harmonise with the old work. The new attic stories consist of new workrooms. The old top floor has been raised, and another floor added, which is appropriated as store rooms, including a photography room and a room for dissecting, lighted by skylights. There is a hydraulic lift at the back provided by R. Waygood and Co. Plans are prepared for further extensions, including a museum at the back towards Portugal-street and an extension of the library on the east side, and these will shortly be undertaken. The contractors are Messrs. Higgs and Hill. When the work is more advanced, we hope to be able to give a description of the new buildings. The old façade possesses a certain historical interest. It is mentioned by the late Mr. Fergusson in his remarks on the Classical revival. Barry found the old façade, with its portico of two stories, a very unprepossessing building, and he gave dignity and unity to the façade by the fine cornicione, which has been retained. The lower story of the new attic above the cornice is pierced by circular apertures, above which are windows. The angle pilasters break forward, and the cornice members are broken round them.

HENLEY-ON-THAMES SEWERAGE.

ON Thursday, Oct. 13th, a larger number of sanitary engineers, medical officers of health, and other officials of sanitary authorities were invited by the Mayor of Henley, Mr. Frederick Ball, to an inspection of the new sewerage works on the hydro-pneumatic system of Mr. Isaac Shone. The works were formally opened in the presence of an important gathering of representatives from other towns, and amongst those we noticed the Mayor and town clerk of Southampton, which town has lately adopted the Shone system with, we are informed, good results. The Henley authorities, like other towns situated in the valley of the Thames, have experienced some difficulty in getting rid of their sewage innocuously and harmlessly, and have been compelled to resort to a system of disposal that will not bring them under the censure of the Conservators of the River Thames.

The natural gradients were not in favour of the ordinary means of sewerage, and it became urgent that the sewage should be expeditiously removed. The sanitary authority availed themselves of the Shone pneumatic system, which is now well known to our readers, and has been successfully adopted in the Houses of Parliament. The system has been at work at Henley since February last, and, as far as we can learn, there is a general opinion that it answers well. The works comprise sewerage pipes of 7in. in diameter from the houses to four underground ejector stations, in each of which are placed two ejectors, one being in use while the other is intended for reserve in case of a breakdown; in addition to which there is an intermediate station where three ejectors are fixed, near the settling tanks and the compound engines, one kept in reserve for compressing the air, which is stored at a pressure of from 30lb. to 40lb. per square inch. The compressor, which is outside the engine-house, is a large tubular receiver, 6ft. in diameter and 27ft. long, and from it the compressed air is conveyed to each injector station by 4in. and 3in. pipes. We may mention that the air-compressing engines and boilers are near the settling tanks, being situated about a mile and a half from the town, at Lambridge Wood, where a large piece of wooded land has been selected and levelled for the purpose of irrigation. The outfall tanks and farm are about 130ft. above the level of the town, and it was necessary to force the sewage to this level. This has been accomplished by a double lift; the rise from the town station to the intermediate station is said to be about 80ft., and from thence to the tanks 50ft., making in all 130ft., but (including friction) the lift is equal to 140ft. The sewers from the streets of the town gravitate into the four pneumatic ejectors, each of which automatically, when full, admits the compressed air, which ejects the sewage at a pressure of 40lb. to the outfall tanks. Each tank holds, we understand, 150 gallons. Visiting the outfall, we inspected the compressing engines, each of 35 horse-power (indicated),, having two single-acting cylinders of 14in. diameter and of 21in. stroke, made by Messrs. Shone and Ault. There are two boilers, one of which is in use. The settling tanks are arranged side by side in three compartments each. When one is full the sewage passes over and under bridges into the second and third, where the sludge settles to be dealt with as solid manure, the effluent passing to the carriers, which distribute it over the land. The effluent was pretty clear, and its smell not at all objectionable. By the Shone system the sewage of 5,000 inhabitants is quickly disposed of before decomposition can take place. We are told that 150,000 gallons a day are dealt with, the ejectors being worked 12 hours per diem. The cost of the works has been £14,770, and we understand nearly £4,000 less than the pumping scheme proposed. Messrs. Ridley, Hughes, and Pratchett are the contractors for the work, which has been carried out under the direction of Mr. Isaac Shone, the engineer, of Westminster Chambers.

If the example at Henley can be taken as an instance of what may be done for towns similarly situated near a river, there is a strong case for adopting similar means of sewage disposal. The Shone hydro-pneumatic system has the merit of forcing out of harm's way, irrespective of natural gradients, the sewage of a whole town before decomposition can ta place, in utilising the sludge, and in making t effluent useful in fertilising sterile soil. Th can be done in easy stages without the gre cost of pumping engines. At Henley 7i drain-pipes jointed in cement have been use the old sewers have been disconnected, and no carry away only the storm water of the tow to the river; thus the expense of large ar costly sewers are avoided, and the separa system of sewerage is carried out. It is for loc authorities to take note of these facts befo committing themselves to costly systems large sewers and reservoirs for storage.

EDUCATION, CULTIVATION, AND EXAMINATION.*

(*Concluded from page* 574.)

IF we have now arrived at some clear under standing of what you require to prepar you for practice, the only questions which it re mains for me to deal with are first, the broa question of how generally you are to obtain it and the narrower one of how much of it yo can get here from me? I am not going t delay you in order at any length to examin any scheme of architectural education not a present in actual force, and within reach. Suc an examination you will find in the reports i the professional papers of the conference o education held in May last. I should, however like to refer, before I pass from the subject, t the programmes of instruction in several of the American Colleges which, through the kind ness of Mr. Cates, have been brought under the notice of many architects. In these programmes a course of scientific instruction is in each case provided, lasting several years, and taking, it is true, history and draughtsmanship; but without enough attempt, so far as I can see, at securing for the student any familiarity with buildings. I trust that if these are seriously examined as precedents, it will be by the help of the light thrown upon them by observations from the pen of Mr. Ware appended to them. The American schemes appear to me too theoretical, not artistic enough, and in other ways not suited as models for an English course of architecture, should such a course come to be established, as is very probable. It will be even less necessary to raise the question of technical education for artisans, which is one of the most important ones of the present day, though the subject before us to-night is, to a great extent, a branch of technical education, for it relates to the education of the architect for the exercise of his art, and time will not serve us to travel outside its limits. I propose to pass at once now to the question of how, with the opportunities that London at present offers, you can be educated for your profession? Even that stage of preparation which the Institute examination marks cannot be reached without *time*. To become a great architect is the labour of half a lifetime. We have, however, had great architects in this country, and have them now; so it is clear that whether our appliances and methods are the very best or not, that at least they can suffice. I once heard one of the greatest of modern water-colourists exclaim before a gathering of artists: "It is not, the water in the brush, but the spirit in the man that makes a painter in water-colours!" This is quite true; and if we take any great architect—say, Sir Charles Barry—it was the spirit in the man that made him what he was; still, the water-colourist does have water in his brush, and Barry reached his eminence by some path. Let us turn to the published memoir of him, and ask what was that path? Pupilage for a long term, travel for a long term, and then continuous effort—first to obtain, and then to carry out, responsible practice—is the answer that we shall obtain. Now, that simple programme will form the outline of the only course at present open to the architectural student of the present day, and I recommend both parts of it to your cordial adoption, not necessarily as the best possible programme—on that I offer no opinion here—but as the best possible in London in the year 1887; and I will endeavour to show how much pupilage and travel themselves can do for you, and what can

* By Prof. T. ROGER SMITH, F.R.I.B.A. A public introductory lecture to the Classes in Architecture at University College, London, delivered on Wednesday night, Oct. 5, 1887.

be done to fill out, add to, and supplement these two cardinal elements. With or without sound preliminary training, let us suppose that the student begins his career as a pupil. The life of Barry tells us that he was articled for and worked out seven years. This is not perhaps too long for a man to work at the drawing board, but it is too long to be in one place. The term now fashionable is three years, which is too short, and I believe that, as a rule, four years is a very useful term, and that then most men had better change, and spend two or three years seeing the practice of other offices as assistants, and, as a rule, as paid assistants. I have not much to suggest to pupils; but I ought to point out that what is really intended to be done for them is not to teach them as they were taught at school, but *to give them a chance*. In consideration of the premium he has paid, a young man who for a long time is more of a hindrance than a help is tolerated in a place where the work would go on better without him, and it is an understood thing that he is to be allowed opportunities of learning if he will use them. This—though it may not sound a very precious privilege—is really of far more value than most young men have the remotest idea of, and the great danger, especially for students who come straight from school and have not had the training in self-culture which college affords is that the opportunities may not be properly made use of. Let me urge on the notice of any pupils who may hear me, half a dozen or so of friendly hints:—first, to consider no trifle beneath their notice; secondly, to recognise that to acquire habits of punctuality, order, the mode of conducting simple affairs, endorsing letters, conveying messages, &c., are all essential to their success in after life as business men; thirdly, to do everything entrusted to them as well as they can, but as far as possible to secure the difficult jobs and pass the easy ones on to someone else; fourthly, to let nothing pass that they do not understand without extorting an explanation from someone; fifthly, to visit the buildings on hand and the builders' workshops whenever there is a chance; lastly, to make sketches and notes of every possible thing, insignificant or otherwise. A pupil who will spend his four years in this practice of this line of conduct will leave the office a good deal nearer being an architect than he entered it. It is, perhaps, right to add that though I may have given what does not seem a very brilliant account of pupilage, and though I am about to show that it must be supplemented somehow, I do not think that what it supplies can be got elsewhere. So practical a pursuit as an architect's business can, I think, only be learnt by taking part in the actual conduct of it; and though many pupils would do better had they spent some time in preparatory study before being articled, I see no reasonable prospect of any system being introduced to supersede pupilage without great disadvantage. In the pupil's career I include any subsequent time spent in somewhat similar work, though under the name of an improver or assistant. A still more useful addition to a pupil's course is a time spent in a position somewhat analogous to that of a clerk of works, or as resident assistant to a clerk of works, or as resident draughtsman on some building. Naturally, this is a rare chance. Very few pupils of five or six years' standing, if any, are really fit to be of much service as clerks of works; but if they can in any capacity spend some time on a building, they will find opportunities for acquiring practical knowledge there which are invaluable. Let us now inquire what advantage the student ought to be able to reap from pupilage, and from that kind of extension of it which I have sketched. First, as to Buildings, our first head. He will learn little or nothing of their history, and in the ordinary course he will see little or nothing of old buildings, but he will have opportunities in a disjointed way of acquiring familiarity with many of the features, ornaments, mouldings, decorations, and with the general design of the buildings in course of erection by the architect to whom he is articled, and not unfrequently with the design of some ancient buildings, as shown in prints, books, photographs, and sketches—Classic, Gothic, or Renaissance according to the proclivities of his master. He ought to have the opportunity of acquiring a pretty thorough knowledge of ordinary construction, and in some cases of special construction, and of learning how to specify and how to make approximate estimates. He will be sure to have opportunities of learning something about materials; but probably most of them will be wasted unless he gains elsewhere some general systematic familiarity with the subject theoretically. He may get some acquaintance with the appearance of buildings in course of erection, and of course it may happen that he may come into contact with old buildings in course of decay; but this experience is generally reserved for later days. I pass on to my second head, Familiarity with Men and Affairs. In a large office a pupil rarely has anything to do with men and not much with business. In a small office, the pupil often has to see people, and to devote part of his time to letter writing or accounts and writing out reports, from all of which engagements he will by degrees learn that valuable familiarity with men and things which we term business habits. If he is at all observant and does his best to make himself useful, and especially if he writes a good hand—a valuable, and, I regret to add, a rare acquisition—he ought to become perfectly familiar with all the ordinary business documents that an architect has to do with, and so when he enters upon practice this part of his office routine will be at his fingers' ends. Much of the proper dealing with *men* must, however, be learned from his actual responsible contact with affairs in real life. My third head was Drawing and Art. If a pupil goes into an office properly prepared, or, at least, well up in drawing the figure, and he has fair abilities, four years ought to make him at least a fair draughtsman. If in four years he thoroughly merits the praise of being a really good draughtsman, he has done well. The routine of preparing drawings from first to last should be familiar to him, and he, generally speaking, will have had an opportunity of making himself acquainted with perspective. Making designs is another matter: it depends upon other things than office work, and will not be learned in the office. As to art, as applied to buildings, or as seen in painting and sculpture, if the student is articled to an artist, and artistic work is being done during his term, he ought to gain much artistic training from office work. If (as is often the case) there is little going on to teach him fine art, he has to look for it elsewhere, and he need not look in vain, for many of the best artists in our profession have been brought up in offices where they had little chance of learning the fine art of architecture, though fortunately for them the technical art of building was learnable thoroughly. If I am correct in the view I have taken, it seems that the student unavoidably, and in the nature of things, is to look elsewhere than to the architect to whom he is articled and the associates with whom he will work in the office for preliminary preparation and for several important parts of his training. As for preliminary preparation, it is impossible for an architect to have too good an education, and I wish that every student were a graduate of one of our Universities; but, at any rate, I hope that most will have obtained a thorough English training, with a good knowledge of, at least, one modern language, a fair amount of mathematics, and the elements of some of the natural sciences, that is to say, physics, and, if possible, geology and chemistry, and last, but not least, that they will be well grounded in drawing. It is seldom that a youth or his friends select architecture for his profession without his having some amount of skill in drawing; but it has rarely been carried far enough. The student should be able to draw the human figure from the antique fairly well, and ought to know something of perspective and landscape. If he has not advanced at least as far as this, it is better to spend some months at a drawing school before entering an office at all. Some actual work in a joiner's shop is not a bad preparation for pupilage. Whether any part of this, which I call preliminary work, has to be taken up in addition or not, the following portions of the equipment I sketched a short time back must, it seems, be got elsewhere then at the office. As to Buildings: Their history; much of their construction, materials, and science, and the superintendence of work. The study of existing buildings. As to Drawing and Art:—Design and the refinements of draughtsmanship, and fine art generally. As to Men and Affairs:—All those parts of the conduct of practice which lie beyond ordinary routine, including the law of buildings. The most important of these is the study of erecting buildings, and I wish with all great emphasis to lay down distinctly the truth—sometimes I fear forgotten — that to study the buildings you must go to them. The knowledge about buildings which lectures, books, photographs, and prints convey, is not a knowledge of buildings. You must see, study, and sketch them. There is very great advantage in a student, after a sufficient number of years have been spent in preparing himself, taking a tour, an extended tour, and a continuous tour through as many of the regions of Europe that are architecturally rich as he can, and if it can be extended into the East so much the better. This sort of tour has, I think, fallen in the estimation of students partly because the facilities for short trips are now so good, partly, I think, because many men during the last 25 years have practised little else than English Gothic, and such have been contented to limit their studies to this country, with perhaps a visit or two to France, Belgium, and Germany. But the star of English Gothic is setting, and the student cannot afford to neglect Classic, Renaissance, Romanesque, and Byzantine examples, such as he must cross the Channel to study; and for good reasons which I cannot stop to go into here, six separate trips of a month each do not do one half, probably less than half, the good that one tour of six months will do. Some building or buildings must at some time be examined very thoroughly. I am disposed to think that the balance of advantage is on the side of comparatively few good examples most thoroughly investigated rather than a large number less completely studied. Each building selected should be measured and drawn out in detail, so that the drawing would suffice to re-erect the building, or the parts of it which are of architectural merit, if it were burnt. It is obviously convenient in many cases to select some English building for this kind of analysis. Of course, a much larger number of buildings must in addition be less thoroughly treated. Though I have urged the long Continental tour as desirable—and, let me add, most enjoyable—it must not be supposed that short periods of study of buildings near home are not great helps. Never lose a chance of visiting, examining, and drawing good work, old or new. There is a certain amount of very good old Gothic, and fairly good old Renaissance, to be met with in London, and the best modern work of both sorts here is quite as well worth study as the old, only let it be the best. London also presents opportunities of study in museums, of which, I think, few architectural students avail themselves as they might. We have antique work in the British Museum. We have an unrivalled collection of decorative work, and Renaissance and Oriental specimens at the South Kensington Museum, where there is also a magnificent series of casts, including many that would form excellent studies for architects. At the Architectural Museum there is a rich collection of Mediæval architecture; and at the Crystal Palace a series of casts and models of every age, the Renaissance, Byzantine, and Gothic being very good indeed. In all these places students who want to work can get leave to draw with very little difficulty. I now turn to the other points in which the student of architecture requires help. First, I am bound, I think, to refer to that provision which this college has made for assisting him, a provision of which I am proud to say that in the past a large number of men now successfully pursuing their practice, and in later years numbers of men whom I hope to see successful in life have availed themselves. Those portions of your necessary studies in which you can be helped by attending classes here are—(1) The history of buildings. This, with an examination into their features, details, and the growth and metamorphoses of architectural styles, forms the subject of the A. or art course here. I do not pretend for a moment to have time, in a session of thirty evenings, or the ability to tell the students all they require to know; but I claim that the course here gives a systematic and connected view of the history of ancient and modern architecture. I endeavour to make the sub-

ject interesting, and prefer to content myself with only taking up as much as can be done thoroughly, rather than to attempt to get over too much ground. There is a magnificent series of diagrams, which are lent to students to work from as well as hung up in the room, and I have endeavoured, with a success of which I confess I am a little proud, to induce the students themselves to draw illustrations of the subjects of the lectures.

The Materials and the Construction of buildings form the subject of course B., and here, as in the history of architecture as an art, I am far, indeed, from attempting to cover the whole field; but the course is consecutive, systematic, and thorough; it takes up all the principal building materials, and how to use them, and I endeavour to make sure work as we go. From both these courses I believe students derive this advantage, that they have planted in their minds a sufficiently connected view of the art in the one case, and of construction in the other, for them to be able to appreciate the meaning of every fact which comes under their notice either in their reading or sketching, or on buildings; in other words, that beyond direct gains they are enabled to get advantage from many other sources of information which would otherwise be of less service. I desire to state very plainly that these courses are not so much directed to enable students to pass the examination at Conduit Street as to give them a real help in their education as architects; but I believe that in this way they will more efficiently aid those who are going in for these examinations than if I attempted to shape them exactly to fit the course of the question papers. I think, too, the final examination at the end of the term, and an intermediate one, which it is usual to hold, are of great service to those who are preparing for the Institute examination, by enabling them to see how much they are able to accomplish in answering a previously unseen paper of questions on architecture within a fixed period, and quite without assistance. I am sometimes asked if these courses give enough information to enable students to pass those divisions of the examination to which they respectively relate. My answer is, that it depends upon the student. If he simply attends and takes some notes, and does nothing else—Certainly not. If he attends and gives time and study at home to the subjects, and tries to make all that he heard in the classroom his own, and then to pursue the lines suggested for further private reading at points where want of time obliges one to curtail part of a subject—Yes. Not, however, forgetting that personal familiarity with some architectural buildings is absolutely essential to success in the examination. Course C. proposes to give such information on the general conduct of building operations and architectural practice, and on some of the laws respecting buildings, as is most needed by men beginning practice, including some notice of the supervision of building works, and the decay of buildings and the measures to be taken to secure dangerous and ruinous structures. Here, again, I think that by giving what is most serviceable to the young architect, I am doing my best for him in his preparation for his examination. Here the work of this college stops; but I have little hesitation in saying that it will help you in the departments to which it is directed to master your subjects more thoroughly than by solitary study you easily can, and that what you will learn in this room is adapted to form the groundwork upon which you own further work may usefully stand. I regret that time warns me that I must condense as far as possible what remains for me to say, and give you bare references in place of stating matters at length. Before leaving this college I must point out that some of the sciences bearing upon architecture can be well studied here, and that the Slade school affords excellent means of instruction in drawing the figure, though in neither case are the courses specially arranged for architects. Some particulars of these will be found at the foot of the prospectus of my lectures. At King's College Professor Kerr gives a course of lectures on the Arts of Construction. His ability and his long experience as a public lecturer are too well known for it to be requisite that I should say more to point out the value of the course. The most important subject remaining, Architectural Design, is to be learned best at the Royal Academy. One must be a good draughtsman to get in; but here not only is good drawing made better under the eye of that accomplished architect and teacher, Mr. Phené Spiers, but design is practised under the personal direction of the very first architects of the day, those I mean who have the honour of being members of the Academy. No opportunity so good as this exists, and no better opportunity well could be devised for students to acquire skill in design; and quite apart from the medals and prizes, this is enough to repay you for any trouble taken in obtaining admission. Next, I must refer to the Architectural Association and its work, a subject so considerable that I cannot do more than glance at it on general terms. A students' mutual improvement society, numbering about 1,000 members, with a library and at least a dozen classes and courses of lectures, and its own travelling studentship and series of valuable prizes, it is an organisation of great importance and with vast possibilities for good. I hope you will all belong to it, for from it individual portions of your architectural equipment can be well obtained. It is sometimes said that there are imperfections connected with the scheme of the Association, the most serious being that the work is to a certain extent fragmentary, and in the nature of things unequal, and that some of the amateur teachers are not practised instructors. Whether this be so or no, the facilities offered are very many and very great, and especially so in that all-important branch of your studies, the study of design. The elementary class of design, the class of design, and class for colour decoration are worthy the attention of you all as open to you before you can enter the Royal Academy, and to these classes many an architect is indebted for his first opportunity of learning and practising design. The practical side of our art is studied by the members of the Association in many classes, each good in its way, and each taking up a useful portion of the work The visits to modern buildings, which are organised by the Association, are a means of learning how the best work of the present day is being done, and in themselves would be worth joining for. In the Brown Book of the Association you will find the whole programme set forth, and there, too, you will find the regulations and programmes of all the other organisations which I have to allude to. Let me recommend to your notice the page of advice to students which that pamphlet contains, and to your practice the personal consultation with a member of the committee of advice which it suggests and recommends. Among the announcements in the Brown Book, one will appear for the first time which I should be glad to believe will be continued for many years—the studio established by Messrs. Baggalay and Millard. This new and as yet untried venture, is fortunately in good hands, and if proceeded with ought to afford admirable assistance to students in draughtsmanship and design, and I hope also in construction. The Royal Institute of British Architects does not give any courses of instruction, but it possesses the best architectural library in London, and this is now accessible without charge and without more than the needful formalities to all working students of architecture, including students at this college. The City and Guilds Institute has given in the month of July short courses of lectures on subjects, most of which are of value to architects. These, no doubt, will be repeated next summer. The establishment at this Institute of various classes bearing on our pursuits is in contemplation, meantime a class of exceptional instruction in masonry was conducted there last session by Mr. Harvey, and this subject is to be pursued together with the allied subject of descriptive geometry, under the same teacher this session. The instruction given by Mr. Harvey is spoken of by those who know most about it as exceptionally good, and there is nowhere else where the same subject, treated from an architect's point of view, is taught so thoroughly and practically. Here I might well end, were it not that I know that this address, or much of it will, by the courtesy of the professional press, be read by students who cannot get to London, or who, being in London, cannot see their way to getting to Gower-street or Conduit-street. To any such I should like, with your permission, to address a parting word, and to say, "Courage, my friend. Remember, it is 'the spirit in the man, not the water in the brush'"; and though I have spent the evening describing useful aids to study, there are few of them which a resolute and energetic student cannot dispense with. What I take to be absolutely essential is first work in an office, and that I take it you have; secondly, buildings to study, and there is hardly a parish in England where there is not at least a fragment of the noble Mediæval architecture of our country within your reach; thirdly, books, and of those you must manage somehow to get hold of a few, but if your choice be not large you must the more thoroughly master the ones you have; and, lastly, the instruction in drawing. That happily the schools of art have spread through the country. Read, I pray you, the "Advice to Students," issued by the Institute of Architects, and appended to the programme of the examinations, and you will notice that there is but scant reference to the London advantages which I have dwelt upon, though I have good reason to think that the Board of Examiners are not insensible to their value; but that the course pointed out is one which a student, with comparatively little aid, may fight out for himself. Still, I am quite sure that the aid offered here and elsewhere will make that course easier, shorter, and, I think, surer. In taking leave of the subject and releasing you, let me revert to what was said earlier in the evening upon cultivation. I trust that each one of you will not simply learn his profession and push his way, but will cultivate his mind, and so successfully that he shall be known, not merely as a safe constructor or a brilliant designer, but as a man of taste, of judgment, of varied knowledge, of some accomplishments. In short, that he shall be an ornament to his profession.

LIGHT AND AIR—THEIR IMPORTANCE.

IT is essential that architects should have some knowledge of the law relating to light and air, and other divisions of the law upon which they are often called upon to decide between two different owners of property. How can a right of light and air be respectively acquired; how should it be preserved when acquired; how might it be jeopardised, and how lost? These interesting questions, says the *Yorkshire Gazette*, were laid before the closing meeting of the Society of Architects by Mr. F. A. Camidge, solicitor, of York. In olden times an owner, after an uninterrupted possession of light and air during a long period, could not be interfered with unless it had been enjoyed by him during that period by some privilege granted to him. This had been modified to some extent, and an Act of Parliament showed that the right to access and use of light should be deemed absolute and indefeasible, any local usages or custom to the contrary notwithstanding, after an enjoyment for 20 years, unless the same was enjoyed by some consent or agreement expressly made or given for that purpose by deed or writing. This fact, however, made no provision for the acquisition of rights of air. Light and air are *res communes*, things in which no permanent property can be acquired, and which everyone may use and enjoy whenever he has an opportunity so to do, but in which no one can acquire a future property. The opening of windows so as to overlook the private grounds of the adjoining owner, or even to command a view of the interior of a neighbour's house, and so lessen the value of his property, is not considered by the law as a wrong for which any remedy is given. No right to access of air over the general unlimited surface of land can be acquired by mere enjoyment. Chief Justice Wray has said that no action would lie for stopping the prospect of a house over vacant land. Mr. Camidge also refers to the other means of acquiring rights and light of air, which were by express grant—that is, by deed, or even by an agreement in writing, or by implication, which may be gathered from the peculiar circumstances of each case. A railway company has no power to stop an adjoining owner from acquiring a right of light so long as it does not interfere

with the working of the railway. As to how far the pulling down of a building might jeopardise the rights of light, there must be clear evidence of the intention to abandon the right to light before the Court would decide that such right had been lost. One important point to be considered by architects is that they cannot build so as to block out a new light if this would interfere with an already existing ancient light. In the case of old property, a plan or photograph should be kept of the ancient lights before the property is pulled down, and in this way prevent any question being raised afterwards as to the right of light. Where a person having built a structure on his own land sold and conveyed it in an unfinished state, with merely openings in the walls for the insertion of windows, such person could not afterwards build on his own adjoining land so as to obstruct the access of light and air to the space left for the windows; or where two persons buy two unfinished houses from the same owner with the space for windows and doors marked out, this would be sufficient indication to the purchasers of the rights they were respectively to acknowledge. If a person pulled down his building and erected a blank wall without any windows, and after a long lapse of time his neighbour erected a building near to this blank wall, the owner of the wall could not afterwards claim the restoration of the ancient windows, and it might be presumed that there was sufficient intention to abandon them by manifest disuse. Easements of light and air might become extinguished by abandonment and release, and also by unity of possession—*i.e.*, where a person owned a house and the adjoining land, the fact that he was the owner of the dominant and servient tenements. There is really no fixed rule as to what might be considered sufficient privation of light upon which to base an action, but the person who complained must be prepared to prove the substantial privation of light sufficient to render the occupation of his house comparatively uncomfortable, or to prevent him from carrying on his business as beneficially and profitably as he had formerly done. The mere diminution of a ray or two of light will not suffice for the maintenance of an action.

THE DICTIONARY OF ARCHITECTURE.*

WE have received Part XXII. of this dictionary, which now brings the work down to within a measurable distance of completion. The part comprises the letters R—S, and is issued with title-page, table of contents for Vol. VII., and list of terms for the concluding part, T—Z. A notice to members is prefixed to the work announcing that the entire cost of the present part has been about £750, exhausting all the available funds. It is estimated that to complete the dictionary £650 is required, and an appeal is made for a subscription of at least £2 2s. from members, except those who have joined since June, 1875. The text of the part we have received is from "Raab" to "Szucoalkach." These two terms are an instance of the comprehensiveness aimed at by the compilers. We have before questioned the wisdom of including names of places of only interest to a very few archæologists, and of many terms which pertain more to engineering than architecture. Some of the terms introduced would have been usefully omitted to make more room for others of architectual importance. A few of the biographical notices might, for example, have been left unnoticed, yet we know the difficulty of the compiler of a dictionary as to what terms ought to be included and where the line should be drawn. The editors have thoroughly fulfilled their part in rendering the dictionary comprehensive. The articles are not too long, briefly giving the definition, with references to works where fuller information can be found. Under "Rainfall," we have a brief account of the mean annual quantity. The average in London is given as 25in., in the driest parts about 18in. The maximum rate of fall is given as 1in. per hour. We read: "On 10th April, 1872, the rainfall in London was 2in. (at Greenwich, 3in.) in about nineteen hours. Between midnight of 25th July, 1867, and 10 in the morning 3·18in. fell an amount unprecedentedly large for London; thus ⅓ of the average rainfall for a whole year fell in 10 hours." Again, "an inch of rain" means a gallon of water spread over a surface of nearly two square feet, or a fall of about 100 tons upon an acre. The mode of calculating the quantity over a given area and other useful memoranda are given. There is a long paragraph of references to reports and treatises. We see our own pages have been referred to in this and the succeeding articles on tanks and cisterns. In the latter we do not see any reference to Roberts's Rainwater Separator, which is an important modern appliance. Under "Ravenna" is an interesting list of churches, in which references are made to Hubsch and other authorities. Short articles on Red Corsehill Stone and Red Timber appear; here, too, this journal has been referred to. Some research and a list of examples are to be found under the word "Refectory," and the article on "Renaissance" is exhaustive, and contains a very complete list of works on the subject and examples. Articles on "Responsibility," "Restoration," "Romanesque," "Rome," "Roof," "Round Churches," "Round Towers," and "Russian Architecture" appear. Under "S" we find well-compiled articles on "Saracenic Architecture," "Saxon," "Screen," "Sound Proof Construction," "Synagogue," &c. Biography occupies too much room, and not a few terms are obsolete. The article "Stability" is concise, but not so clear as it might have been. The finding of the stability of any structure would have been more accurately expressed as the taking the resultant of all the pressures and its line of action, and comparing the moment of the force tending to overthrow the structure with that of the centre of the gravity of the mass. On the whole, the editors are to be congratulated on the success of their labours, and the learning and research shown in the new part. The work when completed will be, with all its faults, the most complete and comprehensive dictionary of architecture in the widest sense of the term probably ever published in this or any other country. It covers a large range of subjects beyond architecture pure and simple, and is therefore more generally useful to the allied professions.

* The Dictionary of Architecture, Part XXII., R—S. London: Whiting and Co.

THE SANITARY ASSOCIATION OF SCOTLAND.

THIS Association held its thirteenth annual meeting in the Burgh Court-room, Falkirk, on Friday. Mr. George A. D. Mackay, Paisley, presided, and there were about seventy delegates present from public bodies in different parts of Scotland. The President delivered an address, taking as his subject "Helps and Hindrances to Sanitation," in which he urged that if the full tide of physical and mental health was to have sway in these islands, the way of the sanitation must be more fully cleared by the statesman and the social economist. Dr. M'Vail, medical officer, Kilmarnock, read some "Notes on Sanitary Legislation in England and Scotland." The Scottish Act of 1867 was, he observed, eight years earlier than the English one, and in these eight years much progress was made in knowledge regarding public health. In both countries the law had too much "may" where there should be "must." The proposed new Public Health Bill for Scotland was much needed, and in many respects its provisions as drafted were excellent. The most important defect of the Bill seemed to him that its action was restricted to populous places. It might be urged that the Bill should be judged on its merits as a Burghs Bill, but unfortunately the proposed Act, like the local Acts already passed—would silence for a long time any national demand for sanitary reform. If the Bill became law in its present form it would be at the cost of an incalculable amount of preventible sickness and unnecessary death in the rural districts of Scotland. He urged that means should be taken to rouse our legislators to a sense of the pressing importance of a broad and inclusive measure of sanitary reform. Bailie Russell, Edinburgh; Dr. Simpson, Perth; Bailie Smith, of Greenock; Bailie Arthur, Airdrie; Mr. Andrew Wallace, inspector of the poor, Govan; the Rev. M. Scott, Camelon; and Mr. M'Leod, Greenock, discussed and criticised the paper, after which Dr. M'Vail replied. Mr. Kenneth Cameron, sanitary inspector, Aberdeen, contributed a paper on "Sanitation in Aberdeen." Within the last few years Aberdeen had appointed a medical officer, who devoted his whole time to the duties of the office, and he himself, as sanitary inspector, had eight assistants. Last year the town council adopted regulations for house drainage and the ventilation of dwelling-houses, the smoke test being also vigorously applied to all drain and pipe-work. The result of the sanitary improvements was a considerable decline in the Aberdeen death-rate, which had fallen from 23 per 1,000 in 1869-73 to 19 per 1,000 in 1884-86. A short discussion followed as to the system of sanitation adopted by different local authorities. The members of the Association and others afterwards dined together in the Crown Hotel, under the presidency of Mr. George Mackay, Paisley.

REREDOS, NEWCASTLE CATHEDRAL.

MR. J. SHERWOOD WESTMACOTT, the sculptor, has this week exhibited, at his studios near Eccleston-square, the statues which he has executed for the new reredos to the High Altar of Newcastle Cathedral. This piece of work is entirely in alabaster, and rises to a height of over 21ft., including the three steps of the Sanctuary. The style chosen by the architect, Mr. R. J. Johnson, F.S.A., of Newcastle, is a Late type of Gothic, rich in canopies and intricate tabernacle work, designed with refined taste and an intimate knowledge of detail. Shortly we hope to illustrate the choir, showing the new stalls and bishop's throne, with other fittings, just executed. The east window has been designed by Mr. E. Frampton, and we shall in the course of a week or two also illustrate his drawing of this work. The reredos itself has been built by Mr. Beall, of Newcastle, who has likewise erected the Caen stone wings to the structure. These are in harmony with the alabaster centre-piece, though somewhat simpler in general character with panelling and traceries. The central figure representing the Majesty is a particularly good piece of modelling, full of dignity and refinement, the face of the Saviour King being highly dignified with well-defined features, whilst a telling outline marks the composition. Above the Majesty stands St. Cuthbert, supporting the head of St. Oswald. In the same range of statues rank the Venerable Bede with his book, St. Benedict Biscop, St. Oswald, King, supporting the cross with a shield in his left hand, and a palm indicative of Martyrdom; St. Edwin, King, also holds a palm for the same reason and supports a sword. St. Nicholas, the Patron Saint of the church, is the subject of a very handsome and central statue, holding the closed book, on which rest bags of coin. The four Evangelists, with their emblems, form a fine series of full-length figures, by the side of the Majesty, beyond them, being St. Gabriel on one side and the Blessed Virgin Mary on the other, in indication of the Annunciation, but the subsidiary way in which this idea is introduced renders it difficult to realise the intention. St. Wilfrid and St. Paulinus came below the two last. It will thus be seen that prominence has been given to Northumbrian Saints. A range of angels is placed immediately above the retable supporting shields bearing emblems of the Passion, and other angels occupy the series of small niches, which divide the composition into three divisions.

ANTIQUE STELÆ AT THE BRITISH MUSEUM.

THE old print room in the British Museum has been turned into a gallery of Greek and Roman sculpture, or, rather, for the display of a number of sepulchral stelæ, vases, urns, and fronts of sarcophagi of Greek and Roman origin, which have been disinterred from the cellars. Many of these possess an interest apart from their archæological value for the beautiful reliefs and sculptural decoration. Mr. Murray has done the best with his treasures. Four of the large stelæ have been let into the walls of the gallery, where they have the advantage of a full light to throw up the reliefs. These represent figures, one a parting scene, from Delos, presented in 1825. At the end of the room is a fine example of a relief

An entablature supported on twisted columns forms the framework of a series of heroic figures sculptured in high relief, the base of which is enriched by a guilloche and other ornaments; and there is a pleasing sculpture of "The Nine Muses," the figures introduced separately in an arcade supported by twisted columns, the capitals in some cases hung with masks; the slab was no doubt a sarcophagus front. On the window side of the room is a torso of Triton from Delos, removed from the Phigalean room—a portion of a colossal figure, and at the other end of room is a beautiful example of a votive monument erected in honour of Lucius Antistius and his wife, Antistia Plautia, by the freedmen Rufus and Anthus. The heads are in alto-relief in shell-like circular niches, which throw them out in full relief. The niches are encircled by laurel wreaths. On the same wall are some interesting sarcophagi reliefs. In groups on the floor many very interesting stelæ are to be seen, and the collection of George, Earl of Aberdeen. Many of these stelæ and sculptures have been stored away in the cellars of the Museum since the middle of the 18th century, and they now have been brought to light for the first time, and appear as rediscovered antiquities. Several of the larger stelæ let into the walls are yet unnamed, and it is probable that their history has been lost. These sepulchral monuments, together with the new Mausoleum gallery, have increased much the interest of the British Museum to all students of classical archæology. A few of the reliefs and stelæ are Greek of the best period, if we are to judge by the ornamentation and style of the drapery of the figures, while the larger number of them belong to the Roman school. It will be an advantage when they are arranged and dated, if the latter is possible.

EFFECTS OF VARIATION OF TEMPERATURE ON METAL ROOFS.

IT is a matter of observation that metal coverings on roofs are liable to a creeping action by the variations of temperature. Prof. Tyndall, in "Heat as a Mode of Motion," refers to the roof of the choir of Bristol Cathedral, which was covered with sheet lead in 1851, the length of the lead being 60ft. and its width 19ft. 4in. Two years after the above date it had bodily moved down for a distance of 18in. An attempt was made to stop this movement by driving nails into the rafters, but the force of it drew out the nails. The roof is not steep. The cause of this sliding down was to be attributed to the expansion of the metal during the day-time in one direction. On a flat surface the lead would have expanded all round equally, but the inclined surface caused it to expand only downwards. The contraction during the night drew the upper edge downwards by the same force of gravity. According to mathematical demonstration, a metal plate will begin to slide when the angle of inclination is about 18° 26′. In point of fact, there must be some temperature required to overcome the resistance of friction between the lead covering and the wooden hoarding. But the resistance of friction, or the coefficient of friction, varies for different materials. Thus a covering of sheet-iron or zinc has a less resistance than that of lead, and would thereby require a flatter angle to overcome the sliding movement downwards. It has been calculated that a temperature of 541° F. would be necessary to overcome the friction between lead and wood with an angle of 4°, whereas only a temperature of 22° is required to overcome the resistance between sheet-iron and wood at the same inclination. This movement or "creeping" of metal on roofs of a certain angle is one objection to its use. Many of the lead roofs of cathedrals and old churches show this creeping downwards, and in many instances a wrinkled appearance is given to the covering. Trusses of iron are liable to movement caused by expansion. Thus a roof of ordinary construction, of, say, 100ft. span, ought to be so fixed as to be capable of free movement at one end or support under a certain range of temperature to which it may be exposed. Assuming this to be 160°, the expansion will equal about 1¼in. In a curved iron roof, like many of those of our large railway stations, provision ought to be made for the greater expansion of the curved rib as well as that of the tie-beam; in other words, there will be a vertical as well as horizontal expansion to provide for. In practice the irregularities and inequalities of the joints doubtless allow any action arising from variation of temperature to take place without serious mischief, though it is not safe to fix rigidly both ends of a truss.

PERMEABILITY OF BUILDING MATERIALS.

IT is well known that bricks, stone, and even cement are not only porous, but allow vapours to pass through them. Some time since a French *savant*, M. Marcker, made experiments with a view of testing the permeability to gases of certain materials. He found that granite, porphyry, slate, alabaster, and limestone are practically impermeable. The question of transpiration is an important one. Houses built of impermeable walls are dry, though it is doubtful whether, under all circumstances, they are the most healthful. All will admit, however, the advantage of cutting off by a really impermeable layer the house, so as to avoid gaseous emanations from soil that is not of virgin quality, and the gases from drains. For such purposes we require impermeable materials. Of all that we know, the best asphaltes and the bituminous compound known as White's Hygienic Rock Composition appear to be the most perfect and easily applied. Concrete, however well made, is not so completely impervious to vapour, and even cement has been found to allow vapours and gases to pass through them. With regard to walls, the cements that are used give all the required impermeability. A thick glazed paper is said to reduce the permeability of a brick wall nearly 40 per cent., and two coats of oil paint considerably help towards the object. A new kind of wall decoration has lately been introduced from France, which consists of thin sheets of metal painted over by a patented process. Tinfoil in sheets is the material used, and this is gilded or painted over. The covering is waterproof, and, we should say, is an excellent substitute for paper on damp walls.

CHIPS.

Mr. Joseph Edward Binns, builder, of Raglan-road, Woodhouse, Leeds, died on Friday, after a short illness. He was fifty-eight years of age, and carried on a large business as a contractor in Leeds and its vicinity. For the past eight years he has been a member of the town council, and for the last four years chairman of the Building Clauses Committee, in which his business experience enabled him to render the town good service.

A gold medal for Portland cement, has been awarded at the Havre Exhibition to Mr. R. W. Cooper, of Strood, manager of the Medway Portland Cement Company.

A steam tramway, connecting the North-Eastern Railway system with the fishing village of Flamborough, is about to be constructed by a private company, of which the Earl of Londesborough is one of the principal promoters.

The Torquay local board, having recently purchased the harbour and other property from Lord Haldon at a cost of £75,000, are about to apply for Parliamentary powers to expend an additional £50,000 in increasing the harbour accommodation. The principal outlay will be in the construction of a pier to shelter an area of 40 acres from the westerly gales.

A liberal club in Leeds-road, Bradford, was opened by Mr. Isaac Holden, M.P., on Saturday. The building has cost £1,400, and has been built from plans by Mr. T. C. Hoper.

Mr. Thomas Codrington, M.I.C.E., an inspector of the Local Government Board, held a public inquiry at South Stockton on Friday into the application of the local board for sanction to borrow £7,248 for private street improvements, £180 for public street improvements, and £400 for the purchase of land for offices.

The foundation-stone of the north wing of the High School at Stirling was laid by Lord Balfour of Burleigh on Saturday. The school was erected in 1854, and a south wing was added in 1873. The present wing is being built at a cost of £7,000, from plans by Mr. J. M. McLaren, of London, an old High School pupil, whose design was selected in competition. It comprises workshops and gymnasium in the basement, classrooms and library on the ground floor, with science and art rooms above.

WAYSIDE NOTES.

THE decision of the Metropolitan Board of works to contribute one moiety of the purchase-money of Parliament-hill appears to have been seconded by public opinion, and is to be commended, since the hill is one of the most interesting places round the Metropolis. Long before the purchase of the hill was decided upon, it would have seemed to have been, to all intents and purposes, in the hands of the public—the *juvenile* public at any rate. Last summer, when the mowers had just finished cutting the grass, I remember seeing the children "hay-making" in a fashion that must have been, doubtless, rather dispiriting to the owners thereof, the aforesaid hay-making consisting of the roughest horseplay in the new-mown grass. Let us, then, welcome the prospect of a public Parliament-hill, that the youngsters may in future rollick and tumble about thereon to their hearts' content.

It is not often, however, that I find myself on Parliament-hill, but when I do I enjoy the prospect and breezy situation immensely, by day, when one can see the maze of towers, spires, and chimneys rising from amongst the rolling masses of smoke-cloud; and on a clear night it is certainly very pleasant to watch the glimmering "lights of London" and to listen to the dull roar that surges up from the great city in the plain below.

I recommend to the notice of those persons who talk about a fever "epidemic" in London a letter of a correspondent of the *Times* of Monday last. He describes the condition of the village of Burnriggs, some six miles from the city of Carlisle. About one-third of the population of this little village, of between 120 and 130 inhabitants, have been laid low with fever of one kind or another. Typhoid has been followed by scarlet fever and measles; and most harrowing are the details supplied by the writer. When we read of a village being shunned by all persons excepting the clergyman and his wife, and a few doctors, we may truly talk of an epidemic.

The sad state of affairs at Burnriggs is said to have been brought about by a polluted well Scarlet fever being essentially and emphatically a *dirt disease*, there is little wonder that when a village draws its water supply from a foul source a terrible scourge should fall upon it. Nor is our surprise lessened when we read that one of the sufferers was unable to open his window on account of the stench from a nuisance within a few feet of it.

In the same edition of the *Times* there was a letter anent the condition of the river Cam. The state of this water-way is described as "filthy and disgusting," and more so than it has been within the last 13 years. The writer lays all the blame at the door of the Improvement Commissioners. Again, on Saturday last I observed an article in the *City Press* headed "The Deadly Lea," which also is described as "filthy and disgusting" between Tottenham and Lea Bridge. This nuisance, also, is said to "call for the severest condemnation and official censure upon the responsible authorities." Really this sewage question is of most serious moment, and, unless grappled with, will leave the Metropolis and many other cities and towns in constant danger of a veritable and appalling epidemic.

The Institute of Auctioneers and Surveyors of the United Kingdom will hold a meeting on the 26th inst. for the purpose of discussing the best way of advancing the interests of the Institute, and, it is to be presumed, their professional brethren generally. With all due deference to this honourable body of auctioneers, I would most respectfully suggest that its members should make themselves acquainted with the details of the Architects' and Engineers' Registration Bill. They will thus become familiar with the appearance of the future frontier line that is to restrain their ambition in matters architectural. Pardon my enthusiasm, O worthy Mr. Auctioneer.

The Society of Architects' visit to York, as completely reported, must be considered extremely satisfactory. A very useful paper was that on "The Remuneration of Archi-

tects." I am quite with the author, Mr. Edgar Farman, as to the generally satisfactory nature of £5 per centum. After all, when one has plenty of work to base this calculation of 5 per cent. upon, we do not, as a rule, feel like quarrelling with the system; but when business is bad there is, we can understand, some excuse for complaint.

The Lord Mayor of York, I see, stated at the entertainment that he so hospitably provided for the S.A. that "he could not but be struck with a comparison of old work with that of modern times." Evidently, by the context, his Lordship intended to refer to the constructional side of the question only, and not the æsthetic. In "antient" times, Great Dignitary, there existed not the leasehold system as at present practised, and the ring of the jerry-builder's trowel was not heard in the land.

A few days back I had the *pleasure* (I employ the word advisedly) of examining some delightful productions of Mr. Buggins—three or four big houses in a Kentish suburban village, all tumbling about one's ears, and having to be underpinned, re-roofed, re-floored, re-ceiled, and plastered, and *only erected five years back!* Such things are, alas! but too common in "small" property; but in houses letting at £70 or so it is a little startling. But on buildings of this sort we must base all our hopes, since by such abortions the eyes of the public are gradually opened to the defects of the jerry-building system.

Scene: A building estate with some ground "got out." Time: A winter's morn, with the thermometer below zero. Mr. Buggins and a bricklayer discovered at work. They suddenly become aware of the near approach of the surveyor. Extraordinary behaviour of Mr. B., who, regardless of the chilly atmosphere, pulls off his coat and rapidly, but with design, spreads it carefully in the trenches. Enter to them the surveyor. Mr. B. (his teeth chattering), loq.: "Fine morning, sir." Surveyor: "Rather fresh, Mr. Buggins; I should put on my coat if I were you, you might get a chill." Mr. B.: "Oh! quite unnecessary, sir; rather warm this morning, sir!" (Tries to look overburdened with heat.) Surveyor: Well, suppose, Mr. Buggins, that you remove your coat from the trenches to please me." (Mr. B. hesitates, and then reluctantly assents. Underneath the garment are discovered several courses of brickwork, already hardening with the frost). Tableau!

We must thank Mr. Plummer for kindly giving us the information *re* Birtley Church. Certainly no room is wasted with the chancel-arch; but its width being 6ft. 8in., and that of North Witham only 6ft., the Lincolnshire building takes the palm for smallness by 8in. The book on Birtley Church referred to should prove interesting reading for a winter's evening.

The death-knell of one more City church is sounded. It is Old Jewry this time that is to fall before the tide of modern improvements. Long years ago the building was doomed, and the arrangements for its removal were, I believe, completed last December. Now, the dead are to be removed, and some feeling is expressed on this score, but I understand that as the vicar will superintend the arrangements there will be no scandal. And we pay more attention to these matters of sentiment nowadays than formerly, so that the "heirs, executors, friends, and relations of persons," as the churchwardens' notice quaintly sets forth, need not fear on this score.

In times past they occasionally mixed up old bones into an odd jumble. Were there not certain "rumpages" made in days gone by, when the overflowing vaults were ransacked and a medley of human remains gathered into a heap and buried wholesale? I fancy I have heard of such occurrences.

There cannot be said to be much material loveliness in St. Olave's Church, Old Jewry, and it looks very mournful just now, with the doors closed and the dead leaves from the few pleasant plane-trees around it strewed about the paths in wild profusion. Its external architecture is of a very hard type of Renaissance. One little, if insignificant, redeeming feature there is—its weather-cock, an apparently well-executed metal model of an old ship in full sail. It surmounts the staff at the top of the tower, which, by the bye, has been long dedicated to the service of Mammon, in that from it radiate myriads of telegraph and telephone wires.

CHIPS.

Mr. B. L. Wells, C.E., engineer to the Weaver Navigation, has been appointed resident engineer to the Aire and Calder Navigation at Goole.

A Jubilee memorial lamp and drinking-fountain have been erected in the square at Ringwood, Hants. Above the stone drinking-fountain rises a column carrying five lamps. The pillars which has been cast by a Glasgow firm, has been erected by Mr. George Etheridge, the steps and mason work have been laid by Mr. W. E. Alexander, and the cistern and cattle trough have been constructed by Mr. J. Armfield.

A block of public buildings are about to be erected, at a cost of £500, adjoining the new Crispin Hall at Street, Somerset. When complete the building will contain a fire brigade station, a place for the village hearse, a waiting-room, a pay-room for those in receipt of parochial relief, the caretaker's premises, and a board-room for the vestry. The builders are Messrs. F. Huish and Son, and the architect is Mr. Skipper, of Norwich. The foundation-stone was laid on Saturday afternoon.

St. James's Church, Thornes, near Wakefield, was reopened on Friday after having undergone alterations and improvements at a cost of £500. The work has been executed from plans prepared by and under the superintendence of Messrs. Simpson and Richardson, of Wakefield.

The foundation-stone of the new post office for Dumfries was laid with masonic ceremony on Saturday. The post office is being built on the site of the old prison in Buccleugh-street, Mr. Kirkland, of Ayr, being the contractor.

What is believed to be the oldest Jewish gravestone in Germany has just been discovered at Zahlbach, a small village close to Mayence. It served as a stepping-stone over a brook, but was observed to have some Hebrew characters inscribed on it. The Rabbi, Dr. Lehmann, of Mayence, had it cleaned, and found on it the date 4560 A.M., equal to 806 A.C. The stone has been removed and placed in the town museum of Mayence.

The magistrates of Colchester last week received plans from Mr. J. W. Start, architect of that town, for proposed new exits to the theatre. They have, therefore, appointed Messrs. J. and A. E. Bull, architects, Charing-cross, C.E., to examine the proposed plans on their behalf. Great structural alterations are required, including fireproof corridors and stairs, proscenium wall, &c. The magistrates have refused to grant the license until the works are completed.

At their last board meeting, the Directors of Robert Boyle and Son, Limited, ventilating engineers, resolved to recommend a dividend of 12 per cent., free of income-tax, on the ordinary shares of the company, for year ending September last.

The board of guardians at Stoke-on-Trent have accepted the tender of Mr. Joseph Blackburn, Gresham Works, Nottingham, for the erection of a telephone exchange at their Hackhill Workhouse and Hospital. The same firm are also engaged upon several new telephone lines; also the fitting of the new Fleming Memorial Hospital, Newcastle-on-Tyne, with their improved registered lightning conductors.

The Metropolitan Board of works decided on Friday after considerable discussion, to contribute a moiety of the cost of securing the land comprised in the Hampstead Heath Extension Act, 1886, such moiety not to exceed £152,000, and also £25,000 towards the purchase of Clissold Park, Stoke Newington.

A Roman Catholic church and presbytery at Burwash, Sussex, have just been built at the cost of Madame de los Heros. The presbytery is built after the Sussex fashion, with truncated gables, tall chimneys, and tile hangings. The staircase, windows, doors, and many other features of the old Hall, formerly occupying the site, have been used again in the new house. St. Joseph's Church, built in the form of a cross with three circular apses, is of stone and brick within and without. The two side chapels forming the transepts are domed in stone and brick, and have arcaded walls. The lofty nave is covered with waggon vaulting of pointed form, the chancel being groined. Mr. E. Thurbon, of Tunbridge Wells, was the builder; and Mr. Bernard Whelan the architect.

Engineering Notes.

Berwickshire.—A road improvement in Berwickshire has been brought to a successful conclusion in the erection of two bridges over the river Whitadder, and the construction of a new road on the main line of communication between Duns and Haddington. The new road from the Duns end commences at a point near Ellem Cottage, where it crosses with a skew-arch a second stream, and then crosses the Whitadder by a freestone bridge of three 40ft. spans. Passing through Ellemhaugh the new road diverges from the line of the old road (which crossed the hill at a very steep gradient), and follows the valley of the Whitadder, through Ellemford, Ellemside, Fellcleugh, and Smiddyhill. At Smiddyhill the road again crosses the Whitadder by a bridge of blue whinstone of two 30ft. spans, and joins the old road near to Cranshaws. The length of the new road is about three miles, and about three-fourths is level. Mr. W. Tait, C.E., Earlston, was engineer, and Mr. D. N. Shaw, Perth, contractor. The cost has been between £5,000 and £6,000, the land having been given free of charge.

Dewsbury and Thornhill Railway.—Major-General Marindin, C.B., Inspector of the Board of Trade, visited Dewsbury on the 1st inst. for the purpose of inspecting the new line constructed by the Great Northern Company, which forms a junction between their station at Dewsbury and the Lancashire and Yorkshire system at Thornhill. The works include a bridge over the river Calder 240ft. in width, one over the canal 88ft. in width, several smaller bridges, and a masonry viaduct. The contractors were Messrs. Brier, Son, and Wilson, of Dewsbury. Major Marindin also visited Batley, and inspected part of the works in connection with the proposed Beeston to Batley extension of the Great Northern Railway. This line, when finished, will form a branch from Huddersfield, Dewsbury, Batley, and district to Leeds, affording an alternative route of about the same length as the existing London and North-Western line from Batley. Part of the work has been finished by the contractors of the Dewsbury and Thornhill branch, and they have just entered into a new contract of £100,000 for the completion of the line. The engineers of both railways are Messrs. John Fraser and Sons, MM.Inst.C.E., Leeds and London, the resident engineer being Mr. W. H. Smith, A.M.Inst.C.E.

Railway Extension in the Hundred of Wirral.—The chairman, directors, and officials of the Mersey and Wirral Railway Companies made a joint inspection last week of the new extensions towards the north of Wirral, North-west Cheshire, which are to be opened at the close of the year. The new line, from the joint station at Birkenhead Park to the Hoylake branch, has been constructed under most unusual difficulties. Fine silt or quicksand was found to underlie the bed of boulder clay of the neighbourhood, and in this treacherous substance the tunnel has had to be constructed in very short sections, commenced at many points. The whole tunnel is now arched in. The engineers and contractors are those who built the river tunnel—namely: engineers, Sir James Brunlees and Sir Douglas Fox; and contractors, Messrs. Waddell and Son, of Edinburgh, under the local management of Mr. Prentice and Mr. D. Davidson, their engineer. The Wirral line has been constructed by Messrs. Meakin and Dean; the local resident engineer, under the directions of Sir Douglas Fox, being Mr. R. A. Freeberne. A branch line has been made across Bidston Marsh, with stations at Wallasey and Warren Park, and through communication is established between James-street, Liverpool, and West Kirby.

Major Tulloch, the inspector of the Local Government Board, held an inquiry at the Local Board offices, Harborne, on Friday, with reference to an application for sanction to borrow money for street improvements and sewerage works. Evidence in support of the application having been given by the surveyor, Mr. J. C. Dixon, the inspector viewed the sites of the proposed works, and remarked that he was satisfied with regard to the necessity of the proposed works. There was no opposition to the application.

Building Intelligence.

Cork.—A bacon-curing factory at Cork has been rebuilt from the designs, and under the superintendence, of Mr. Robert Walker, M S.A., architect, of 17, South Mall, Cork—Mr. S. Hill, Cork, being the builder, and Mr. T. A. Walsh, clerk of the works—for Messrs. Lunham Bros. It is designed so as to secure the most convenient arrangement of plan, with a view to carrying on the different processes of manufacture in their proper consecutive order. The different appliances are of the most approved type, put up under the guidance of Mr. Walker, who has made a special study of these factories, both as to buildings and appliances. A similar factory has been carried out by the same architect at Hamburg, for Messrs. Thompson and Co., Bartelsstrasse St. Pauli. The buildings cover one and a half acres.—A Capuchin convent and chapel at Charlotte Quay, Cork, have been built from the designs, and under the superintendence, of Mr. Robert Walker, M.S.A., architect, Cork. The walls are limestone, with a few red brick bands, and square limestone mullions to the two-light windows. The rules of the Order rigidly excluded features of an ornamental character. The buildings are grouped round a central open court, and are approached by a corridor and verandah running all round the court. They comprise: Chapel of the third order, reception rooms, vestibule, hall, library, refectory, kitchen, scullery, hospital, lavatories, &c. The oratory and single bedrooms are on the upper floors, approached by corridors surrounding the central court, as on the ground floor. The buildings adjoin Father Matthew's Chapel, to which it is attached. Mr. John Delany, of Cork, was the builder.

Edinburgh.—At the last sitting of the Edinburgh Dean of Guild Court, Sir James Gowans presiding, a final warrant was granted to the Association for Improving the Dwellings of the Poor to proceed with the erection of houses in West Port as dwellings for the poorer classes. Since the foundation-stone of the tenement was formally laid some little time ago, the plans have been altered and extended, the result being that the number of houses to be built will be increased from 26 to 40, while the promoters will provide a plunge bath on every flat, and a couple of washing-houses. Building operations are to be commenced forthwith, and it is expected that the property will be ready for occupation by May next year. Warrant was granted to the representatives of a philanthropic society in the city, having somewhat similar objects to the Association, to execute alterations and improvements on property in White Horse Close, Canongate. The society in question have acquired a range of old and dilapidated buildings in White Horse Close—some of the property being said to be 300 years old—with the view of so altering them as to make them thoroughly habitable and suited to the requirements of the poorer classes. The property was partly condemned by the Public Health Committee of the Town Council. By the alterations proposed to be carried out from 30 to 40 houses will be provided, as well as several shops, the latter having a frontage to Canongate. The alterations and improvements alone will cost about £1,000. The same society have also on hand the improvement and alteration of three blocks of houses in Brown's Close, Canongate, to accommodate some thirty families.

Fountainbridge, N.B.—Important alterations have just been completed in Fountainbridge Free Church, Edinburgh, at a total cost of £850. The front entrance has been extended towards the main thoroughfare. The old seats have been removed, and the church reseated throughout in pitch pine. A new pulpit has been constructed of the same material, and above it, in the north end of the building, a circular window, filled with ornamental glass, has been introduced. Six additional windows have been inserted in the roof, and the walls painted in light colours. The heating apparatus has likewise been entirely renewed. In addition, the vacant space on the west side of the church has been filled up by the erection of a hall and a couple of small class-rooms to be used for school purposes, evangelistic meetings, and other congregational work. The buildings are a memorial to the late Rev. Dr. Chalmers (1780-1847), and cost between £500 and £600. Accommodation is provided for 300 in the hall, which measures 41ft. by 28ft., and is lighted from the roof. Three coloured-glass windows have been placed in the north end of the hall, the centre one bearing an inscription. The church as altered was formally opened on Thursday, the 6th inst., and the new hall was opened the following day. Mr. R. R. Raeburn was the architect. Messrs. Mekie and Whyte carried out the mason work on the church, and Mr. N. Grieve the joiner work. The hall was built by Messrs. Cowie and M'Leod, and the joiner and other work was performed by Mr. William Galloway.

Glasgow University.—On Friday last the top stone was laid on the completion of the tower of the University buildings by a new spire. The original architect, the late Sir Gilbert Scott, designed a spire to be added to the central tower actually built, but want of funds prevented the authorities from carrying out his plan. The new open stonework spire which has just been added was designed by Sir Gilbert's son and successor, Mr. J. Oldrid Scott, of Spring-gardens, S.W. The height of the addition is 101ft. Standing on an eminence the tower and spire, which together rise about 280ft., are visible from all parts of the surrounding country, and will be the most prominent object in views of the city from a distance. The four corner pillars of the tower are continued by four stone turrets, each 40ft. in height. Two-thirds of the way up the spire is surrounded by a projecting gallery, approached by an inside staircase. This gallery and the ornamental open stonework of the spire give the completed tower a special character. The funds have been provided mainly from a recent legacy of £5,000 by Mr. Andrew Cunninghame, late deputy town clerk of the city. The contractor engaged on the spire as well as in the whole of the original University buildings, and of the Bute and Randolph Halls, is Mr. John Thompson, of Peterborough. The University Union Building is also all but completed from Mr. J. O. Scott's designs; it has cost £5,000. A portion of the front of the old College of Glasgow has also been recently rebuilt at the entrance to the University grounds through the liberality of Sir William Pearce, M.P.

Manchester Consistory Court.—At the last sitting of this Court a faculty was granted for taking down the present east end of Holy Trinity Church, South Shore, Blackpool, including the transepts, a portion of the nave and chancel, for the purpose of extension; the cost of the alteration was £4,800, and the seating accommodation would be increased by 300 seats. Faculties were also granted for pulling down the old parish church at Longton, and removing the fittings to the new one, and for adding a chancel to Holy Trinity, Littleborough, at an estimated cost of £1,600, and for rebuilding the tower of St. Michael's, Flixton.

Oxford.—During the year just closed with the Long Vacation the builder has been busy at Oxford, and is still at work both in the city and the suburbs. The extension of Brasenose College which is now in progress from Mr. T. G. Jackson's designs, is a most important work, since upon its architectural character depends to some extent the whole aspect of the High-street. The extension has necessitated the demolition of a row of shops. At Trinity Mr. T. G. Jackson has nearly completed the President's new house (illustrated in our issue of 1st July last), and the front quadrangle has now been completed. A new lodging has been built for the President at Magdalen in harmony with the Founder's Tower and the new St. Swithin's Quod. At Queen's the ravages of the late fire have been made good, and all the division walls are now carried 1½ft. above the roof so as to divide the staircases in case of a recurrence of fire. A new tutors' residence is in progress at University from Mr. Johnson's designs; and Exeter has during the vacation been redrained. Extensive new buildings are also being carried out at Hertford College, on the Catherine-street front, by Mr. Jackson. The unsightly blank wall at the east end of the new schools is now covered by a new block for unattached students, and an old building which obstructed the view of the east front has been removed. The erection of Mansfield College on the old Penton cricket ground is advancing fast, from plans by Mr. Basil Champneys. At Somerville Hall, for lady students, designed by Mr. H. Wilkinson Moore, and illustrated by us on the 9th ult., the first block has been built by Messrs. Symon and Co., of Oxford. The University Museum is being extended. Besides these University buildings, much is going on in the way of extending the city. In the north, one or two new roads are in course of construction, and many of the residents are building for themselves new houses. The increasing population has necessitated an extension of the gas works, to which a new gasometer and plant have been added at a cost of £20,000. The water company have now completed the laying of a 24in. new main from the river above King's Weir to their works, by which a new supply of 2,000,000 gallons a day is available. The cost of this work is estimated at £12,000. New parochial buildings for St. Clement's, illustrated by us on May 27 of the present year, have been erected from Mr. H. Wilkinson Moore's designs.

Pillgwenlly, Mon. — The new Roman Catholic Church of St. Michael, at Pillgwenlly, near Newport, Mon., was opened on Michaelmas Day. It is in the Gothic style of architecture. It comprises nave, aisles, sanctuary, confessional, two side chapels, and sacristy, and will accommodate 600, exclusive of the gallery. The internal dimensions are: Length, 108ft.; width, 49ft.; height to wall plate nave, 35ft.; to ridge of roof, 61ft. The base of the tower only is built yet; but it is intended to carry the tower and spire to a height of 120ft. The architect is Mr. W. Gardner, and the contractor Mr. W. N. Blackburn. The building cost £3,377, exclusive of fittings.

Pollokshields, Glasgow.—A new church erected in Pollokshields for the Stockwell Free Church congregation, was opened on Sunday last. The buildings comprise a church seating 1,000 people, church-hall seating 480, large classrooms, session house, ladies' room, vestry, &c., have been designed by Mr. John B. Wilson, A.R.I.B.A., Glasgow, his scheme having been selected by the committee from those submitted in competition. The style is a free treatment of Italian Renaissance. A tower rising to a height of 140ft. forms a conspicuous feature of the design externally. The interior of the church is free from columns; the area, 52ft. wide, being roofed over in a single span with double coved ceiling, across which the roof-couples are partly shown in ornamental construction. The contractors for the various departments of the work, mainly of Glasgow, were:—Mason, Mr. P. Shannon; wright, Mr. D. Buchanan; plumber, Mr. W. Anderson; slater, Mr. A. Sinclair; plasterer, Mr. A. Brown; glazier, Messrs. Meikle and Sons; painter, Mr. W. Stevenson; gasfitters, Mr. H. Buchan, Glasgow, and Mr. T. Main, Birmingham; heating, Messrs. Cook and Co., Edinburgh; upholstery and carpets, Messrs. T. and J. Smith; tiles and mosaics, Mr. T. Main; and wrought-iron gates and railings, Mr. George Adam, Partick. Mr. George Banks was clerk of works.

Whetstone, N.—On the 15th the memorial stone of a Congregational school-chapel was laid. The style of the building is a simple treatment of the Early Gothic. It is faced with white bricks, with Bath-stone dressings and tiled roofs. Accommodation is provided in upper floor school chapel (60ft. by 35ft.) for about 350 adults, with a vestry, tea-making room, &c. On ground floor will be an infants' class-room, a lecture-room, vestry, and five class-rooms. The contract for the main building, including lighting, heating, &c., is £2,007. The architect is Mr. George Baines, 4, Great Winchester-street, E.C., whose designs were chosen in a limited competition. The builder is Mr. R. G. Battley, 21, Old Kent-road, S.E.

The parish church of Detling, Kent, was reopened last week, after extension of the north aisle, addition of organ chamber built in the Perpendicular style, and removal of the western gallery. Messrs. Clarke and Canning, of Stratford-place, W., were the architects, and Messrs. Wood and Sons the builders.

A marble statue of the late Earl of Iddesleigh was unveiled on Wednesday in the public gardens of Northernhay, Exeter. Mr. E. J. Boehm, R.A., was the sculptor.

CONTENTS.

Architectural Lecturing ... 608
Alterations in Oxford-street and Lincoln's Inn-fields... 603
Henley-on-Thames Sewerage ... 604
Education, Cultivation, and Examination ... 604
Light and Air: their Importance ... 606
The Dictionary of Architecture ... 607
The Sanitary Association of Scotland ... 607
Reredos, Newcastle Cathedal ... 607
Antique Stelæ at the British Museum ... 607
Effects of Variation of Temperature on Metal Roofs... 608
Permeability of Building Materials... 608
Wayside Notes ... 608
Engineering Notes... 609
Building Intelligence ... 610
Our Lithographic Illustrations ... 611
Furness Abbey: the Chapter House ... 611
Competitions ... 611
Architectural and Archæological Societies ... 630
Archæological... 630
Correspondence ... 630
Intercommunication ... 633
Legal Intelligence... 633
Water Supply and Sanitary Matters ... 634
Stained Glass ... 634
Our Office Table ... 634
Meetings for the Ensuing Week ... 635
Tenders ... 635

ILLUSTRATIONS.

NATIONAL GOLD MEDAL DESIGN FOR A CATHEDRAL CHURCH.—NEW REREDOS, LONG MELFORD CHURCH, SUFFOLK.—ESHER VILLAGE HALL AND LONDON AND COUNTY BANK.—VICTORIA TEMPERANCE HOTEL, BARNSTAPLE.—"IN NORMANDY."—DRINKING-FOUNTAIN AND CLOCK TOWER, STRATFORD-ON-AVON.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DESIGN FOR A CATHEDRAL CHURCH.

This design is arranged for a supposed rectangular site, the building lines being 360ft. by 265ft. The site is open all round. A rather elaborate phase of Decorated Gothic is selected, more as a study than for any preference for the style, a study of a similar nature having been previously made in Early English. The plan is arranged to bring the officiating clergy reasonably within view of the congregation, the pulpit standing under the crossing, the opening under the central tower being closed by vaulting. A choir vestry, not shown, is situate over the two clergy vestries, approached by a circular stair from the north aisle of the chancel. The organ galleries are carried up externally as a feature to give greater height for length of pipe. Arrangements are suggested for heating by hot water, accommodation being provided for boilers, gas engine, &c., under the vestries, the flue from which runs up the side of chapter house turret. The design is by Mr. F. Whitwell, York, and was awarded a National Gold Medal in 1886.

NEW REREDOS, LONG MELFORD CHURCH.

In the description of Long Melford Church given by Sir William Parker reference is made to a carved subject of the Crucifixion having formerly existed above the altar, containing many figures, horses, &c. On removing some woodwork a large recess was discovered, into which the new reredos is placed, the central panel being 7ft. in width. The design is by Mr. John Medland, of the firm of Messrs. Medland and Powell, and the work has been executed by Messrs. Farmer and Brindley.

THE ESHER VILLAGE HALL AND LONDON AND COUNTY BANK.

These premises recently erected at Esher are the result of a project originated by the late Duke of Albany, and carried out by the neighbouring residents after his death. They comprise a hall adapted for concerts and meetings, seating 430 persons, with accommodation for the local working men's club, and banking premises for the London and County Bank, with a manager's residence. The building has been constructed in local red bricks and half-timbered work, with Broseley tile roofs, at a cost of £4,200, by the contractors, Messrs. Oldridge, from designs by Mr. Wm. Harvey, F.R.I.B.A., and was opened by the Duchess of Albany in July last.

THE VICTORIA TEMPERANCE HOTEL, BARNSTAPLE.

The accompanying design, by Mr. J. King James, of Birmingham, was selected out of a large number in public competition. The front walls are of Appledore stone, and the roofs tiled; the internal walls are brick. The dining-hall will seat 150 persons; there are besides the coffee bar, commercial room, coffee and smoke rooms, private sitting-room, manager's room, and parcels room, 15 bedrooms, with ample lavatory and bathroom accommodation, and there is stable room for 80 horses. There are entrances both from High-street and Gammon's-lane, and there will eventually be an entrance also from Tuly-street.

"IN NORMANDY."

This is the title given by Mr. E. Jeaff-Jackson to the sketch which we publish from the Royal Academy Exhibition of an old French chateau stair-tower and turret. The author of the drawing is abroad, and no particulars having reached us, we are unable to give further details. It might be taken as a portion of the Bishop's Palace at Evreux.

STRATFORD-ON-AVON DRINKING-FOUNTAIN.

This structure is a gift from Mr. George W. Childs, of Philadelphia, to the town of Stratford-upon-Avon in the Jubilee year of Queen Victoria as a useful and much-needed object of utility, as a tribute to the memory of Shakespeare, and a mark and memorial of the friendly feelings now existing between Great Britain and America. The plan of the ground and second story is square, with buttresses placed diagonally at the corners. These are terminated by lions and eagles alternately, bearing the arms and symbols of the two countries. On two sides are large and massive drinking troughs for cattle, beneath which are troughs for dogs and sheep; on one side is a trough and spout for men. The whole of the plinth as high as the upper line of the troughs is, with the troughs themselves, of Peterhead granite. The remainder of the stone is from Bolton Wood, in Yorkshire, a fine-grained and extremely hard material of a delicate grey tint. It bears a remarkably fine arris, thus giving great sharpness and crispness of effect to mouldings and carvings. The carvings in the panels are emblematical of the nationalities of the United Kingdom, whilst the gargoyles, &c., represent some of the fantastic creations of Shakespeare in "Midsummer Night's Dream." The monument was inaugurated by Mr. Henry Irving on Monday last, the American Minister and other notabilities being present. Mr. Irving made a very eloquent and beautiful speech on the occasion. A luncheon given by Sir Arthur Hodgson, Mayor of Stratford, was afterwards served to 100 guests in the town hall, where speeches were made by the American Minister and others. Mr. Jethro A. Cossins, of Birmingham, is the architect, and the work has been carried out by Mr. Robert Bridgeman, of Lichfield.

A Roman Catholic school chapel in Hale-road, Walton, near Liverpool, was opened on Sunday. The new building, erected at a cost of £2,550, is in local grey brickwork, with Runcorn red stone dressings, and measures 103ft. by 17ft. The upper portion, approached by a stone staircase, will for the present be used as a chapel, and accommodates 500 persons. An altar and reredos have been erected within the sanctuary. On the ground floor are a schoolroom and three classrooms, with suites of lavatories and cloak-rooms arranged on one side. The accommodation provides for 470 children. The building is surmounted by a belfry. Messrs. Sinnott, of Liverpool, are the architects, and Mr. Foggarty the contractor.

The death is announced, at the age of four score years, of Herr Frederick Theodore Von Vischer, the distinguished German art critic. In 1844 he published his celebrated "Excursions in Criticism," which caused him to be suspended from his post of professor of art at Tubingen University, to which he was restored eleven years later. In 1857 his work on "The Sublime and the Humorous" was issued, and was followed by "Æstheticism the Science of the Beautiful," his most important production, and in which the history and development of æsthetic speculation from Kant to Hegel was traced.

The Congregational church in Carter-street, Uttoxeter, was reopened last week, after reseating in pitch pine and other improvements, carried out at a cost of £600. Mr. Isaac Wood, of Uttoxeter, was the builder. A new organ has also been placed in the church, built by Messrs. Nicholson and Lord, of Walsall, at a cost of £300.

FURNESS ABBEY: THE CHAPTER HOUSE.

The Chapter House is about 56ft. long by 42ft. broad. On the east side of the cloisters are three large Norman archways—the centre one leading into the vestibule of the Chapter House, and the others into cells—equal in size to the vestibule, which is about 12ft. square. The vaulted roof of the Chapter House has been supported by six clustered shafts, the capitals of which have been plain and foliated alternately. The room was lighted by 12 lofty windows; on the north side by two, which face the sacristy windows; and on the south side by four—the remaining six windows were placed on the east side, all being arranged in pairs. A raised platform or dais was carried round three sides of the room, reached by steps. The date of this part of the abbey is from 1120 to 1130. Over the Chapter House, which adjoins the south transept of the church, was the scriptorium or library, and south of the Chapter House are the remains of the once-busy fratry or day-room. The whole interior has been gorgeously painted and gilded. Our illustration of the north side of the Chapter House is from a drawing by J. Fredk. Wilkinson, of Kendal.

COMPETITIONS.

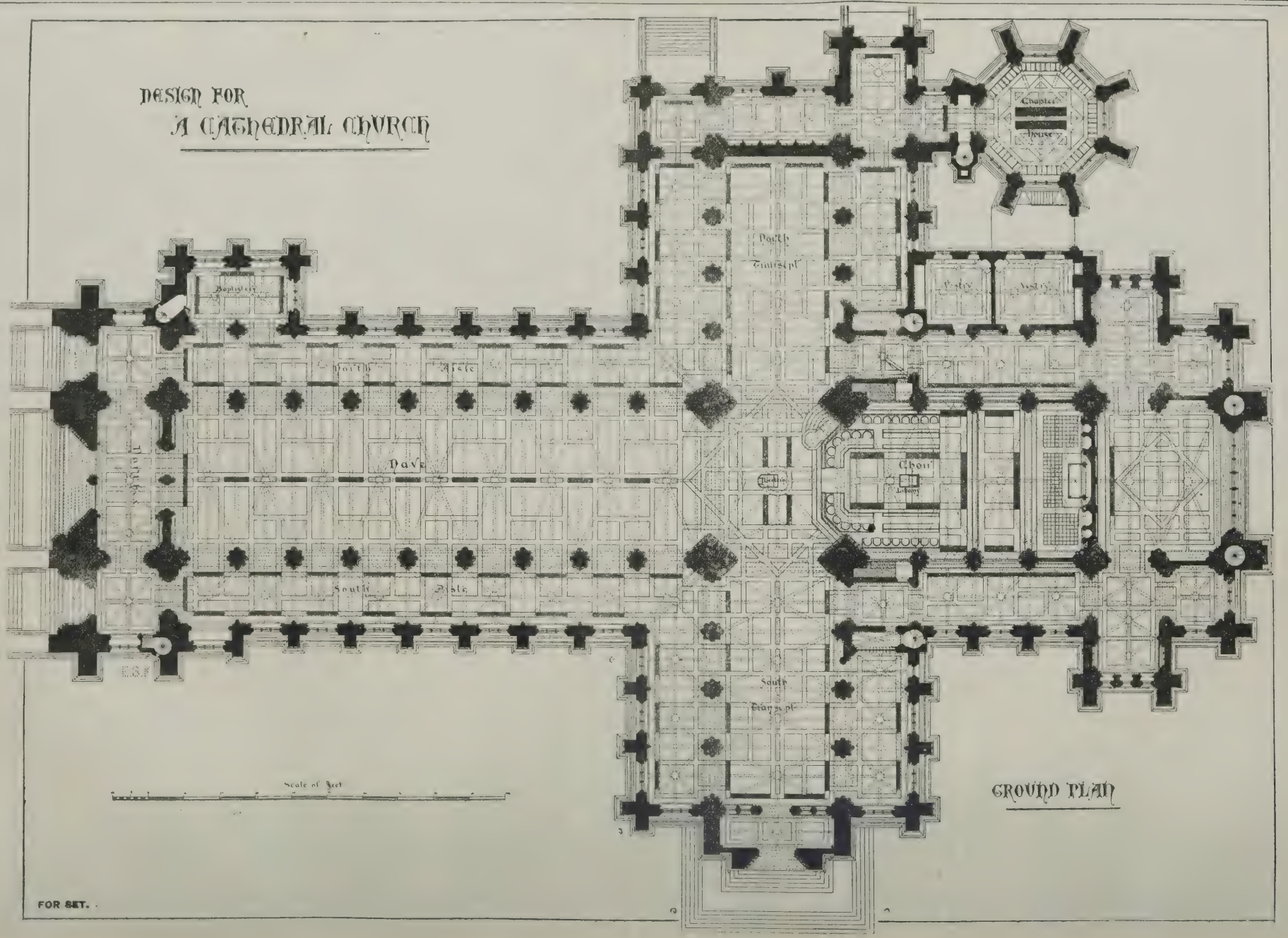
Leeds.—The population in the vicinity of Roundhay-road having increased with great rapidity of late year, it has been felt desirable to provide additional church accommodation for the district. With this object in view, it has been decided to form a new district by amalgamating portions of the areas attached to three other districts. A local committee has been organised, and is proceeding with the steps to be taken for the erection of the requisite buildings. A plot of land, extending from Harehills-road to Roundhay-road, has been given by Earl Cowper, upon which it is intended to erect a church, schools, and vicarage. Competitive plans were invited from several local architects, those submitted by Messrs. Chorley and Connon being unanimously accepted by the committee. The erection of the schools is to be proceeded with at once. These are to be used for service until funds have been raised for the completion of the entire project.

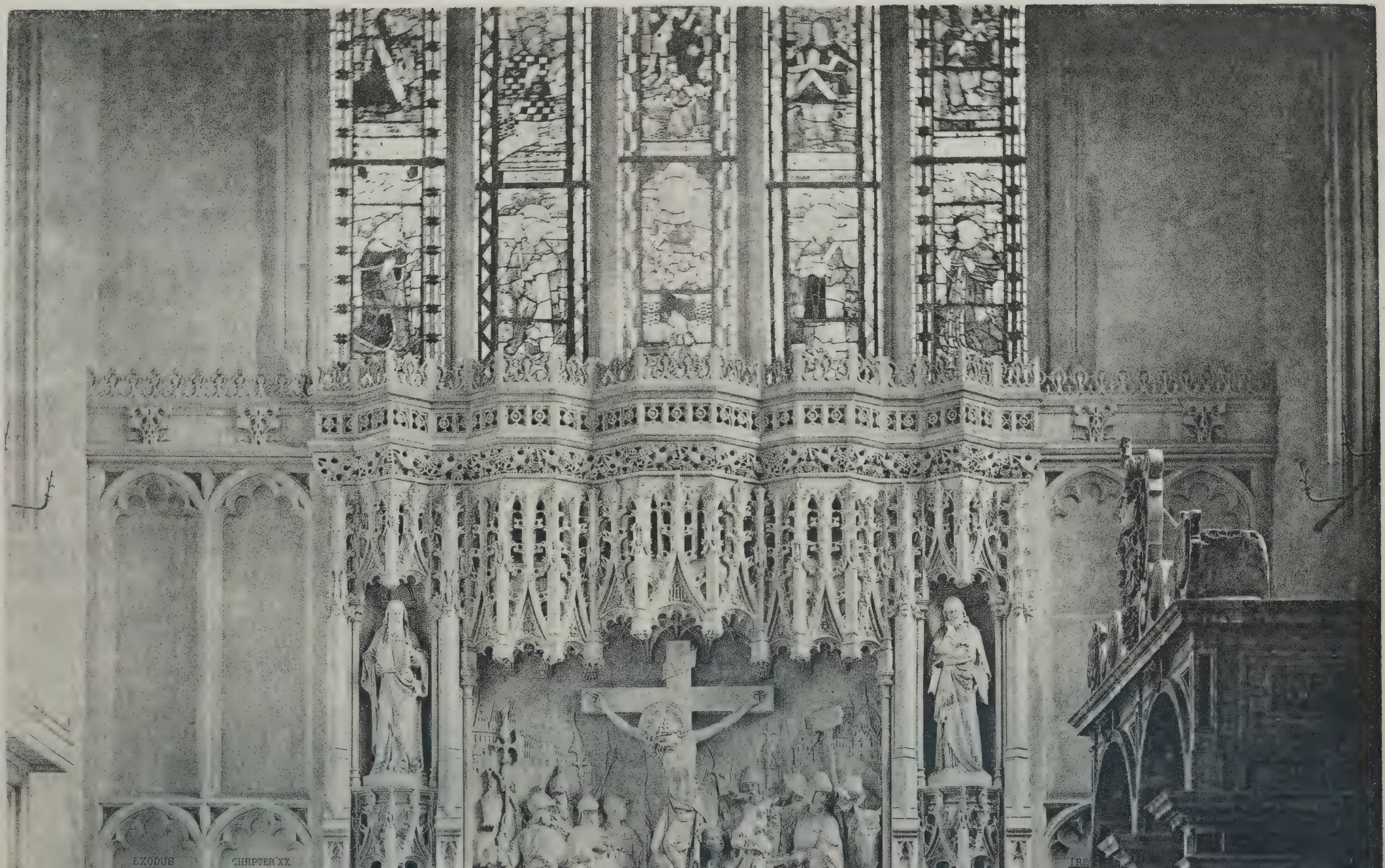
Paisley.—From about twenty plans sent in in competition for the proposed new county and police buildings for Renfrewshire, the Police Committee of the Commissioners of Supply have approved of the plans submitted by Mr. George Bell, architect, St. Vincent-street, Glasgow. The new county buildings are to be erected to the east side of the Sheriff Court-house in St. James-street, Paisley. The accommodation to be provided in the new buildings will include a county hall, apartments for the Commissioners of Supply and the Clerk of Supply, rooms for the County Road Board and the County Road Trustees, a Court hall for the Justices of the Peace, a county police office and cells, with dwelling-houses for Renfrewshire police officials.

South Shields.—In a competition limited to the architects of South Shields, the Burial Board of that town have selected the following designs submitted for their proposed new cemetery chapels and superintendent's house:—1. "Respice Finem," by Henry Grieves, A.R.I.B.A.; 2. "Accipe Homo," by Messrs. Stout and Dockwray. Six designs were sent in. The Board have given instructions to the author of the first to carry out the works, and have awarded a premium of 10 guineas to the authors of the second design.

Copies of four of Mr. Watts's pictures have been hung in the Church of St. Jude's, Whitechapel. They have been made under Mr. Watts's personal superintendence, and they had their finish from the master's own hands. The subjects of the pictures are "Love and Death," "The Messenger of Death," "Death Crowning Innocence," and "The Good Samaritan."

The east window of the chancel of St. Andrew's parish church, Moreton-on-Lugg, Herefordshire, has been filled with stained glass by Dr. Salviati and Co., of London and Venice, who have also decorated the ceiling of the chancel in blue and gold, and executed mosaic decoration on the side walls.


DESIGN FOR
A CATHEDRAL CHURCH
Chapter House
Porch
Transept
Baptistery
North Aisle
Nave
Choir
Library
South Aisle
South Transept
Scale of Feet
GROUND PLAN
FOR SET.


EXODUS
CHAPTER XX.



"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C

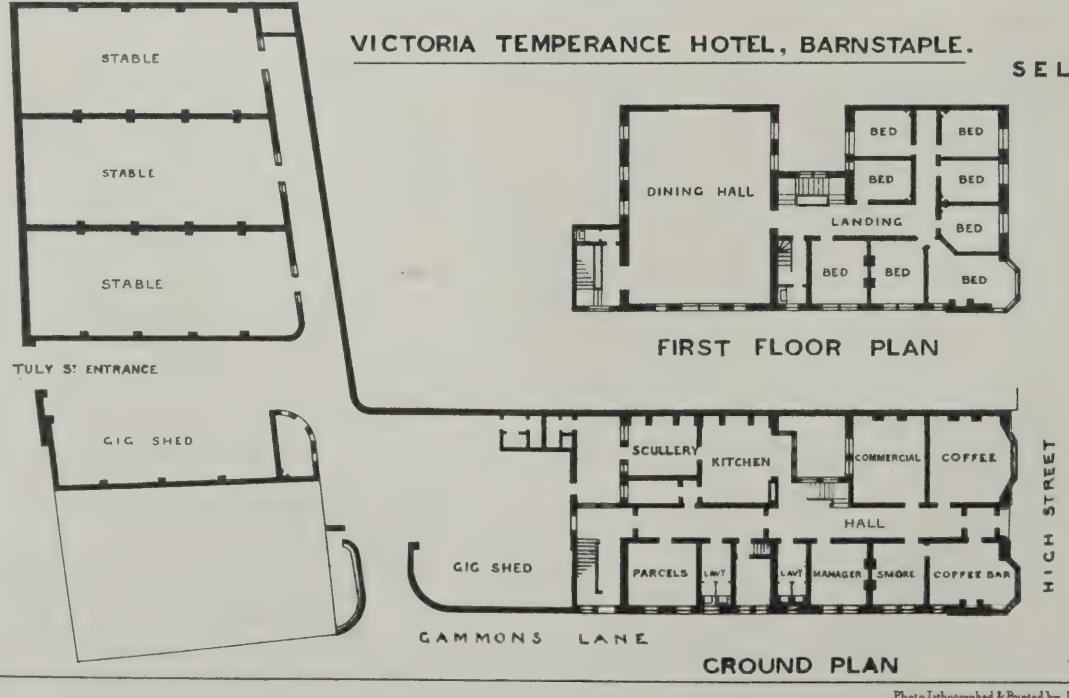
NEW · REREDOS · LONG · MELFORD · CHURCH · SUFFOLK

J · MEDLAND · ARCHT



VICTORIA TEMPERANCE HOTEL, BARNSTAPLE.

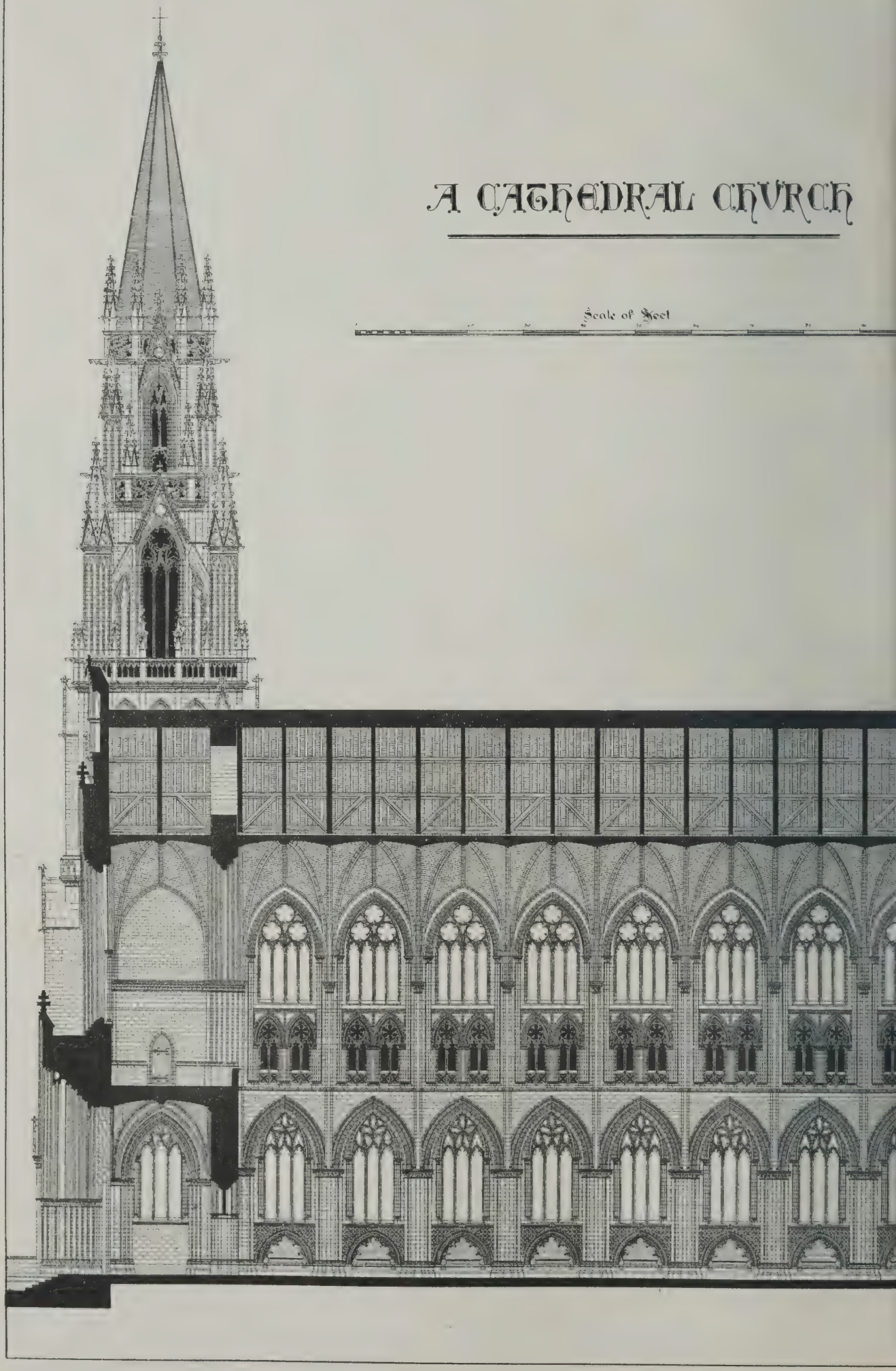
SELECTED DESIGN

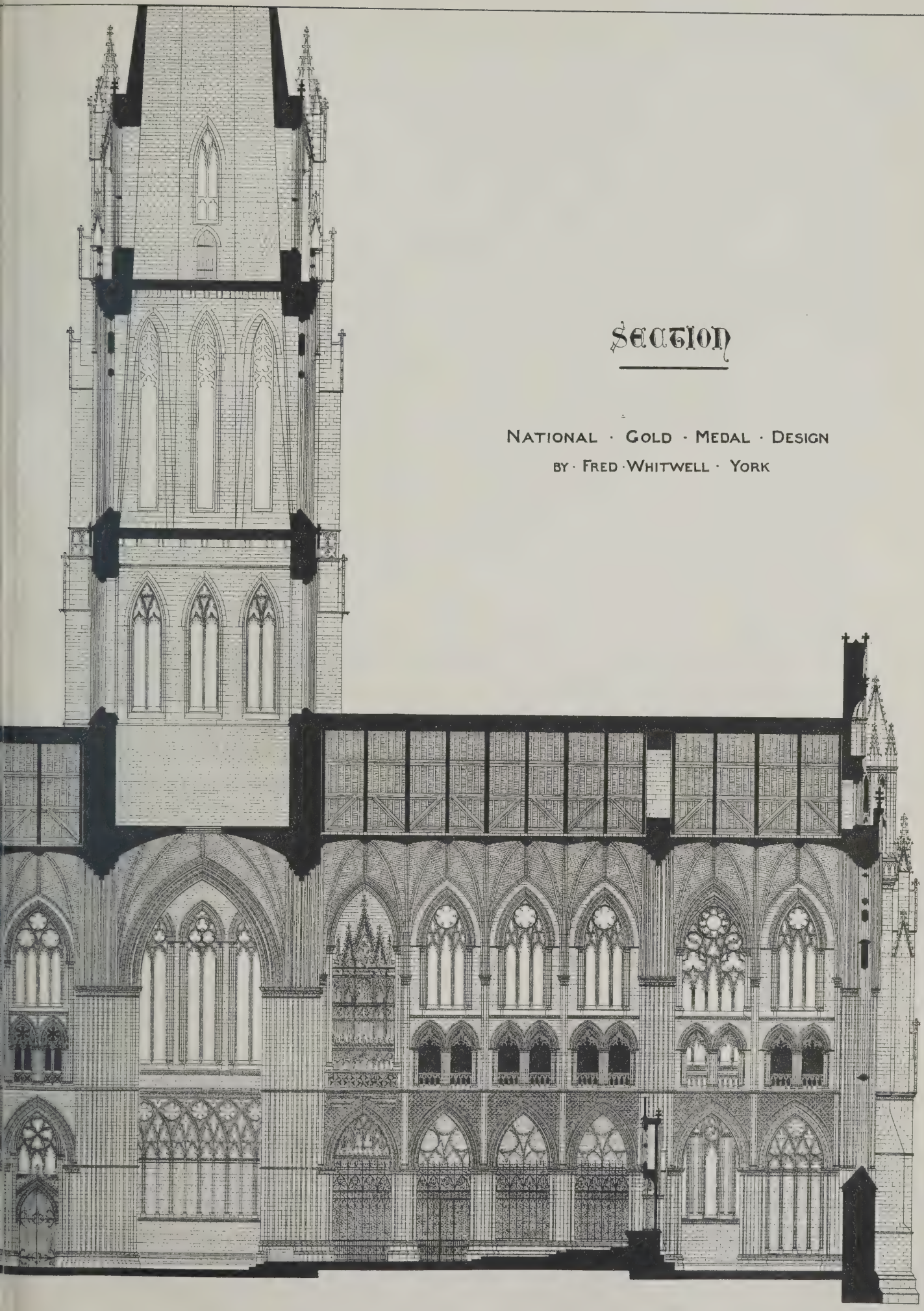


J. King-James
Architect. Birmingham.

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

A CATHEDRAL CHURCH



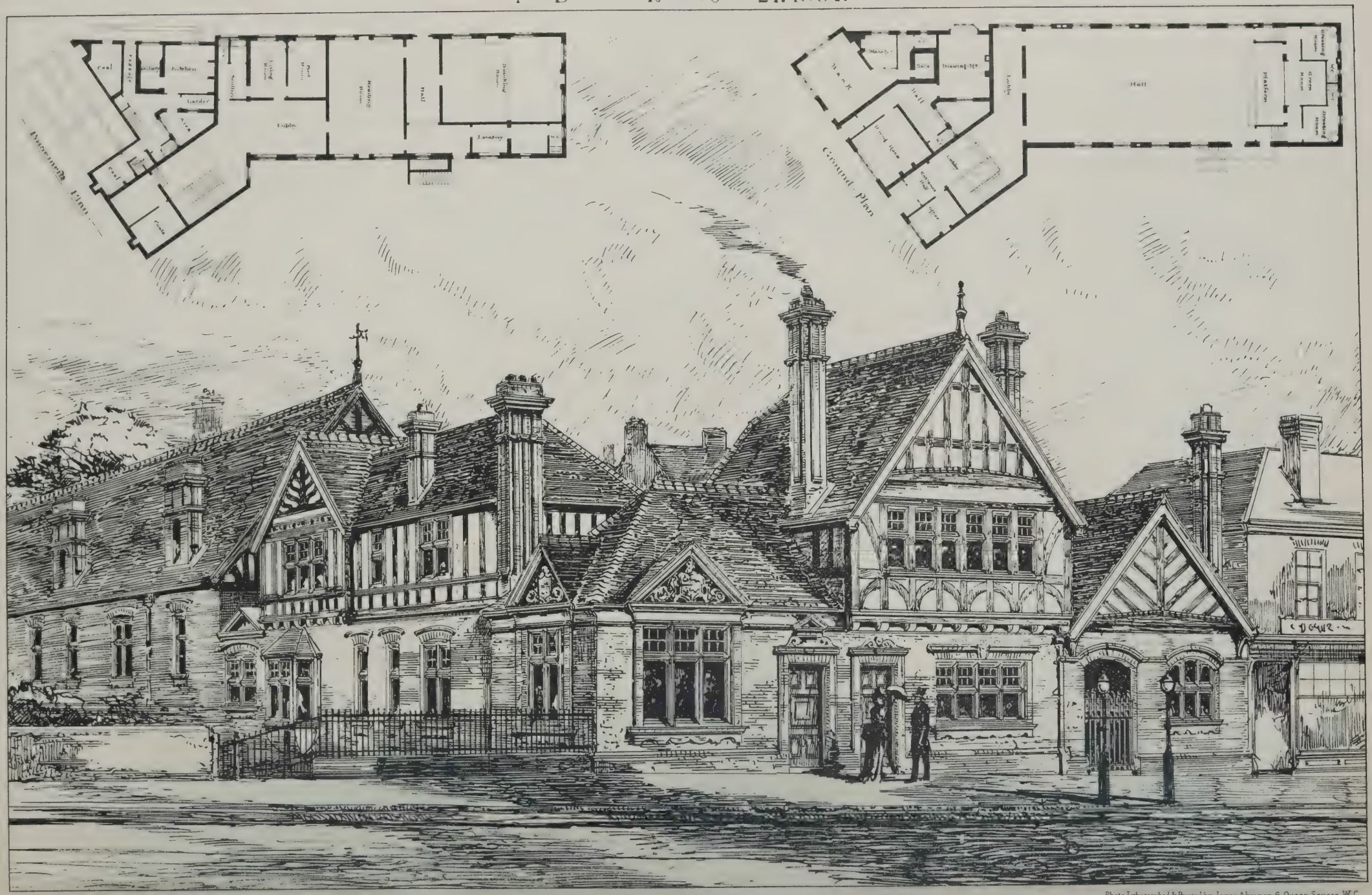


Section

NATIONAL · GOLD · MEDAL · DESIGN

BY · FRED · WHITWELL · YORK

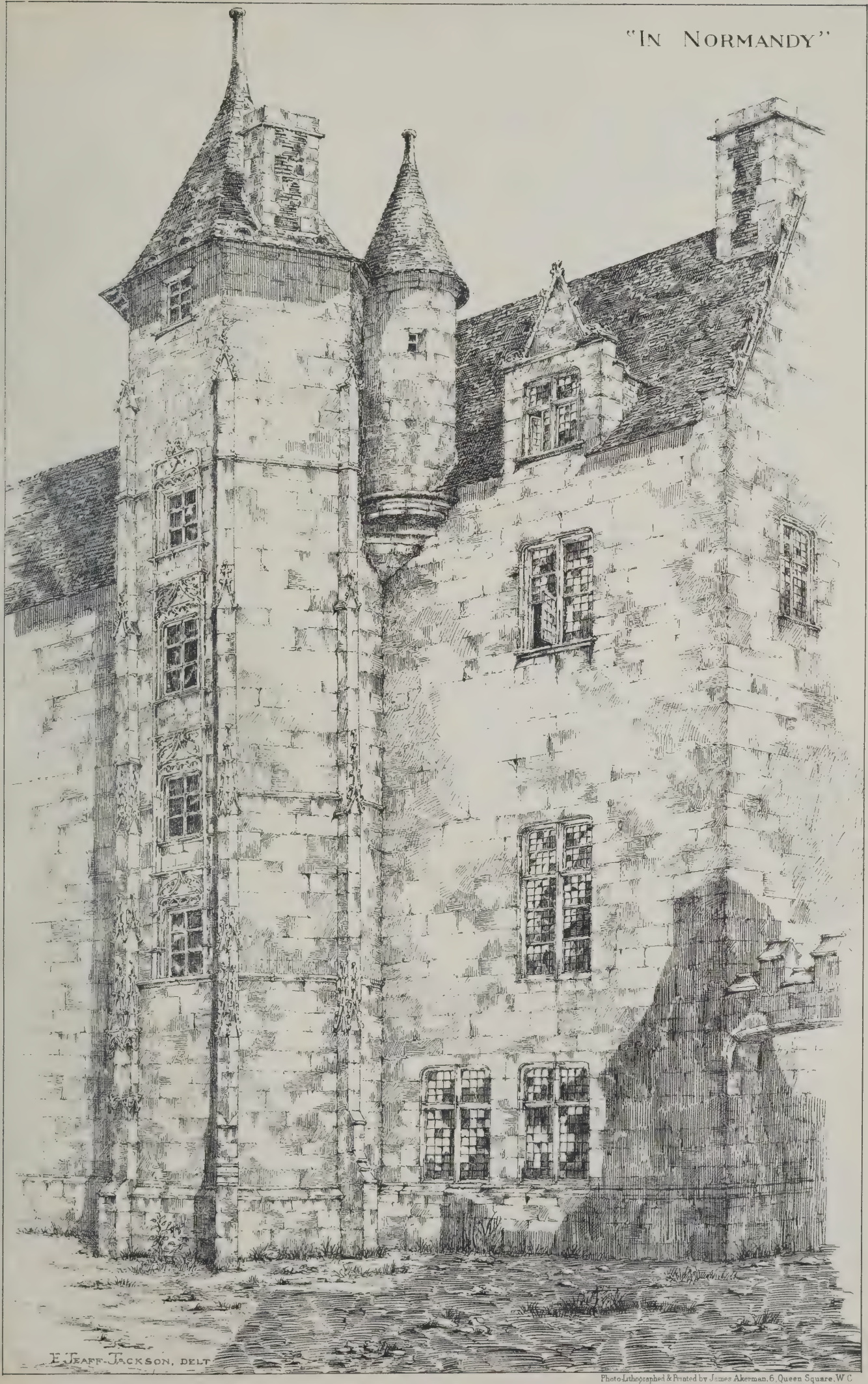
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ESHER · VILLAGE · HALL · AND · LONDON & COUNTY · BANK

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"IN NORMANDY"



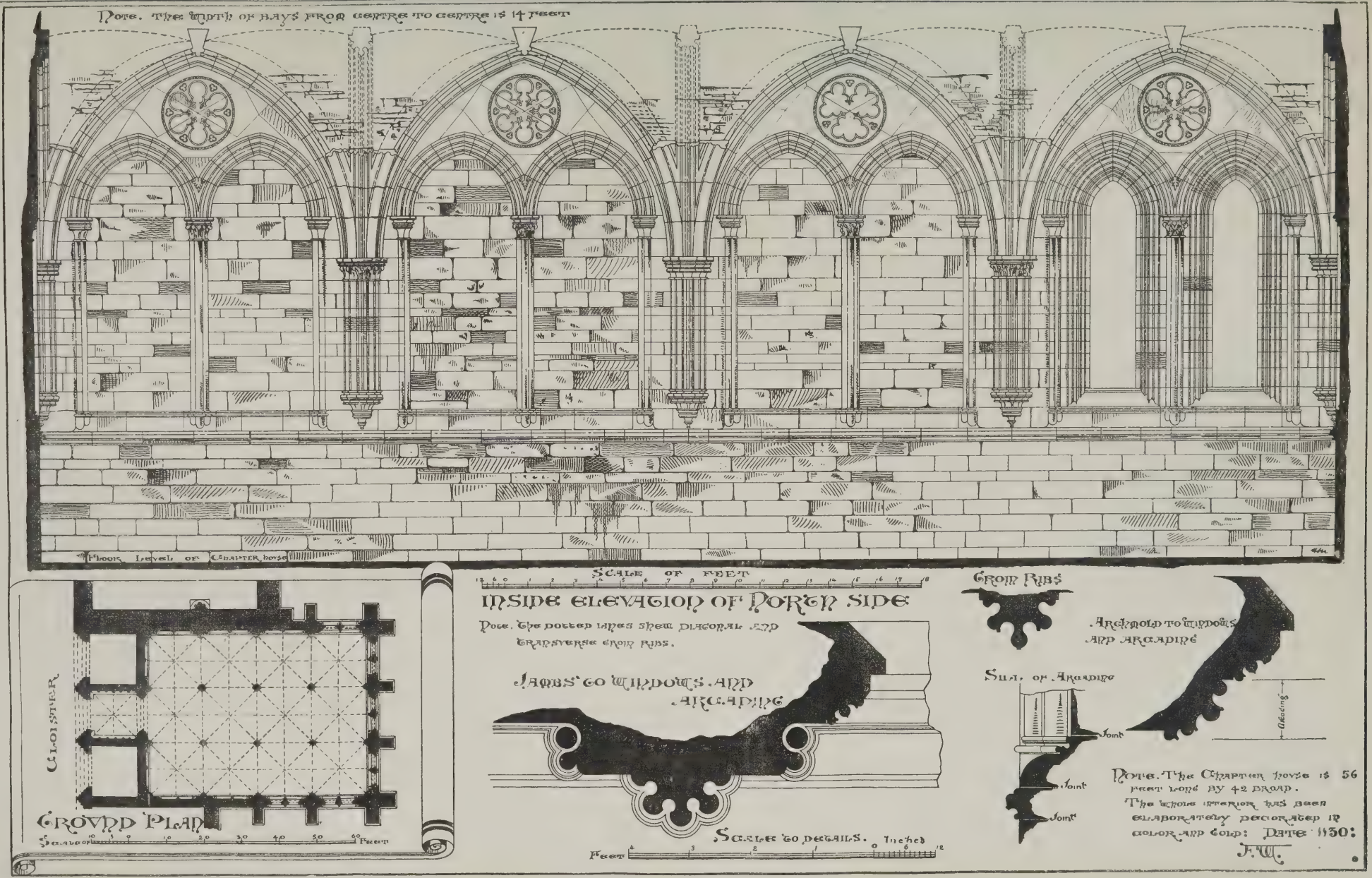
E. JEAFF-JACKSON, DELT.

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Drinking Fountain & Clock Tower Stratford-on-Avon — The Jubilee Gift of George W. Childs Esq^r Philadelphia U.S.A | Jeffery & Cossins. Architect. Birmingham

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C



Furness Abbey: the Chapter house

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Architectural Association.—The following is the programme of this Association for the ensuing session :—

Nov. 4th.—Annual Conversazione and Architectural Exhibition at the Assembly Rooms, Edgbaston.
Nov. 15th.—Paper by Mr. J. W. Bradley, B.A., "A Gossip about Old MSS."
Nov. 27th.—Paper by Mr. A. Reading, A.R.I.B.A., "German Romanesque" (illustrated).
Dec. 13th.—Paper by Mr. W. Wallis, F.R.G.S., "The Temples, Forum, Theatres, and Tombs of Pompeii" (illustrated).
Jan. 3rd.—Paper by Mr. W. H. Bidlake, M.A., "Optical Refinements in Architecture."
Jan. 17th.—Paper by Mr. W. Henman, A.R.I.B.A. (subject undecided).
Feb. 14th.—Paper by Mr. W. Wallis, F.R.G.S., "Pompeian Art," Lecture No. II.
Feb. 28.—Paper by Mr. J. W. Tonks, "Gold and Silver Keys."
March 13th.—Paper by Mr. W. Doubleday, "Mr. John Ruskin and the Stones of Venice."
April 3rd,—Paper by Mr. H. Lloyd, "Notes in Norfolk."
April 17th.—Paper by Mr. S. T. Holliday, "An Architectural Tour on the Mediterranean."

Manchester Architectural Association.—The thirteenth session of this Association was opened on Tuesday evening by a conversazione held at the Athenæum. The President, Mr. A. H. Davies-Colley, A.R.I B.A., received the guests, and afterwards delivered a short address. A number of architectural drawings and models, specimens of decorative art, furniture, and building materials were exhibited, and selections of vocal and instrumental music were given at intervals during the evening. The annual report of the Association, after referring to the services of the retiring president, Mr. Lawrence Booth, who has occupied the chair during the past two years, states that there has been an increase in members during the last twelve months, the total membership now being 11 honorary and 54 ordinary members. During last session papers were read by Messrs. L. Booth, W. Parslow, A. H. Davies-Colley, W. H. Littlewood, J. E. Pythian, H. E. Stelfox, W. H. Rawle, and J. B. Gass. In reference to the question of federation, the report observes :—"The Royal Institute of British Architects, in instituting the examination in architecture by formulating the draft charter and by reforms in its procedure, is placing itself more in touch with the great body of architects in the country than was ever the case before. Much, doubtless, remains to be done to make the Institute thoroughly representative ; but, while differences of opinion exist, the preponderance of opinion among our members is certainly in favour of working as much as possible in conjunction with the R.I.B.A." The awards in the Association classes are as follows :—Class of Design : 1st prize, Ernest Farrar (with Mr. J. Lowe) ; 2nd prize, A. S. Chadwick (with Mr. J. Horsfall). Class of Construction : 1st prize, A. S. Chadwick ; 2nd prize, Rd. Booth (with Mr. Lawrence Booth). The balance-sheet shows a total income of about £54, and the balance in hand is larger than last year, being nearly eleven guineas. The following is the syllabus for the ensuing session :—

Nov. 1, 1887.—President's Address.
Nov. 15.—Paper by Mr. J. Corbett. Subject, "House Water Fittings."
Nov. 29.—Reserve.
Dec. 13.—Paper by the Rev. R. H. Snape (Bolton). Subject, "Scottish Cathedrals."
Jan. 10, 1888.—Paper by Mr. C. Heathcote.
Jan. 24.—Paper by Mr. G. E. Statham (Nottingham). Subject, "Notes on Building Stones."
Feb. 7.—Paper by Mr. Edgar Atkins. Subject, "The Law in Relation to Architects."
Feb. 21.—Paper by Mr. W. C. Tuke. Nomination of Officers.
March 6.—Election of Officers.

Sheffield Society of Architects and Surveyors.—The list of members and rules of this newly-established society has just been issued, from which we learn that it commences its first session with forty-eight fellows (all of whom have been in practice as architects or surveyors as principals for not less than five years), twenty-two associates, and four students. Mr. T. J. Flockton is the president, Mr. F. Fowler vice-president ; Mr. J. B. Mitchell Withers treasurer, and Mr. W. C. Fenton, of Bower Spring, hon. sec., with four fellows and an associate as ordinary members of council. The objects of the society are defined in the rules as :—(*a*) The advancement of the profession of an architect and surveyor ; (*b*) for promoting and facilitating the acquisition of a knowledge of the various arts and sciences connected therewith, and the education of the junior members thereof ; (*c*) the consideration of questions of professional practice.

ARCHÆOLOGICAL.

Tockington.—The members of the West Gloucestershire section of the Bristol and Gloucestershire Archæological Society paid a visit on Friday to Tockington for the purpose of inspecting the remains of a Roman villa rediscovered three years since close to a farmhouse. Sir John Maclean, F.S.A., described the remains, which were originally partly uncovered in 1787, and again lost sight of. The remains appeared to be those of the foundations and tesselated pavements of a Roman villa, apparently of early date. Prebendary Smith agreed that the pavements were very good and of early date, probably of the time of Agricola, adding that this was the 27th Roman villa opened up in this country. He trusted that the excavations would be continued.

CHIPS.

A new thoroughfare in Poplar, 40ft. wide and 250ft. in length, was opened on Tuesday week. It has been made at a cost of £15,000, borne jointly by the Metropolitan Board of Works and the Poplar district board, and provides a new and shorter route between the City and the Isle of Dogs.

A new Free Presbyterian church and manse on the island of Bernera, Harris, have now been completed, and the church will be opened by the Rev. Dr. Rainy, of Edinburgh. The architect was Mr. Binnie, of Glasgow, and the contractor Mr. W. Bain, Benbecula.

The late Mr. Richard Berridge, a partner in the brewing firm of Meux and Co., has left the sum of £200,000 in trust for the advancement and propagation of education in economic and sanitary science in Great Britain.

A harbour is in course of construction at Portnochie, N.B., and will be completed in another year. Messrs. D. and T. Stevenson, of Edinburgh, are the engineers, and Messrs. Morrison and Son, of the same city, the contractors. The cost will be about £10,000.

The premises of Mr. J. Greenfield, in High-street, Belfast, occupying the site of two 18th-century houses, have just been rebuilt from plans by Mr. James J. Phillips, Antrim-street, Belfast ; Messrs. John Lowry and Son were the contractors.

Mr. Alfred E. Hewitt, at one time master of a branch of the Birmingham School of Art, has been appointed principal of the Guernsey School of Science and Art, which was declared open last week by Lieutenant-General Elkington, C.B., Lieutenant-Governor of the island.

The Free Libraries Act was adopted at Welshpool on Saturday. The nucleus of a library is provided for by the presentation to the town of the Powysland Museum and Library, valued at £6,000.

A stained-glass window of three lights has just been inserted in the north aisle of Buckland Filleigh Church, Devon, in memory of Mr. W. B. Browne, 16th Lancers, who died in the Soudan Campaign. The subject is "Moses striking the rock." The artists were Messrs. Savile and Young, and the architects, Messrs. Hooper Bros., Hatherleigh.

A new chapel for the Wesleyans of South Bank district, York, was opened on Thursday, the 13th inst. Designed by Mr. Charles Bell, of London, it has cost, including site, £6,000, and seats 650 persons.

Mr. Webster, the borough surveyor of Malton, who has for some weeks been suffering from typhoid fever, is now convalescent, though still confined to his room.

Owners of first-class pictures by deceased British artists, commencing with Hogarth, up to date, who are willing to lend them to Sir Coutts Lindsay, are requested to address him at the Grosvenor Gallery, London, where it is proposed to inaugurate the New Year with a loan collection of oil paintings, which will be limited to 100.

There has just been placed in the parish church of Runcorn a mural tablet to the memory of the late Canon Barclay, vicar of Runcorn. The tablet, which is made of white marble and alabaster, is from the establishment of Messrs. Williams and Clay, of Warrington. In the centre is a profile of the late vicar, flanked on the right side by a figure representing Industry, and on the left a figure representing Eloquence.

The tower of March parish church is about to be refaced, strengthened, and partly rebuilt, from plans by Mr. Bassett Smith.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings ; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

Received.—H. and S.—E. and H. L.—T. R. C.—R. S. N. and Co.—S. Bros. and Co.—W. C. and Son.—J. A. and Sons.—J. E. and Son.—J. G. A.—J. W. and Co.—C. E. and Co.—G. E. and Co.—G. and T. E.—A. B. and Co.

Apprentice. (Send to B. T. Batsford, 52, High Holborn, for a catalogue of his new and second-hand cheap architectural books.)

Correspondence.

A PROVIDENT FUND FOR ARCHITECTS ASSISTANTS.

To the Editor of the Building News.

Sir,—It was with pleasure I noticed in your last week's issue of the 14th inst. a suggestion for the formation of a fund for architects' assistants. This, to my mind, is a most desirable thing, and would tend to that unity wherein alone is strength, and doubtless would be beneficial in building up those constitutions that otherwise by the force of circumstances must succumb.—I am, &c.,

J. A. Piccaver.

165, Upland-road, East Dulwich, S.E.
Oct. 18th.

Sir,—The suggestion made in your last issue for starting a provident fund to help assistants during illness appears to be a very good one, provided only that care be taken in the distribution of the fund, that it may not be used to keep the idle when out of work at the expense of their more fortunate or more industrious brethren. So long as the fund is limited to providing medical aid to assistants who are in want of it, with, as it grows, beds constantly kept ready for use in one or other of the pay hospitals, and possibly a cottage by the sea, to eventually become a convalescent home, nothing but good can come of the movement, and I am sure most assistants would subscribe to the fund. Those who are now earning money would know that they were providing for themselves against a rainy day, whilst in

the mean time their money was being used for a good purpose. I would suggest that the secretary of one of the professional societies should act as secretary to this fund, the president being permanent patron, whilst the fund should be entirely under the control of a committee of assistants, formed for the purpose under the Friendly Societies' Acts.—I am, &c.,

HOPEFUL.

ST. OUEN, ROUEN.

SIR,—The author of "Wayside Notes" is, I think, in error when writing of the west front of St. Ouen, Rouen, as a "dreadfully hard piece of *restoration*." The west front of St. Ouen was never completed, and the portal and two towers which now form the front were built in 1846-52, unfortunately not carrying out the original design, which still exists in the library. Otherwise, I quite agree with your correspondent that nothing will be more terrible than French restoration.—I am, &c.,

R. PHENE SPIERS.

[Mr. Phené Spiers' correction, for which I am obliged, hardly affects my argument. It will be remembered I said that—"French restorers, like new brooms, *generally sweep clean*." Surely there was a pretty clean sweep at St. Ouen when the diagonally-set tower-stumps (which, I believe, had been carried up in the Middle Ages to an elevation of 50ft.) were pulled down to make way for the present overgrown *flèches* of despicable outline and ignoble proportions. Ruthlessly to pull down the commencement of an old west front to a noble church is a piece of very hard restoration indeed. For the hardest restoration would appear to me to be that which is most unlike, and most careless and destructive of the work of the old builders. Still, my apologies are due to any youthful readers who I may have led into believing that the west front of St. Ouen is a literal restoration of an old piece of design and workmanship.—GOTH.]

FOREMEN OF MASONS.

SIR,—I have read with interest the letter from a "Banker Hand" which appeared in your issue of the 23rd of September, and am constrained to ask permission to make a few passing remarks thereon.

Your correspondent states truly that foremen masons are occasionally sought after by means of advertisements in the papers. I will just pause to say that the same will apply to foremen in all the other branches of the building trade, and unquestionably for the same reason.

To proceed, "Banker Hand" not unreasonably asks, Could not the appointment be made from the ranks of the staff of workmen in the shop where the vacancy is to be filled up? and further inquires, If it is just to those men that a sranger should be brought into their midst?

So far so good. But "Banker Hand" ought to know that justice or sentiment has no place in the calculations on either side. What appears to his rather obscure vision as an act of injustice is undoubtedly to the other side a matter simply of expediency.

Time was, though probably not within the experience or recollection of "Banker Hand," when a master in any particular branch was a master in fact as well as in name; that is to say, he was a master of the craft, and presumably he might himself have risen from the ranks, and it became at once his pride and glory to move about amongst his men, and not unfrequently took a place beside them at the banker or the bench, as the case might be; between them and him there was a perfect understanding and a reciprocity of interests. He would know, as no one else could know, their individual capabilities and character, and would place his confidence and fix their rate of wages accordingly as each one distinguished himself, thereby infusing amongst them, from the highest to the lowest, an active and laudable spirit of emulation with the most satisfactory results all round. Under auspices such as these the master would experience no difficulty in selecting the right man for the right place, and consequently have no need to advertise; they (the men) on their part would be under no fear that a stranger would be brought into their midst to rule over them.

But time and circumstances have changed all that, and, however much it is to be regretted it is nevertheless a fact that the old race of masters who desired nothing more than to remain as such to the end of the chapter are unfortunately all clean gone—never, I fear, to return; and in their place has arisen a new line of men who act as "general contractors," who, so long as they can command capital, need not necessarily be craftsmen at all, but simply *financiers*, whose chief aim and desire is to grow rich in the shortest possible period of time, the foreman acting the part of master craftsman, on whom alone devolves the duty of supervision; in them only the employers place their confidence, which they (the foremen) are allowed to retain just so long, and no longer, than the financial results are satisfactory to their chief; and in case of the foreman seeking a new appointment, his chances of success depend upon whether or not his credentials state that his work came out a financial success. Herein lies one of the most cogent reasons why foremen are occasionally advertised for.

Then, on the other hand, in the stead of the old school of artisans, who, with good reason, prided themselves upon the mutual good understanding that in their time existed, as it ought to exist, between master and man, has grown up a class of workmen, styled *employés*, who have been taught to believe, and persistently cherish the belief, that the employers are a common enemy, who deserve to be swept out of existence altogether, forgetting the while the naked fact that as yet, up to the present time, they have discovered nothing which they could set up in their places. They, the employers, are credited with having but one anxiety in regard to their employés—that is to get as much work done per hour as they can possibly wring out of them, under the fear of discharge, with its accompanying search after another job. While they on their part entertain a fixed determination to render just so much and no more then they can, under the circumstances, possibly help. The good old healthy spirit of emulation is dead and buried, having been wilfully murdered by the blighting and undermining influences of the much-to-be-deprecated system of a uniform rate of pay; and when by chance its ghost reappears, as it occasionally does, in the shape of some more than usually intelligent and especially skilled artisan, who also, being industriously inclined, its stay is in most cases exceedingly brief, for he that being in possession of those rather exceptional qualifications, has the temerity to put them into practice in the presence of his fellows for the purpose of advancing his own individual status in the eyes of his foreman, and, through him, the esteem of his employer, with the view of some day being lifted into a position of trust and its accompanying reward in the form of a higher rate of wage, must be possessed of a larger share of moral courage than falls to the lot of the majority of workmen nowadays if he is able to withstand the pressure that is certain to be brought to bear upon him. Thus it is that individual excellence is in so many instances stifled at its birth, or, at least, stunted in growth.

There is yet another reason which doubtless influences an employer when he is induced to seek amongst strangers for the purpose of filling up a vacancy in his staff of foremen—namely, such a one in his estimation would possess superior advantages over one selected from amongst those over whom he will be appointed to rule, in the fact that he would at least be a free agent, and thereby armed with an independency of action.

I believe these facts—for facts they unmistakably are—will sufficiently explain away the apparent mystery which caused "Banker Hand" to propound his question.—I am, &c.,

J. WOODLEY.

ST. ALBAN'S ABBEY.

SIR,—The following appears in a recent issue of the *Herts Advertiser and St. Alban's Times*:—

"We understand that a large tank is being placed in the bell-chamber of the tower, the weight of which when full will be about ten tons. We pointed out a few weeks ago that cracks were showing themselves on the eastern arch of the tower, and yet fresh weight is being added! It may be that there is no danger; but it would be satisfactory to the large congregations which attend the Abbey every Sunday if some assurance were given by a competent authority that there is no likelihood of the tower giving way under the strain. Now that the hoarding which has for some time hidden the south transept is being removed, the interior presents itself in all the ugliness of a Grimthorpean restoration. The old ceiling has disappeared and a plain *pitch pine!* one has taken its place, while the five tall lancet lights of the new south window, all of exactly the same height, and rising to an equal level at the top, would not do credit to a Salvation barracks. The old south window, whether a genuine Perpendicular one or only a modern imitation, was certainly far preferable to the present monstrosity. The old features of our ancient Abbey, hallowed by the associations of bygone days, are fast disappearing."

The fine old panelled roof of English oak that has been taken off to make way for Lord Grimthorpe's abortion in pitch pine, was commonly reputed to have been decorated with its quaint painting in Abbot Wheathampsted's time. (John of Wheathampsted was the 33rd Abbot of St. Alban's, one John Bostock by name, and ordained A.D. 1382.) What *will* be "done" next?—I am, &c.,

NON-BECKETT.

ESCAPE FROM FIRES AND PANICS IN THEATRES.

SIR,—Agreeably with the suggestion in your "Wayside Notes," I send you particulars of the means about to be adopted in the Nottingham Theatre Royal for improving the exit from the gallery, which at present is no better than that which was provided for the Exeter Theatre.

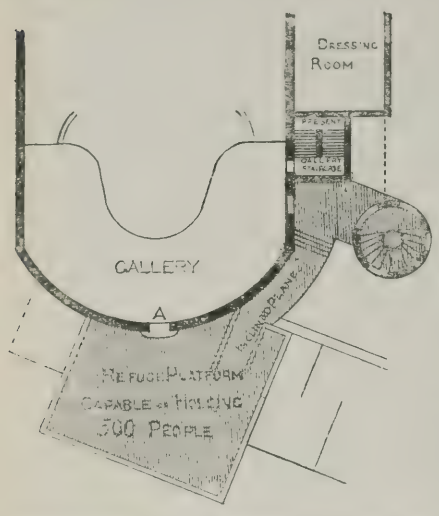
In respect to this part of the building, I am of opinion that it represents all that is necessary as a provision for the safety of the occupants—at any rate, I think it would be found to be more adequate than is contained in one of the recommendations of your contemporary, the *Builder*—namely, that an audience should learn to acquire that degree of self-control as would enable them "*to take military order*, and walk downstairs in step, three abreast, or as many as the width of the stairs allow."

In the instinctive eagerness to gain the outlet on the dire occasion of a panic, my own experience tells me that the possessor of the coolest head will not scruple to trample over the body of his most respected neighbour, and, assuming the audience always to remain the same, I question whether any amount of discipline and drill would qualify them to behave in the orderly manner above named.

[The roof over the portico and rooms behind the same will be converted into a platform, protected by iron railings, and made level with the gallery, from which wide fire-proof doors will open outwards on the platform, and this will be large enough to contain the whole of the gallery occupants. From this point an open balcony will communicate with an outer staircase, free from sharp turnings, and leading to the ground. In case of fire the audience would naturally make for the more immediate opening leading on to this platform, and, finding themselves in the open air and separated from the building by a brick wall, would feel such a sense of security as would enable them to descend from this temporary haven of refuge in a quiet and orderly manner; but so long as a single internal staircase is the only means of exit, as at Exeter, the same direful consequences would inevitably ensue. Should any additional exit from the upper circle be needed, a doorway and outer wide landing might connect this corridor with the proposed new staircase. Wherever an outer balcony and exit therefrom are practicable as a means of escape from the galleries of our other public buildings, it is hoped that the proprietors will at once see the necessity of making such provision against fire and panic, and thus prevent a recurrence of those terrible calamities of which there have lately been so many. In the plan, "A" indicates the position of the new exit from the gallery on to the refuge platform. This is by means of spring doors opening outwards on to the refuge platform, which is level with the uppermost of the stepped seats of the gallery, thus, as an exit, avoiding the precipitant rush which would otherwise be made on to the occupants below.

The egress from this platform will be by a

wide balcony on the outside of the building along an inclined plane of one in six, at the foot of which will be another exit from the



lower corridor of the gallery on to a large landing, and at the extremity thereof a circular staircase, consisting of four flights of broad steps, separated by spacious landings, will lead to a yard communicating with the street.]
—I am, &c.,

Thomas C. Hine.

Victoria-street, Nottingham, Oct. 8, 1887.

GANGWAYS v. STAIRCASES.

Sir,—Since the fire at Exeter Theatre, the question of exits and entrances has been prominently before the public, and the question of the best form of staircase discussed. I may state that in connection with public buildings stairs are a mistake, and I would in their place recommend a staircase in the form of a gangway. The reason I have for advocating the gangway is the ease with which you can ascend or descend. In public works, especially dye-works, they will not use the stair, but gain access to the several floors by gangways with a rise of about 5ft. in 12ft. or 13ft. of length, and any one watching the speed and ease with which the workers run from floor to floor would at once understand why staircases are not used. Of course, architecturally, they have not the dignity of the staircase; but, in theatres and music-halls, dignity is secondary to security. The advantage of the gangway is easily explained. In going down a stair, each step, or, in a hurry, each second step, must be taken, and the slightest mistake throws the person down. In a stair 12ft. long, at least six different steps require to be taken: in a gangway of the same length, a person in a hurry, or in the excitement of a panic, would take it in two bounds, and with perfect safety. I would like if you would publish this, that the opinion of your readers might be taken.—I am, &c.,

A. Lindsay Miller.

DRAIN TRAPS.

Sir,—I observed in your issue of last week, on p. 601, a letter from Mr. Wm. Brown, architect, York, referring to illustrations and description of traps on p. 565. Since reading Mr. Brown's letter, I have again carefully measured one of the traps referred to in my former letter, and I now beg to confirm the description on p. 565, and beg leave to correct Mr. Brown's figures, and when put in his style of description would read: "The opening at the bottom of the 6in. trap, taken vertically, is 2½in., and the dip or water seal 3⅜in." The oblong inspection openings are made about 1ft. 3in. long, on the 6in. traps. The proprietor states that it was upwards of eighteen years since the house was built, and no alterations were made on the drains till this year. Surely, Mr. Brown can find a difference between the trap shown and described on p. 565, and the patent trap he described in his letter.—I am, &c.,

Oct. 17th. Clerk of Works.

THE WEST OF SCOTLAND SANITARY ASSOCIATION ON HOUSE DRAINAGE.

Sir,—After many years' practical experience, full and careful consideration of every detail, and application of every possible test known to me, I beg to confirm Mr. Buchan's statement, and maintain that the principle of trapping and ventilation of drains described as executed by him at "Hulmhurst," Glasgow, is much better, and a better protection to the inmates of the house than the faulty principle described as "desirable improvements" by the Sanitary Association, and I cannot concur with "Engineer" when reported to have said that the soil-pipe was the natural ventilator for the drain, or, rather, the tail-drain.

The traps at the foot of soil and waste pipes should be placed a few feet from the vertical pipe, so that the force, or velocity of water does not damage the seal of trap.

In some cases it is perfectly safe to ventilate the drain between house and disconnecting trap by means of a rain-water pipe, well jointed, and placed a few feet from the windows. It is not safe to use rain-water pipes as drain ventilators on any house having dormer windows; but what is suitable for one house may be quite the opposite for another. Only one safe principle can be applied generally for the drainage of every dwelling-house—that is, place a disconnecting-trap in manhole at the furtherest possible distance from the house, and place traps on each branch drain to soil and waste pipes, &c., and ventilate the drains between the traps as circumstances will permit. The soil, waste, and ventilation pipes should be extended full bore to the roof at a point well exposed to the wind but in no sheltered position, such as the side of a chimney stack or terminating on a gable. The upcast current will be very good if the pipe is taken about 2ft. through the side of an ordinary roof, if it is not suitable to extend it to the ridge.

The following tests will show all that can be obtained with the best arrangements as advocated by the sanitary associations and under the most favourable circumstances — viz., temperature at manhole grating in side wall, 46°; temperature at top of soil-pipes, 47°; manhole 9ft. deep with disconnecting trap, and length of drain 40ft., connected to 43ft. of vertical soil-pipe, giving an upcast current of air 48ft. per minute in a 4in. pipe. In another branch drain 80ft. long, off the same manhole, with soil-pipe 40ft. high, shows an average of 50ft. per minute of air passing up a 4in. soil-pipe. The wind was blowing at the rate of 300ft. per minute on the side of house where the 40ft. soil-pipe was situated.

The following is another test during a higher temperature and much stronger wind:—Temperature at air inlet on surface, 55°; temperature at top of soil and ventilation pipes, 55°; depth of drain at manhole, with trap, about 3ft., and length of drain about 30ft., and height of pipes 63ft., with a current of air passing through a 4in. pipe to the trap at the rate of 40ft. per minute. Perforated conical taps were fixed on the 4in. soil pipe and 3in. ventilation pipe, and when the taps were removed the air current increased to 70ft. per minute. The wind was blowing at the rate of about 900ft. per minute over the top of soil and ventilation pipes.

I beg to suggest that Mr. Buchan should go to "Holmhurst," and make an exact plan of the drains with the various traps, soil, and waste pipes, &c., and take the temperature at air-inlets and at top of soil and ventilation pipes; test the inlet current of air at each trap, also at inlet to manhole with disconnecting trap, and the wind-current passing over the top of pipes; and during the same day, if possible, test a house as executed on the principle recommended by the sanitary associations, and I can assure Mr. Buchan that the results will repay his trouble, and be of much interest to your readers.

Very few of our sanitary "engineers" and young architects, following in their footsteps, know the effect which the flushing of one water-closet alone has on the current of air in drains and soil pipes. A pan w.c. flushed by a 1in. pipe will cause a downward current in a 4in. soil pipe at the rate of 130ft. per minute, and a washout w.c. about 18ft. above the drain level, when flushed with about two and a half gallons of water, will cause a downward current of air in a 4in. soil pipe and 3in. ventilation pipe at the rate of about 300ft. per minute. A washout w.c. about 10ft. above the drain level, flushed with a three-gallon cistern and 1½in. pipe, will cause a downward current in a 4in. soil pipe and 1½in. ventilation pipe at the vate of 480ft. per minute. The above tests are given to show that it would be much better to have a down current in the soil pipes, and the up-current in a separate pipe connected near the house side of trap.

Sometimes the "desirable improvements" recommended by some sanitary associations are rather amusing, and as an illustration, I may state that a member asked a report on a large town mansion he had purchased, and among other improvements recommended, was the removal of all the hot-water copper pipes, because the *couplings were old fashioned;* and the sanitary engineer recommended iron pipes instead of copper. It may be needless to add that the copper pipes, with their old-fashioned couplings, still remain.—I am, &c.,

Clerk of Works.

CHIPS.

The extension of Fisher-row school, just carried out for the School Board of Musselburgh, near Edinburgh, has just been completed, and has been opened this week. Mr. Dunn was the architect.

Dr. Gunning, of Brazil and London, has commissioned Mr. W. Stevenson, sculptor, Edinburgh, to execute a bust of Hugh Miller for the Hall of Busts at the Wallace Monument on the Abbey Craig, Stirling.

The death is announced of Mr. George Sim, F.S.A.Scot., a well known Scotch antiquary and numismatist, in his 73rd year. He was caretaker of coins at the Edinburgh Museum, and at the time of his death was engaged on an important work on the coinage of Scotland. His own collection of Greek and Roman coins, comprising 13,000 specimens, is unequalled in Scotland for extent and variety.

The name of the winner of the prize in the Colour Decoration Class at the Architectural Association last session was Mr. Walter Dewes, of 13, Burghley-road, Highgate-road, N.W., and not as printed in the prize list on p. 574 in our last issue.

On Thursday in last week a special committee of the Shrewsbury town council sat to open the tenders received for the alterations at the Corn Exchange. The tender of Mr. Price was accepted at £925, being the lowest of four received. Mr. Whittingham was appointed clerk of the works, he having been employed in that capacity at the erection of the Barracks, Bicton Church, and Trinity Church, Shrewsbury. The alterations will be proceeded with at once.

A Jubilee wing is to be added to the Royal South Hants Infirmary at Southampton from plans by Mr. W. H. Mitchell, of that town, at an estimated outlay of £1,800.

A school of art has just been established at Exmouth, under the superintendence of Mr. Birkmyer, head master of the similar institution at Exeter. The committee was formally appointed on Saturday, and the school will commence work at once.

Important structural alterations are now being effected at St. Thomas's Church, Pendleton, from designs by Mr. Medland Taylor, of Manchester. Messrs. Beanland, of Bradford, are the contractors, and Mr. Reuben Bennett, of Manchester, is engaged upon the decorative work.

The joint committee of the Maxwelltown Police Commission and Town Council recently issued an invitation for competitive plans for a tower proposed to be erected on the burgh court house; and out of three sent in, that of Mr. James Halliday, architect, of Dumfries, was preferred. According to a Dumfries journal, as the prospects of raising the requisite funds are not very encouraging, it has been resolved not to proceed with the work at present, and a fee of no less than *three guineas* has been voted to Mr. Halliday for preparing the plan. Such generosity deserves wider publicity.

Mr. William Peel, of King-street, Manchester, and Prestwich, has been appointed surveyor to the local board of Prestwich out of 32 applicants.

Mr. Robert Hunt, F.R.S., late keeper of the Mining Records at the Museum of Practical Geology, died on Monday at his residence in St. Leonard's-terrace, Chelsea, aged 80 years. Mr. Hunt will be best remembered as the editor of three editions of Dr. Ure's "Dictionary of the Arts," and as the originator and for many years the compiler of the useful "Mining Statistics." He was the first appointed Professor of Mechanical Science to the Government School of Mines.

The chief corner stone of a Jubilee wing, now being added to the infirmary at Northampton, was laid by Prince Albert Victor on Tuesday. The wing, which will cost £4,000, is being built from designs by Mr. Hull.

Intercommunication.

QUESTIONS.

[9433.]—**Damp.**—In the case of a hall about 60ft. by 30ft., material common bricks, with cement facing outside and plastered inside, no damp-course was specified or supplied. The gutters were also insufficient to carry off a heavy rainfall, having, by directions of a "practical" member of committee, been cemented to a height of ⅝in. from top at one end, so as to insure a sufficient fall to the downspouts. Since completion eighteen years ago the walls have been dry for only short periods. At first the damp showed itself mainly near the floor line upwards; of late years the upper part of the walls have shown most damp, whilst the walls near the floor are decidedly drier. Do any of your readers know of a building having been erected without a damp-course? If so, will they be so good as to report the result, and if any remedy has been successfully applied? Is it probable that the damp from omission of the damp-course will eventually disappear altogether? The damp from the gutters can easily be remedied.—R.

[9434.]—**Refusal to Proceed.**—A. tenders to do a job for a certain sum of money, and he being the lowest, his tender is accepted by B. A. refuses to proceed with the work. Can B. compel him to do so, the usual contract form not being signed, and if you know of any case where it has been carried to court, would you kindly mention it? —W. VAUGHAN.

[9435.]—**"Killing" Cement.**—I was recently told by an experienced builder of railway bridges that before cement mortar is used it should be, to use his expression, "killed"—*i.e.*, after being mixed allowed to set partially, then remixed. This, I was informed, prevented the expansion of the mass of masonry, and did not impair the mortar. This method of building being contrary to what one generally finds specified, I should be glad to know the opinions of a few experienced readers of the BUILDING NEWS.—DOUBTFUL.

[9436.]—**Varnish on Old Engravings.**—Will some reader kindly inform me how to remove varnish—in this case ordinary copal—from old coloured engravings, also dirt or stains, without damaging the engravings?—CRAWFORD.

[9437.]—**A.S.I. Exam.**—Will a reader give best books to study for the A.S.I. exam. in the building division for other than students in following subjects—1, Trigonometry as applied to surveying; 2, Laws of Fixtures, dilapidations, easements, light and air; 3, Composition and properties of stone and cement; 4, Prices, &c.?—NO SIG.

REPLIES.

[9412.]—**Eyesight.**—I am obliged to "J. H. W." and "E. C. P." for their advice in respect to my query *re* the above; but I cannot see how it is possible for a draughtsman to obtain a good light for working on a sheet of paper, say, double elephant size, when the source of that light is behind him, for the shadow thrown by his body must of necessity fall on some portion of the paper. I can easily manage to read a book with the light behind me, and always do so; but when the eyes are to wander over so large a surface I cannot conceive it possible. As to washing the eyes, I have adopted "E. C. P.'s" plan, and have carried it out for many months, but am unable at present to say I have found much benefit from it. Any other suggestions they, or any other of your numerous readers, may throw out, will no doubt be of service to many others besides myself.—VEDRA.

[9415.]—**Mun. and San. Engineer's Exam.**—The following list gives the books from which information can be obtained for above examination in order of subjects:—Haskoll's "Land and Engineering Surveying," Neville's "Hydraulic Tables," Box on "Hydraulics," Latham on "Sanitary Engineering," Hughes on "Water Supply," Humber's larger work on same, Inst.C.E. special lectures on "Hydro-Dynamics, Hydro-Geology, &c." (two years ago), "Society of Arts Conference at Health Exhibition" (published by them in separate pamphlet, 1s.), Law and Clark on "Roads and Streets," Rivington's "Building Construction" (3 vols.), Seddon's "Builders' Work," Hurt's or Tarn's "Tredgold's Carpentry," Knight's "Annotated Model By-Laws," also "Notes on Model By-Laws" in *Sanitary Record* of November, December, 1886, January, March, June, &c., 1887; Hood's "Heating and Warming for Ventilating," Box on "Heat," Wilson's "Hygiene," Robinson's "Sewage Disposal," Royal Commission on Metropolitan Sewage Discharge (lately issued), Corfield on "Sewage Disposal for House Drainage," Latham, Hellyer, and Davies on "Sanitary Plumbing," "Health Exhibition Handbook on the Dwelling," Glen and Lumley on "Public Health Act and Rivers Pollution Act"; and for much valuable information and the latest practice on many of foregoing subjects see Boulnois' "Municipal Surveyor's Handbook," *Proceedings* of the Institute of Civil Engineers, ditto of the Municipal Engineers, and the professional journals. Any person intending to sit for above examination should send to Mr. T. Cole, 6, Westminster Chambers, Victoria-street, S.W., for copy of list of subjects, and also for syllabus of examination questions which have already been set.—A BOROUGH ENGINEER AND A MEMBER OF THE ASSOCIATION OF MUNICIPAL ENGINEERS AND SURVEYORS.

[9423.]—**Expansion of Portland Cement Concrete.**—The footpaths in this borough have been laid with Portland cement concrete since 1880 on the following specification:—"EXCAVATING: To be carefully dug out to the required depth of 9in. below the top of the kerb and top of pegs next the wall of houses. A subsoil drain of 4in. common field-pipes laid at least 2ft. below the top of kerb and cement footway, and trapped before entering the sewer; after the excavation has been dug out and drain laid and certified by the surveyor, the trench of the drain to be filled in with broken slag, scars, or clinkers, properly beaten in to the required depth for the kerb. CEMENTING.—The cement shall be in the corporation yard 14 days before it is required for use, and shall be tested to bear a strain of 330lb. to the square inch. Crushed granite (Dalbeattie preferred) about ⅝in. cubes with not more than 20 per cent. of fine which will pass through a No 20 sieve of 20 meshes to the inch. The footway is to be prepared with a foundation of broken slag 6in. thick, the slag at the top to be so broken as to be able to pass through a 2in. ring, and then coated with the best Portland cement well mixed with crushed slag in the proportion of four parts of slag to one of cement, and laid on the broken slag bottom to a thickness of 2in., which, by filling up the interstices, will raise the surface 1½in.; on this surface at the proper time when the first coat is not set but ready to receive it, a finishing coat of cement, of one part of cement mixed with two parts of crushed granite or whinstone chippings is to be laid and well spread and beaten to bring the moisture to the surface, and to be 1½in. in thickness. The outer edge shall form a kerb 12in. deep and 4in. wide at the bottom, and shall be continuous with the footwalk. The whole to be lathed with a rise from the outer edge or kerb of half an inch to the foot, and to be laid in four or five feet lengths alternately, properly laid on the edges and truly square from the kerb. *After the cement has been set 24 hours the intermediate slabs are to be filled in (the laths being first removed) and a neatly-struck joint to be drawn at the division line. Opposite every door or suitable place, a small square about 1ft. 6in. wide to be left open until the squares are properly set, to allow for expansion*, and for the conveyance of a gas-pipe when required, and a (×) mark to be chiselled out on the kerb and on the footwalk next the house over the part. A small square (24in. by 18in.) with letter T cut in it to be formed in cement over each trap. The contractor to provide a night watchman and a sufficient number of tarpaulins to protect the cement from damage during heavy rains." I have observed the expansion in a number of cases where the footpaths have been laid, in two streets, crossing each other, and joined at the end. The expansion may be seen by the cement being forced from the walls at the corner of the streets. The greatest expansion I have observed was ⅜in. in a street 280ft. in length, and in many other cases ⅜in. and ¼in. may be found in different parts of the town. The expansion must be very much greater than what I have stated, where the cement is laid in a continuous piece, without leaving squares out for gas services to houses. There is a flight of stone steps leading to a bridge across the railway adjoining the station here. After the steps had been so worn by the constant traffic as to be considered dangerous, the part worn was cut out in the middle of the steps, leaving about 4 to 5in. at each end of solid stone. The space cut out was then filled in with Portland cement and crushed granite (I do not know what proportion the cement bore to the crushed granite). The result was the ends of the steps were broken and remained so. One step is splintered at both ends, and projects ¼in. or ⅜in. This I did not measure.—PETREE.

[9424.]—**Gable Ends.**—"Enquirer" should first of all see what are the conditions relating to gables or party walls on the estate on which A. has built. I am architect to some large building estates in the North, and the rule is that the gable-wall shall be a party-wall, the centre to be the division between the two owners, the party building first to be repaid by the one building against him, half the cost of such gable or party-wall. A. should have looked to this before having his land conveyed to him, and not have had conveyed the whole of the wall. I am afraid there is no claim against B., because he has built entirely on his own land. From the look of it, I imagine there has been some difference between A. and B., as it would have been less trouble to B. to buy a share of the wall than build an additional 4½in. against it.—J. W. D.

[9425.]—**Cement Concrete Footpaths.**—The cause of breaking up may be difficult to define. I have had a similar experience to "Castrum." Where the upper surface was 1½in. thick of crushed granite, 2 parts to 1 part of Portland cement, the lower strata of crushed blast-furnace slag, 4 parts to 1 part of cement. The slag appeared as if coated with the fumes from sulphur. The footpaths had to be relaid by the contractor. Blast furnace slag from a different district, which showed no signs of sulphur fumes, has not broken up. The percentage of broken footpaths in this district is very small when compared to the quantity laid.—JARROW.

[9425.]—**Cement Concrete Footpaths.**—The specification of materials appears to be all right, and the fault may be found in the bottoming or substratum. "Castrum" should examine the bottoming and ascertain if the riddlings of lime shells were mixed with the stone and bricks, and if such is not found to be the case, send a sample of crushed brick and cement to be properly analysed.—CLERK OF WORKS.

[9427.]—**Cheap Public Baths.**—It is not easy to answer 'Enquirer" in a few words with respect to the above. If he wants a really cheap and good public bath he will have to go to the riverside in some country place; but for public baths in towns, the bottom has been touched in several instances within recent years, and I should be glad to give him what information I have on the subject, or put him in the way of working it out for himself if he writes and makes known his wants to me. I enclose my address.—E. PHILLIPS, 90, Bolton-road, Manchester.

[9432.]—**Black Stains in Varnished Stained Deal.**—"H. H." does not explain if he used water or oil stain, and has not stated the kind of varnish used. If water stain and good varnish were used, the defects are certainly in the wood. If good oil stain was used, no spots would appear on good wood. Is there not sap-wood on the back of the dado framing and panels? If not, the timber used has been from deals and planks, and not taken from logs, as it should have been, for staining and varnishing.—CLERK OF WORKS.

The corporation of Nottingham, in response to an advertisement inviting applications for the post of water engineer, recently received over ninety replies. Nine were selected by a committee, numbering Messrs. H. J. Clarson, of Tamworth; L. J. Godfrey Evans, Liverpool; J. E. Hughes, London; Lake, Lancaster; W. A. H. de Pape, Tottenham; H. Preston, Grantham; C. H. Priestley, Cardiff; Whitton, Nottingham; and Whillink, Vyrnwy; Works. The committee, by nine to four, decided in favour of W. A. H. de Pape, M.I.M.E., engineer to the Tottenham Local Board of Health, subject to confirmation by the town council.

LEGAL INTELLIGENCE.

IN RE W. B. SIVELL.—At the Rochester County Court on Wednesday week, Mr. J. Basset applied to his Honour Judge Homersham Cox for the discharge of a bankrupt named William Bass Sivell, of Crockenhill, architect. The Official Receiver (Mr. R. Prall) opposed, and said there were unsecured creditors to the amount of £1,700. Mr. Basset pressed for the discharge, and asked that the bankrupt should be allowed £300 a year. The Official Receiver said £150 was enough; but eventually the Court ordered the bankrupt's discharge, and allowed him £200 a year, all income above that amount to be paid to the trustee.

OMITTING NOTICE TO DISTRICT SURVEYOR. Worship-street Police Court, Oct. 15th, 1887. Before Mr. Bushby.—District Surveyor for East Hackney (North) *v.* Brooke, Simpson, and Spiller (Limited).—The defendants had executed works to four buildings without notice to the district surveyor, who summoned them for penalties in respect of the offences. Defendants' counsel objected that the summons was addressed to the old firm instead of the present company; but the district surveyor produced a letter from the company on the subject of the summons, and the summons was amended by the addition of the word "Limited." The defendants claimed exemption under Sec. 6, contending that the clause was to be construed as "60ft. from the nearest buildings (and ground) of an adjoining owner." Included in one alleged offence was the repair of an external wall, in which about 100 new bricks showed on the face of the wall, and the district surveyor considered this was a repair affecting the construction of the wall, because if the new work had been taken away the brickwork over it would have fallen. The magistrate decided that the context of the part of the exempting clause referred to, as well as the general policy of the Act, shut out the construction put upon it by the defendants, and, as the buildings to which the works were done were within 60ft. of other buildings belonging to the defendants, the district surveyor was entitled to notices. The repair was not to be considered a work requiring notice, because old bricks were simply replaced by new, and there was no alteration, as if stone had been substituted for bricks, or the wall had been made thicker. The defendants were fined £4 and 12s. 6d. costs.

CHIPS.

The condition of the rivern Cam, and the recent letters by Dr. Alfred Carpenter and others, were discussed by the Improvement Commissioners of Cambridge on Tuesday. The chairman of the board stated that a report on the proposed diversion of the town sewage from the river would be presented to the board in a short time. The surveyor was making inquiries and investigations into the present conditions of the sewers of the town, and would soon make his report to a special committee.

Mr. James Reid, of the firm of Messrs. John Reid and Son, cabinet makers, Park-row, Leeds, died suddenly when in London on Friday night. Mr. Reid was well known locally as a connoisseur in art, a topic upon which he occasionally lectured and wrote, and he has left behind him a work which was almost ready for publication. The firm had opened a branch in the Metropolis, and Mr. Reid had taken a house there on the previous Wednesday.

At a meeting held in Rochdale on Monday, the Mayor said the condition of the Rochdale Town Hall had been exaggerated. No one would deny that the building was not what it ought to be, and it was a great shame that the work had been scamped, and improper material used. But two persons who had examined the building agreed that the cost of the necessary repairs would not exceed £1,200.

At the annual meeting of the incorporation of Mary's Chapel, Edinburgh, held on Monday, Mr. Robert Paterson, architect, was elected Deacon of the Masons, and Mr. John White, plumber, was elected Deacon of the Wrights and treasurer for the ensuing year.

On Tuesday evening, at the Rotunda Lecture Hall, Liverpool, Mr. John A. P. Macbride, lecturer on sculpture at the British Museum, delivered the first of a course of lectures, entitled "How a Marble Statue is Made."

The City Court of Common Council received yesterday (Thursday) a report from a committee recommending that the office of architect, rendered vacant by the death of Sir Horace Jones, be not filled up, but that in lieu thereof a "surveyor" be appointed at a salary of £800 a year.

The statue of Mr. Samuel Morley at Bristol, executed by Mr. Havard Thomas, now of Chelsea, a native of that city, will be unveiled to-morrow (Saturday).

WATER SUPPLY AND SANITARY MATTERS.

Acton, W.—The members of the Society of Engineers and friends visited on Wednesday the new sewerage works at Acton, the refuse destructors at South Ealing, and the new reservoir in course of construction at the Grand Junction Waterworks at Ealing. The party were received at the Acton Sewerage Works by Mr. C. Nicholson Lailey, the engineer to the board. The local board has formed a drainage system for its own district, independent of the Metropolitan main drainage, and has adopted the purification system of the International Sewage Purifying Company, in which the purification is effected by a combined process of precipitation and filtration. The works as now constructed can deal with the sewage of a population of 20,000, and have cost £70,000. The refuse destructors at South Ealing, while generally based on the plan of Fryer's destructors, have some distinctive points devised by Mr. Charles Jones, the engineer to the Ealing local board. Here the sewage sludge of 19,000 people, and the house refuse of 22,000, are being dealt with. The new storage reservoir now in course of construction in connection with the Grand Junction Waterworks is situated near Hanger Hill, to the north of Ealing, and occupies ten acres of land. The water surface, when full, will be about six acres, and it will contain about 51 million gallons. It will be used for the storage of filtered water, filled from the pumping station at Kew-bridge, through a line of 30in. pipes. The work is being carried out under contract by Messrs. Aird and Sons: Mr. Alexander Fraser being the engineer to the Grand Junction Water Company.

Hornsey, N.—A Local Government Board inquiry was held at Highgate on Thursday, the 13th inst., by Mr. John Thornhill Harrison, C.E., to consider the application of the Hornsey Local Board with reference to the borrowing of £12,000 for the erection of a Fryer's dust destructor and other works of public improvement, in accordance with plans submitted by Mr. T. De Courcy Meade, their engineer. The Board was represented by Mr. Littler, Q.C. The proceedings were almost formal. After evidence given by Professor Tidy, Mr. T. De Courcy Meade, C.E., Mr. Andrews, C.E. (Bournemouth), Mr. Bennett, C.E. (Southampton), and others, the inspector expressed his satisfaction with the plans and closed the inquiry. The local board await the formal sanction only of the Local Government Board in order to proceed with the works, the carrying out of which will revolutionise their present system by taking the entire work of dust collecting and scavenging into their own hands, instead of letting it out to contract, the latter system not having proved very satisfactory of late.

STAINED GLASS.

Kimbolton Parish Church.—The east window of this church, which is of four lights with tracery in the 15th-century style, has just been filled with stained glass, representing the "Adoration of the Magi." In the second light is the figure of the Blessed Virgin seated with the Holy Child on her knee; and in the third light two of the kings with an attendant bearing gifts; above these two groups is a choir of angels singing the "Gloria in Excelsis." No. 1 light contains St. Joseph and two angels in adoration of the Child, and in the fourth light is the Ethiopian King. In the foreground are a lamb and doves; while in the background are the town of Bethlehem and the surrounding country. The whole picture is surmounted by canopies of the Perpendicular period, and based by an arcading containing angels. In the tracery are angels playing musical instruments, cherubim and seraphim, and above all the miraculous star. The whole was designed and executed by Messrs. A. O. Hemming and Co., 47, Margaret-street, Cavendish-square, London, W.

St. Lawrence Jewry.—This fine City church has just been enriched by the addition of a large stained-glass window of Classical design, containing a large figure of St. Luke, and subjects of the parables of "The Lost Sheep," "The Lost Money," and "The Prodigal Son," in two scenes. Above, in the circular head, is a group of five angels rejoicing over "The One Sinner that Repenteth," while, at the base is the winged bull. The ornament throughout the window is rich, and full of delicate detail, and the whole is surrounded by a border of ornament. The work has been designed and executed by Mr. Alfred O. Hemming, of 47, Margaret-street, Cavendish-square, W., under the supervision of Mr. A. W. Blomfield, M.A.

A stained-glass memorial window was unveiled at Crambe, near York, on Tuesday week. The window, which is of two lights, representing Christ the Good Shepherd, and The Light of the World, has been executed by Mr. J. Knowles, of York.

Our Office Table.

We should like to see something come of the proposal now being discussed in our correspondence columns to found a Provident Institution for Architects' Assistants. We assisted many years ago in the foundation of a similar society for Builders' Clerks, which is now firmly established, and is doing good work. We suggest that the assistants should meet together informally and ask the Institute, or the Society of Architects, for a room at Conduit-street or St. James Hall to hold a public meeting. If at the Institute, the secretary of that body would probably contribute the benefit of his aid and experience; if at the Society, Mr. Farman or Mr. Middleton might no doubt be induced to assist in a similar manner. If established, it would in every way be desirable, if possible, that the permanent office of the Architects' Assistants' Provident Society should be located at one or other of the headquarters of the Metropolitan professional societies.

The question of the payment of travelling expenses to an architect living at a considerable distance from the works in progress formed the subject of a discussion at the last meeting of the Sunderland town council. It will be remembered that in the competition for the new municipal buildings now in progress the designs of an Ipswich architect, Mr. Brightwen Binyon, F.S.A., were selected, and the works were intrusted to him. The town council received a report from the buildings committee again recommending, on reconsideration of the subject, that Mr. Binyon be paid his railway fare (first-class) for his journeys to and from Sunderland required during the progress of the work. The recommendation was objected to on the ground that when the competition was drawn up it was stated that the 5 per cent. commission would include "all services and everything," although railway fares were not expressly mentioned. The town clerk pointed out that the report ought to be agreed to, for, as a legal point, railway fares were not "services." After an undignified discussion on this point, it was proposed that the amount of Mr. Binyon's railway fares should be limited to a hundred guineas, to which it was replied that by limiting the sum to be expended they would also limit the number of Mr. Binyon's visits. The town clerk said Mr. Binyon had consented to accept his railway fares without charging hotel expenses. The motion having been withdrawn, the report of the committee was carried by 28 votes to 12 against.

In the last issue of the Proceedings of the Royal Society, Professor Carnelley, of Dundee, and Mr. J. S. Haldane, M.B., give the results of their recent investigations into the nature of sewer air which, if correct, affords grounds for belief that sewer gas is neither so dangerous to human health nor so frequently the causes of the spread of zymotic diseases as had been assumed of late years by sanitary engineers and others. It will be remembered that Mr. Haldane read a paper on this subject before the Sanitary Congress at Bolton a month since, which attracted considerable attention. The author's experiments showed that although the sewer air contained twice as much carbonic acid and three times as much organic matter as the outside air, the number of microbia present was much less. Indeed the air of sewers had the advantage as regarded the presence of microbia over that of any class of dwelling house. The organic constituents of sewer air, when filtered off, were apparently harmless. As the number of microbia decreased with the increase of carbonic acid, it appears that the less ventilation there was, the smaller was the number of microbia, and thus it appears probable that microbia entered the sewer air from the exterior rather than arose from decomposing matter in the sewer itself. The experiments strengthen the growing opinion of micro-biologists that zymotic diseases are conveyed in liquids, such as milk or water, rather than through an atmosphere containing free oxygen.

A peculiar case of church tower "restoration," well worthy the attention of the S.P.A.B., has just been completed at Woolfardisworthy, near Bideford. The tower is a square one, standing 80ft. high, and it was found that though the whole of the inner or eastern wall of the tower was a good one, the west wall of the tower had for some time bulged out, and was in a dangerous condition. Mr. Arnold Thorne, architect, of Barnstaple, proposed to restore the tower by literally cutting it vertically in two, taking down the west side from top to bottom and part of the north and west sides, and to reface the remainder, leaving the whole of the east side and corners standing to the full height of 80ft. Incredible as it may appear, the vicar, the churchwardens, and parishioners adopted this somewhat hazardous plan of mutilation, and, according to the local newspapers, Mr. Thorne has accomplished the task, and restored the tower to its original position and strength, the work having been carried out by Messrs. Sanders and Cook, Northam. The peal of bells has also been rehung by Mr. J. Abbott, of Bideford. The total cost of the work was about £300. The tower was reopened at the harvest thanksgiving services last week.

A rather stupid attempt was made on Wednesday at the Birmingham Board of Guardians to call in question the discretion of the Workhouse Management Committee in accepting the tender of Messrs. Strode and Co. for gas services at the new infirmary. Seven tenders had been received—the highest, from the Corporation of Birmingham (which manages its own gas supply), being £871 7s. 1d.; and the lowest, £545 15s. Messrs. Strode and Co.'s tender was just midway, being £685, and the strong presumption is that the guardians have got the best work at the lowest price. The dissentients, who wanted to give the work to one of the three local firms which tendered lower than Messrs. Strode and Co., should remember that some discretion must be left to committees, and that in these days of "lowest tenders" it is rather in the selection of good firms to do work at fair prices than in the cutting-down system that the true interests of the ratepayers is studied.

The *Russische Revue* of St. Petersburg states that 56 per cent. of the total area of Finland is either forest or marsh covered with forests. Approximately, half of this belongs to the Crown, and half to private owners. For some years past the export has remained stationary at about 50 millions Finnish cubic feet, but in 1885 it decreased to 41 millions, and in 1886 it was about 20 per cent. less. Hence much less timber has lately been felled, and those interested in the trade look for an increase in the price of timber. The export to all the British ports, such as London, Liverpool, Grimsby, Hull, Hartlepool, &c., was very much reduced. Apart from the general depression of trade, this decrease is attributed to a decreased demand for timber, the increase of freight, and the want of shipping in the ports of Finland.

The United States Government have just published a series of reports by their consuls on forest culture and forest preservation in Europe, regarded from a practical standpoint, so that the replies may serve as a basis for framing forestry legislation at home. The questions cover every matter of importance connected with forestry and forest administration. The reports include Austria-Hungary, France, Germany, Italy, and Switzerland, and are exhaustive in character. They come from every district in each country in which a Consul resides, the task of dealing with the general legislation of the country being left to the Consul-General. The reports deal with their subjects under the following heads:—(1) Areas under forests, distinguishing (where possible) between State and private areas; (2) common forests, if any, and privileges of the population in them. If pasture is permitted, how are the trees, &c., protected; (3) organisation and functions of Government forest bureaux; (4) revenues from Government forests, costs of maintaining or managing forests, profits of cultivation; (5) forest planting and culture, methods, bounties, if any, schools, their organisation and course of study; (6) destruction of forests, causes and results; (7) reclamation of sand dunes or waste places by tree planting; (8) sources of lumber supply, trade in lumber, bounties on importation, if any, and customs duties; (9) names of three reliable sellers of seeds and shoots in each district; (10) copies

and translations of the forest laws of each country or locality.

A few years ago, says the *North-Western States Lumberman*, there was little, if any, lumber sawed in the States quartered, or with the grain. Now not only oak but many other woods are being sawed more and more in that manner. Every consumer of lumber believes that it is by far the better way to manufacture. We now have oak, poplar, gum, and sycamore in large quantities thus sawed. It costs more to saw quartered stock than plain, but it is much more valuable. The waste is considerable. Take a 24in. 12ft. log, clear and straight, and 75 per cent. of it will make good quartered firsts and seconds if properly managed. Probably no wood except oak has so grown in popularity as quartered poplar. It is used "plump" inch, 6in., and up wide, and immense quantities are now used by piano manufacturers. There is a scarcity of it, and anyone who finds plain poplar dull and hard to sell should quarter-saw his stock, as it will then be worth from 2 dols. to 5 dols. a thousand more.

MEETINGS FOR THE ENSUING WEEK.

Saturday (to-morrow).—Clerks of Works' Association. Excursion to Cambridge, to be conducted by Mr. G. Dalton, clerk of works at St. John's College, in that town. Train from Liverpool-street, 9.10 a.m.

Tuesday.—Glasgow Architectural Association. "The Architect's Assistant," by J. J. Burnet, F.S.A.

Wednesday.—Institute of Auctioneers and Surveyors.

CHIPS.

Messrs. Steven Bros. and Co., of 4, Upper Thames-street, and Milton Ironworks, Glasgow, have secured the first award for their kitcheners, and the same for their ornamental and architectural ironwork at the recent Adelaide Exhibition. Wherever exhibited Messrs. Steven Bros.' kitcheners have never failed to secure the highest award, and the popularity attained by their ranges has, we believe, been well deserved, both as regards the excellency of design and quality of material and workmanship. Their architectural ironwork is also daily growing in favour with the profession and the public.

The Austin Memorial Almshouses, erected by the Mayor of Glastonbury in memory of his late wife, were opened on Friday. They are four in number, are situate in Magdalene-street, Glastonbury, and are built of brick, with Bath stone dressings, and Broseley tiled roofs and verandahs. Messrs. Budd and Spire, of Glastonbury and Shepton Mallet, were the architects, and Mr. Henry Hawkins was the builder.

The church of St. Peter at Gowts, Lincoln, is being rebuilt, with the exception of the fine tower and south aisle, from designs by Mr. C. Hodgson, F.S.A., of Durham, and will be opened in December. Messrs. H. S. and W. Close, of Lincoln, are the builders; and Mr. S. C. Basker is the contractor for joinery.

The Swinton Local Board, who have been served with notices by both Captain Dauntesey, of Agecroft Hall, and the Salford Rivers Conservancy Company, to cease polluting Slack Brook, Pendlebury, and the river Irwell, have invited Mr. Vawser, C.E., of Manchester, to visit Pendlebury and report upon the scheme prepared by the board's surveyors for dealing with the sewage of the district. The board have purchased several acres of land for erecting precipitation and other works.

The new buildings erected in the Finchley-road, Hampstead, to take the place of the old Hackney College, in Well-street, for the training of students for the Congregational ministry, were opened on Wednesday. The new buildings, with purchase of the land and furniture, will cost about £23,000, and will provide residential and other accommodation for the principal and 36 students.

Memorial stones of a new Baptist school-chapel at Honor Oak, S.E., were laid on the 8th inst. The style adopted is Early English, the materials are red bricks and Bath stone dressings, and the chief room is 61ft. 6in. by 32ft. 6in. Mr. Geo. Bains, Great Winchester-street, E.C., is the architect, and Messrs. F. and H. F. Higgs have taken the contract at £1,093.

As the church of St. Olave Jewry is about to be demolished, notice has been given as required by the Act 23 and 24 Victoria, cap. 142, that it is proposed to remove the remains of all persons interred within the fabric to Little Ilford cemetery, the tablets and monuments being at the same time transferred to, and set up in, the parish church of St. Margaret, Lothbury, to which St. Olave's has now been united.

An insignia rest has been placed in front of the corporation seat on the south side of the nave of St. Mary-le-Tower Church, Ipswich. The rest is constructed of hand-wrought and hammered on, and is designed after the 16th-century German work. It consists of delicate scrollwork springing from a main stem. The civic sword will be placed in the centre with the point upwards, the hilt resting on a scrolled bracket, and the blade in its scabbard held in position in an opening in the scrolled arm above. On either side is a curved support, and in these the two maces were placed. At the end of the bracket for the sword is a rest for the Corporation silver oar, formerly the sign of the office of the water-bailiff, and below is a shield of the borough arms and crest. The whole is to be treated in colour. Mr. John Shewell Corder, 9, Thoroughfare, Ipswich, designed the rest, and prepared full-sized drawings from which Messrs. Hardman and Powell, of Birmingham, carried out the work.

John Watson Bertie, a joiner, of Dundee, was remitted to the sheriff of that burgh on Monday on a charge of embezzlement. It is alleged that, while acting as secretary to the Dundee branch of the Amalgamated Society of Carpenters and Joiners, he appropriated sums amounting to £15 10s.

The salary of the borough surveyor of Christchurch, Hants, has been raised by £30 a year.

The work of deepening by 3ft. the Upper North Forty-foot Drain, near Boston, for a distance of four miles, has just been completed. The work has been carried out under the direction of Mr. James Lancaster, of Boston, surveyor to the Second District Drainage Commissioners.

The memorial stones of a new Wesleyan chapel at St. Catherine's, Lincoln, were laid on Thursday, the 13th inst. The edifice will be semi-Gothic in style, and accommodation will be provided for 520 people. The total cost of the undertaking (including the value of the land) will be about £3,000. The plans have been prepared by Mr. Chas. Bell, architect, of Dashwood House, New Broad-street, London; the builders are Messrs. Thompson and Son, of Louth; and the superintendence of the work is left in the hands of the chapel steward, Mr. J. Weighell, builder, of St. Botolph's.

The first public trial of the electric light at Leamington took place on Saturday evening, when the Parade and Bath-street were lighted. The works for supplying the light are in Wise-street, where engines, boilers, and dynamos have been laid down by Messrs. Roby and Co., of Lincoln. The machinery and entire plant are in duplicate. The proprietors of the works are the Midland Electric Light and Power Company, who have arranged with the Corporation to light the Parade and Bath-street, and to supply the light to the Town Hall and the Pump Rooms. A large number of the principal tradespeople have given orders for private supplies of the light.

The new organ, built by Wilkinson and Sons, of Kendal, for St. Chad's Church, Everton, from the specification of Mr. C. S. Ridley, was opened by the latter gentleman on Wednesday evening last.

A new wing is about to be added to the Mercers' Hospital, Dublin, from plans by Messrs. J. H. Brett and W. M. Mitchell, of that city.

A marketplace and shambles together, with three dwellinghouses and shops, are about to be built at Hemel Hempstead, for the high bailiff, town commissioners, and vicar, acting as an improvement committee. The plans of Messrs. G. and W. R. Low, of Basinghall-street, E.C., have been adopted.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

Depression of Trade.—Complaints about the falling off in consumption of many articles are loud and universal, but there is one exception to the prevailing dulness, viz.: GRANT'S MORELLA CHERRY BRANDY, for this popular liqueur not only maintains its position, but continues to increase in favour notwithstanding the efforts to supplant it by rubbishy imitations. Observe our branded corks and capsules. Sold by Wine Merchants, and by THOMAS GRANT and SONS, Maidstone, and 46, Gresham-street, E.C. Makers of the delicious Morella Marmalade. Sold by Grocers.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BANGOR.—For the erection of the Lord Penrhyn memorial wing, and also a laundry, at the Anglesey and Carnarvonshire Infirmary. Mr. Kennedy, architect:—

Williams, E.	£645 0 0	£200 17 0

(Accepted for both works.)

BOURNEMOUTH.—For pianoforte warehouse, for Messrs. Price and Sons. Messrs. Lawson and Donkin, architects:—

George and Harding	£1,295 0 0
James, G.	1,175 0 0
Rigler and Crane	1,170 0 0
Hoare, F., and Son	1,149 0 0
Beavan, G.	1,098 0 0
Barrow and Entwistle	1,089 0 0
Lucas and Cosser	997 0 0
Walden, F.	986 0 0
Scott and Mitchell	985 0 0
Hoare, W.	948 0 0
Jenkins and Son	945 0 0

BOOTLE, LIVERPOOL.—Accepted tenders for various works, for the town council:—

For the construction of filter beds and storage tanks at the public baths:—
Holme and King £2,157 2 0

For the construction of police cells and charge office under the police court:—
Bell and Burnie... ... ... £165 10 0

For additional staircase from the gallery at the town hall:—
Wilkinson, J. W., Bootle £33 10 6

BRIDGWATER.—For the re-erection of Crippshalted Bridge at the Brue Outfall, for the Somerset Drainage Commissioners:—
Durnford and Son, Bristol (accepted) £148 6s. 0d.

BRIGHTON.—For the erection of Jubilee Clock Tower, Brighton, for Mr. J. Willing :—

Smith, G., and Co, London... ...	£1,544	0	0
Barnes, J., Brighton...	1,470	0	0
Carey and Corben, London ...	1,452	0	0
King Bros. and Co, Norwood ...	1,442	0	0
Philips, W., and Co, Brighton ...	1,416	0	0
Cheeseman and Co, Brighton ...	1,410	0	0
Chappell, J. T, London	1,342	0	0

BURY ST. EDMUNDS.—For the erection of a gate lodge at the Free Grammar School, Bury St. Edmunds, for the governors. Mr. F. Whitmore, Chelmsford, architect :—

Frost	£216	10	0
Robinson, Jun....	234	0	0
Tooke, F. (accepted)	208	0	0

All of Bury St. Edmunds.

CHELMSFORD.—For alterations to Boarded Barns Farm, Chelmsford, for Sir H. B. P. St. John Mildmay, Bart, Dogmersfield Park, Winchfield. Mr. F. Whitmore' Chelmsford, architect :—

Beaumont	£250	0	0
Moss	241	0	0
Baker (accepted)	235	0	0

CLEVEDON.—For the jubilee memorial almshouses at Clevedon, Somerset. Messrs. Barker and Cross, Weston-super-Mare, architects :—

Forse, H....	£450	0	0
Green, W.	386	0	0
Dowland, W. (accepted)	295	0	0
Pollard, A.	230	0	0

DULWICH, S.E.—For the formation of carriage roads and a lake at Dulwich Park, for the Metropolitan Board of Works :—

Bath and Blackwell (accepted) ... £16,400 0 0

EDINBURGH.—For the enlargement of Davie-street School :—

Accepted tenders :—

Mason :—

Chambers, T.	£1,267	15	0

Joiner :—

Cormack, A.	762	0	0

Plumber :—

White, J.	161	0	0

Plasterer :—

Ross, J....	100	0	0

Painter :—

Ross, R. J.	50	8	9

Slater :—

Lamb, T., and Son	37	19	0
Total	£2,379	2	9

[Probable total cost of Davie-street School :—Existing school buildings acquired from the Heriot Trust, £2,368 16s. 8d.; new buildings and alterations £2,379 2s. 9d.; cost of furniture and fittings, £34); extra work, add 7½ per cent., £203 18s. 6d; architect's commission at 3 per cent., salary of clerk of works, and superintendence, £145; legal and other expenses, £63 2s. 1d.—total, £5,500.]

EDINBURGH.—For the erection of a new water service reservoir at Comiston, for the Edinburgh water trustees : Henderson, Matthews, and Co., Edinburgh £606 8s. 0d. (Accepted.)

EALING.—For altering and decorating Grimstone Lawn, Ealing, W. Mr. H. Phelps Drew, 99, Gloucester-road, S.W., architect :—

Bailey, Ealing	£550	0	0
Norton, Chelsea	520	0	0
Rye, Ealing*	480	0	0

* Accepted subject to additions.

FARNBOROUGH.—For alterations and additions to the Cambridge Hotel, Farnborough, Hants. Mr. S. Parker, architect :—

Prestige	£593	0	0
Bishop (accepted)	455	0	0

FAREHAM, HANTS.—For providing heating apparatus in the rebuilt church of St. Peter, Fareham :—

Grundy (accepted) £180 0 0

For gas-fittings throughout the church :—
Shirrell (accepted).

FULHAM.—For the erection of shop at Stamford Bridge, Fulham-road, for Exors. of the late Mr. J. Bowden. Mr. Banyon Tinker, M.S.A., 4, New Inn Chambers, Strand, W. C., architect :—

Smith, W. H....	£2,590	0	0
Stimpson and Co.	2,395	0	0
Prestige and Co, Cambridge Wharf Grosvenor-road, S.W. (accepted)	2,273	0	0

HARLOW, ESSEX.—For alterations to new hall. Mr. C. G. Baker, 5, Bloomsbury-square, W. C., architect :—

Rider, T., and Son £700 0 0

(No competition.)

HOLBORN.—For executing works of sewerage, for the Holborn District Board of Works :—

Killingback, C, Icewell Wharf, Camden Town (accepted) £697.

KIRKBY LONSDALE.—For restoration and reseating of the Congregational Chapel, Kirkby Lonsdale. Mr. R. Walker, Windermere, architect and surveyor :—

Mason's work, walling, and plastering :—Bayliff, W.
Carpenter and joiner :—Hodgson, C.
Plumbing, painting, and glazing :—Moorhouse, J.

KINGSLAND.—For alterations to the Lamb p.h., Kingsland. Messrs. Wilson, Son, and Alwinckle, architects :—

Hearle and Son	£1,297	0	0
Drew and Cadman	1,199	0	0
Shurmur, W.	1,148	0	0
Jarvis and Son	1,140	0	0
Jackson and Todd	1,119	0	0
Mills, J. and H.	1,090	0	0

LIVERPOOL.—For repairs to shops in St. John's Market, Roe-street end, for the corporation :—

Raffle and Campbell (accepted) ... £48 10 0

LIVERPOOL.—For repairs and painting at the plant-houses, Botanic Gardens, for the corporation :—

Tomkinson, W., and Son (accepted) £157 0 0

LAMBETH.—For the erection of new moulding mills, &c., at York-road, Lambeth. Mr. R. P. Wheelock, architect. Quantities by Mr. H. E. Pollard :—

Mackie, A.	£7,322	0	0
Howard, W., and Co.	6,795	0	0
Longmire and Burge	6,666	0	0
Hosegood, B.	6,325	0	0
Brass, W., and Son	6,282	0	0
Colls and Son...	6,239	0	0
Rider and Son	6,162	0	0
Ansell, C.	6,161	0	0
Howell, E. C, and Son	5,969	0	0
Holloway, J. (accepted)	5,890	0	0

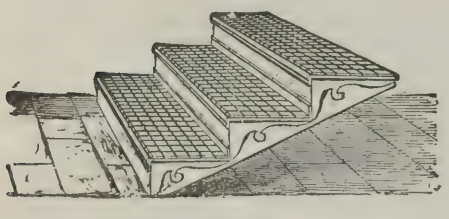
LONDON, S. W.—For partially rebuilding mansions in Cadogan-place, S.W., for Mr. E. J. Barker. Mr. W. M. L. Seaman, Albert Gate Mansions, S.W., architect. Quantities by the architect :—

A.	B.	C.
Lascelles, W. H., Bunhill-row, E.—		
£810 0 0	£1,690 0 0	£2,500 0 0
Martin, F., Maidenhead—		
744 6 5	1,544 13 2	2,288 19 7
Drew and Cadman, Holborn, W.C.—		
715 0 0	1,539 0 0	2,254 0 0
Green and Lee, London—		
735 0 0	1,487 0 0	2,222 0 0
Garlick, J., Sloane-street, S.W.—		
	Total	2,198 0 0
Rhodes, W. A., Hyde Park, W.—		
690 0 0	1,485 0 0	2,175 0 0
Scharien and Co, South Kensington—		
659 0 0	1 438 0 0	2,097 0 0
Stimpson and Co, Brompton-road, S.W.—		
680 0 0	1,410 0 0	2,090 0 0
Robson, J. J., Snaresbrook, E.—		
626 0 0	1,396 0 0	2,022 0 0
Ockenden, H. R., Anerley—		
638 0 0	1,359 0 0	1,997 0 0
Rayment, J. J., and Sons, Pont-street, S.W.—		
601 0 0	1,306 0 0	1,907 0 0
White, G., Shepherd's Bush, W.—		
593 19 11	1,297 17 7	1,891 17 6
Smith, W. H, Walham Green, S.W.—		
832 0 0	1,012 0 0	1,844 0 0
Ingram, H., Woking—		
554 0 0	1,234 0 0	1,788 0 0
Ashfold, W. H., and Gibbs, West Kensington—		
510 0 0	1,260 0 0	1,770 0 0
Braid, A. and E, Chelsea—		
563 0 0	1,129 0 0	1,692 0 0
Bowd, W., Knightsbridge—		
	Total	1,660 0 0
Hewitt, C F., Westminster—		
628 0 0	753 0 0	1,381 0 0
Groom, Islington—		
	Total	790 0 0

A.—For mansion, No. 87. B.—For mansion, No. 88. C.—For the total.

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Bescot Junction
Birmingham
Bishopsgate
Blackfriars
Blackfriars Bridge
BlakeStreet, Sutton Coldfield
Blaydon-on-Tyne
Bletchley
Bolton
Bolts Bridge
Bombay, India
Bow
Bowdon Central
Brick Lane
Bristol
Broadfield
Broad Street
Broadstone, Dublin
Burdett Road
Burscough Junction
Burton
Bury
Borough Road, Mersey Tunnel
Canonbury
Camden Road
Chalk Farm
Charing Cross
Cheddington
Cheetham Hill Junction
Chequerbent
Clayton
Clifton
Clitheroe
Crewe
Crooked Billet Level Crossing
Cross Lane
Crumpsall
Cullercoates
Cannon Street
Dalston
Daubhill
Daybrook
Denholme
Derby
Droylesden
Drighlington
Dudley
Dudley Port
Dundee
Ealing Common
Ealing Terminus
Earl's Court
Edgware Road
Failsworth
Farringdon Street
Farrington
Fenchurch Street
Finchley Road
Firsby
Forest Gate
Forest Road Level Crossing
Fulham
Geedley
Gloucester Road
Gower Street
Grantham
Greenwich
Hackney
Haggerston
Hammersmith
Heaton Park
Hereford, Barr's Court
Highbury
Highdraw Road, Wallsend
Hollinwood
Holyhead
Homerton
Horley
Hounslow
Hounslow Barracks
Keighley
Kemble Junction
Kenilworth
Kensal Green
Kentish Town
Kilburn
Kilsby
King's Cross
King William Street
Langley Green
Latimer Road
Lea Bridge
Leamington
Leman Street
Leyland
Leyton
Leytonstone
Lichfield
Limehouse
Lincoln
Little Ealing
Liverpool Road, Manchester
Liverpool Street
Llandudno
Long Buckby
Londoun Road
Ludgate Hill
Mark Lane
Maidstone
Manchester
Manchester, Exchange
Manchester Road
Mansion House
Mildmay Park
Millhill
Milverton
Monkwearmouth
Moorgate-street
Monument
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New Cross
Newport
Newton Heath
North Brentford
North Bridge
Northampton (Castle Station)
Nottingham
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Roade
Salisbury Road
Seething Lane
Shadwell
Sheffield
Shoreditch
Sloane Square
Snow Hill, Birmingham
Slough
Soho
South Bromley
South Kensington
Southport
Speke
Spring Grove
Stechford
Stepney
Stoke
Stourbridge
Stratford
Stretford
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West End Lane
Westminster
Whitchurch
Whitechapel
Whitefield
Whitley
Widnes
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AN ARCHITECT'S AUTHORITY.

THE limits of authority of the architect in ordering goods and work for his employer have never been satisfactorily defined by any decision of the Courts. Has an architect power to give an order for a material not specified, or for any variation in the plans without the building-owner's knowledge or permission? The question turns upon whether the architect as an agent to his employer has an express or an implied authority to use his own judgment. One legal authority observes: "As a general agent the architect can bind his principal by all acts within the scope of his employment as against third parties, although the employer may have privately limited his authority." From this statement an architect appears to have an authority to order any material or deviation that he may think fit in the exercise of his function of architect. As far as we can read between the lines or the legal dicta of the Courts, an architect can order anything he thinks necessary, or enter into a contract with a third party to supply materials so long as there exists no doubt as to the *bonâ fide* nature of the transaction and it is not called into question. For instance, an architect may, with the best of intentions in carrying out a building, order an alteration to be made that would not, so far as he can see, add anything to the cost, or substitute stone for brick, and he would be perfectly within his right in exercising this power; of course, on the assumption that his client would sanction or agree to the change. To keep the work as much as possible under his own control, he may enter into a contract with a stone merchant to supply the stonework. We will suppose the employer is a man that does not care to be troubled about these matters, leaving the ways and means to his architect. The work, let us further suppose, costs more than that provided under the first contract and a question has arisen as to payment. The stone merchant, upon the faith of the architect being duly authorised, proceeds to make a claim against the employer. Now, it is very easy for the employer to discredit the transaction and decline to pay, and the architect is placed in the unenviable position of having acted without authority, though, in fact, he was simply doing what he considered he had a right to do as an agent for his client.

The powers of an agent are not very clear, if we take the decisions as a guide. The architect is regarded as a general agent, and, as the authority we have quoted says:—"An agent of this class can bind his employer by all acts within the scope of his employment as against third parties, although the employer may have privately limited his authority." Now, it has been decided that an architect may employ a surveyor to take out quantities. There is an implied authority, ruled by custom, which gives him power to do so; but he is not, by the same rule, permitted to order alterations, or to make contracts on his own authority. In the reported case of "Randall *v.* Trimen," the architect honestly believing that he had authority to order anything for the building, ordered stone for a church, and he was held liable to the builder for the value, whether the representation was fraudulently or *bonâ fide* made. He was also held liable to pay the costs of an action against the client, which had failed, on account of his own misrepresentation. The precedent afforded by this case, at any rate, makes it undesirable for an architect to order materials or extra work without sanction from the owner. The probabilities of such compacts being made by the architect on his own authority, are not favourable to his trusting too much to it.

In building matters it is very uncertain to know when an architect can be said to exceed his authority if he acts within the "scope of his employment." To authorise some deviation that will improve the design without adding to the cost, is surely allowable; but it seems less so if the cost happens to exceed the sum allowed. It appears, indeed, the limit is reached when the order incurs cost. If, from ignorance or neglect of his duties, an architect leads his client into expense or trouble, the case is widely different, and we can understand the law which makes the architect liable for pecuniary injury in such a case, for he is paid for the exercise of skill and diligence. But it is a much harder case to make him responsible for cost necessarily incurred in carrying out his design. But so, too, has the employer a right to be protected from that kind of charlatanism which is common in all professions—that arising, we mean, from improperly prepared designs and plans. In short, the obvious difficulty there is in detecting cost incurred in a *bonâ fide* manner, and that incurred through incompetence or dishonesty, has made the law hard alike upon the honest and fraudulent. The owner cannot always discover whether his adviser is not acting in an illicit manner by entering into transactions opposed to his own interest. An agent cannot legally enter into any such contracts.

Making percentages out of tradesmen and merchants who supply materials or labour is one of the kinds of illicit business into which architects occasionally fall. The thing can be done so easily and so quietly. The manufacturer quotes a price for his work, including the commission, which, under any circumstance, the employer is said to pay for. If the architect refuses, it goes to the contractor. Many of our readers remember the action of the Institute some years ago, when that body drew up a declaration on the practice of sharing commissions. Whether or not it had a salutary effect in checking the evil amongst members of its own body may be very much doubted; the custom of taking commissions lurks in very unsuspected quarters, and indeed is looked upon by many as legitimate business on both sides. Since 1877, when the article on "Illicit Commissions" appeared in the *Westminster Review*, the subject has been allowed to drop—it was a "nine days' talk," the attention of the public was drawn to the practice, and those who dealt in such transactions and had consciences were stricken, no doubt. The transaction is unfortunately too interwoven with the practice of English architects to expect a speedy removal of the grievance. It is necessary to remind the young practitioner that the custom carries its penalties as well as its rewards. If any disagreement arises, the architect is mercilessly tied: he cannot, with any independence, reject work not done according to specification; he is completely handicapped, and his client suffers in two ways—first, in cost; secondly, in regard to the quality of the materials or workmanship over which his agent has lost his right of rejection. These are violations of the faith reposed in the professional adviser or agent; there are other kinds of transactions less gross which ought to be mentioned. Whenever the agent has an interest opposed to his principal the same responsibility is incurred. When, for instance, an architect prepares quantities for a work carried out under his own superintendence, and receives for the same a surveyor's commission or fee, he is practically yielding his authority, and is no longer a free agent. All profits so earned by him belong morally and legally to the employer. The question is one that has been threshed out in these pages, though not exactly in this light. We cannot find fault with an architect supplementing his practice with that of taking out quantities for works other than his own; but when he prepares them for his own, we are of opinion that they should form part of the contract, that the owner should be made aware of the document, and his liabilities in respect thereto. This view of the case is agreeable to the recommendation made in 1872 by a committee of the Institute. Where such is not the case, and the owner is ignorant of the existence of quantities, any excess, deficiency, or error discovered places the architect in a very unsatisfactory, and, in fact, untenable position as an agent of the owner. A set-off may be made; but this is often to the prejudice of the building.

The one question the contractor has a right to know is, Who is to take the responsibility for deficient quantities? When they are supplied by the architect it is generally made a condition that he is not to be held responsible—a very undesirable conclusion, as it only adds to the cost of the work. By making them a part of the contract the objection is rendered less intolerable, and the architect is free from the suspicion that he is acting in two capacities. Lord Grimthorpe advises the employer not to allow quantities to be taken out by anyone who can be made out to be his agent, and this legal opinion is worth consideration.

Other circumstances are likely to arise calling for the exercise of the authority of the architect that may afterwards be questioned. We may here mention the desire of introducing a mode of construction, or some new material about which the architect knows very little. He may, for instance, design a roof truss that fails, or a pillar that is found to be insufficient in strength. Of course, he is liable for the consequences that follow, as his skill and experience have been accepted. The architect runs another risk in these days of advertising and long trade-lists, to which it is necessary he should be on his guard—namely, the responsibility attaching to the specification or employment of any new patent or manufacture. He is not in a position to try experiments at his employer's expense, though there is often a great temptation and inducement to his doing so; his safer course is in declining the responsibility of recommending appliances or materials of which he has not had experience or which are not well known to the profession. The desire to introduce novelties is sometimes too strong to resist; but it is a rather hazardous thing for an architect as agent to undertake the responsibility of anything which is quite new to him, even at the risk of being thought old-fashioned. It is hard to define, again, the responsibility of the architect as distinct from that of the builder. We have no Code Napoléon here by which the obligations of the architect are determined. Broadly he is responsible for all that pertains to the design, while the contractor is responsible for defective materials and execution. Yet it is not very easy to discover which is the most to blame in the case of a defective foundation or the failure of an arch—the builder, or the architect who has neglected the superintendence of the work leading to the result. In France, if an architect has superintended any defective work, he and the builder are both regarded as equally liable, and this rule appears to be a reasonable one from the public point of view. If we look upon the architect's work as indivisible—that is, design and superintendence, he is, no doubt, responsible for any neglect. Extenuating circumstances, however, must be taken into account. It would be absurd and unreasonable to expect an architect to examine every part of a foundation, to see that

a centre was not struck too soon, and to inspect the quality of every stone or brick. An architect's responsibility, in short, is a very ill-defined quality: if it is a correlative with his authority it can be understood; but when accidents and builders' mistakes are included in it there appears to be no limit to its extent.

THE SHOP WINDOW — COMMERCIALLY AND ARCHITECTURALLY.

THE need there is for making the most of of a shop window is calling out the ingenuity of architects engaged in the design of commercial premises. Years ago a very plain and unpretending window for displaying goods was in vogue, and if we go back a century or more we find very little area devoted to glass—perhaps quite as much taken up in mullions and piers. Now, the utmost area is required to give light, and to exhibit as large a number of articles as possible, every available expedient is made use of to increase the glass area. There would appear to be not much to be done in this direction, so long as the shop window was in the same plane as the front wall of the house, and one or two doorways were taken out for access to the premises. The recessed centre doorway between two bay windows projecting beyond the front, and covered by a flat, was an improvement upon the single shop window, as the front sides of each bay gave a larger frontage for display. To both these forms there is the serious architectural objection that there was nothing apparent to carry down the house-front. The iron pillars, painted black or hidden behind draperies, are not apparent, and the whole front wall appears to be without any support except the breastsummer or cornice. The flat, the canted, and the circular bayed windows were alike open to the objection of presenting a large area of glass below a solid masonry façade.

There have lately been a few attempts made to avoid this defective kind of design by carrying down the façade and by recessing the shop windows. One practical difficulty in the way of this arrangement is the great value of area in the shop. A projecting window on the breastsummer system gives space, and if only a few feet or inches of projection covered by a flat can be obtained, so much more room is thrown into the ground floor, besides the thickness of the front wall. On the contrary, upon the new plan, some area must be sacrificed, measured by the depth back of the recessed window and lobbies. All this area must be taken out of the shop floor. The requirements of the Building Act, which makes it compulsory to keep to a building line and to avoid projections, prevents the architect bringing forward his front wall to compensate for the loss of a projecting window. These points have to be carefully considered in the planning of a shop front, and in shallow sites every inch is important. In short, the insuperable objection to giving up any space has been detrimental to good shop design in London and elsewhere. Circumstances are not always, however, so prejudicial. Those who erect commercial premises are not always so cheeseparing as to object to a sacrifice of a foot or two of space, or they have plenty of room. One of the recent examples of a recessed front to a jeweller's shop occurs at the corner of Cecil-street, in the Strand. The house has a narrow frontage to the Strand, and there was little space to throw away. The architect has made the best of the opportunity. The supports to the breastsummer are encased as mahogany pilasters on each front, and these are directly under the fronts. From these the shop windows are splayed back in the form of triangular recesses—that is, the splayed glass windows meet at an angle within the boundary line of front by about 2ft. In the Cecil-street front there are two such recesses with three pilasters, and towards the Strand two pilasters with a rounded corner brought out to the boundary line. The result of the arrangement is that three recesses are thrown open to the pavement for the inspection of passers-by, and a very effective though simple shop window is to be seen. A few square feet are lost internally by the plan; but the advantage gained is that intending customers and others can inspect at their leisure any articles in the windows without being subjected to the movement and hustling of pedestrians. Now, we think that this must be a consideration to every shopkeeper in such a thoroughfare as the Strand. It is impossible to remain even for a moment before any window comfortably without the disturbing feeling of "I must move on" being experienced. With a recessed window, those who come in to look at the shops—and there are many such—ladies especially, a quiet inspection can be made without inconvenience, and certainly to the benefit of the tradesmen. So much, then, for the commercial and utilitarian side of the question. On architectural grounds the case is quite as strong: the façades of the house are brought down to the ground, visibly, and in the perspective view form a kind of screen-like effect to the plate-glass windows within. In the window to which we have alluded the triangular-shaped recesses on the pavement are filled in with mosaic, with the name of the jewellers, "Smith and Son," adding a far better mode of street-advertising than the "facia," which is seldom looked at; they are also ceiled at a moderate height of 7ft., and arched open spandrel pieces are introduced, springing from the pilasters. Above this, the window fronts are straight, and filled with small panes of glass. Economy and light are thus combined, while internally the tops of the triangular recesses can be utilised as shelves. There are other forms of recessing the windows, but which take up more room internally, by throwing the shopfront back entirely free from the external pilasters. A spacious appearance and effective treatment is to make a deep external lobby, the showcases or windows being placed on each side, which permits of external decoration by majolica bricks or faïence appliqué and by mosaic pavements. Many of the large restaurants are now treated in this way. These external lobbies are convenient and certainly inviting. From an architectural point of view, they seem to be the proper mode of emphasising a place of business were they not open to the objection of sacrificing floor area.

The subject is one that must be regarded mainly from the economic point of view. Before tradesmen are willing to sacrifice internal space for external effect, they must be convinced that there are commercial advantages in setting their windows within the lines of front, and that what has been called "politeness" in architecture is more of a reality than they are inclined to believe. To the architect the matter ought to be obvious enough, if he only takes the trouble to recommend the merits of a plan that at once would redeem a street from the appearance of shop-obtrusiveness so offensive to good taste.

OLD CHURCH SIGNS AND MEDIÆVAL BESTIARIES.

CHRISTIAN symbolism ever affords materials for investigation to the ecclesiologist and archæological student, while the diverse opinions held by many who claim to be learned in such matters as to the origin of the more ancient signs used in the early days of the Church invest the subject with an interest peculiarly its own. Mr. J. Romilly Allen, F.S.A.Scot., has just published a work on "The Early Christian Symbolism in Great Britain and Ireland before the Thirteenth Century," the book being an amplification of the Rhind Lectures in Archæology for 1885.* The first of these admirable lectures comprises a classification of the subjects usually represented in symbolic pictures and carvings, and reference is briefly made to the remote systems of symbolism before the dawn of Christianity, as in the phonetic alphabets of the Phœnicians, Greeks, and Romans, or the picture writings familiar in the Egyptian hieroglyphics. The stereotyped modes of thought found among the first converts to the new faith of Christianity largely account for the survival of certain archaic forms, especially in isolated branches of the Church. To properly understand and appreciate Mediæval symbolism it unquestionably is necessary to lay on one side all ideas which are the result of modern culture and endeavour to view things within the limits of the thinker of the Middle Ages, making due allowances for the political as well as religious changes which have so entirely altered the cast of the national mind, and remembering, too, that advances of knowledge have completely revolutionised science and art. Mediæval literature and contemporary manuscripts alone afford reliable interpretation of much which otherwise would be hardly intelligible; while the rudeness of execution of some of the early Christian sculptures has proved a stumbling-block to many inquirers, who have misinterpreted the meaning of the subjects represented entirely by not making sufficient allowance for the want of art training existing in remote places and times. The sources whence the materials for the study of Christian art are generally obtained may thus be enumerated:—A.D. 50 to 400: Mural paintings, sepulchral tablets and sarcophagi from the Catacombs. A.D. 400 to 700: Paintings and mosaics, sarcophagi, carved ivory, coins, and engraved gems in Italy and the East. A.D. 700 to 1050: Ecclesiastical buildings and their parts in Italy and the East; Pre-Norman sculptured crosses in Great Britain; miniatures in Greek, Carlovingian, Lombardic, and Celtic MSS.; belt clasps and Burgundian graves. A.D. 1050 to 1200: Architectural works in Europe and the fittings of churches; stained glass and ecclesiastical furniture and utensils; ivories and miniatures. The rites of religion or burial seem associated with all these sources, particularly those of the earlier epoch. Mr. Allen describes the history of his subject with considerable skill, and devotes to the task a patient industry and zealous love of inquiry. The Romano-British Period occupies his second chapter, wherein Pre-Augustinian Christian remains are illustrated by Celtic monuments and other instances. The oldest authentic examples, perhaps, of Christian symbolism in England are the Chi-Rho monograms from the Roman villas at Frampton in Dorsetshire, discovered in 1794, and Chedworth, in Gloucestershire. There are but very few sepulchral remains and structures belonging to this period which show any trace of Christian symbolism, and the same may be said with regard to the objects discovered in connection with them, such as the following:—A silver bowl found at Corbridge, in Northumberland (now lost), two oval cakes of pewter found in the river at Battersea, and now in the British Museum; a fragment of a metal foot-rule in York Museum; a terra-cotta lamp in the Museum at Newcastle, and a few other specimens. The rude pillar-stones and high crosses of Ireland and Cornwall, dedication stones, and other flat slabs such as those at Clonmacnois, Llan Nnwns, and Tullylease, may be classed among Celtic

* Early Christian Symbolism. By J. Romilly Allen, F.S.A.Scot. London: Whiting and Co., 30, Sardinia-street, W.C. 1887.



TYMPANUM OF DOORWAY OF ELY CATHEDRAL.



IRISH ZODIAC,

With Names of the Apostles and Tribes of Israel, from "Liber S. Isidori," Bâle, Switzerland.

examples, like the Alpha and Omega stones of Gurmarc at Pen Arthur, St. Edrens, and of Hildithryth at Hartlepool. Early erect tombstones and hog-backed recumbent monuments or zoomorphic slabs are next referred to, with some further remarks and descriptions on stone coffins, and representations of men in the ancient attitude of prayer, as at Llanhamllech, Brecknockshire, and at Llanfrynach in the same county. Of the first three centuries of the Christian era no representations of Our Lord's Passion have been found, whereas in later times the Crucifixion is the commonest subject of all, and in this way it is to be noted that each period in the history of Christian art seems to have had its special set of subject and objects upon which the symbolism of the day was employed. The varying wealth and position of the Church, too, in different centuries largely influenced ecclesiastical art necessarily; while, of course, the aptitude of particular races for painting, sculpture, or architectural art likewise must be taken into consideration; as also the revival of literary learning under Charlemagne, for example, should be considered, or the extension of the art of illuminating manuscripts with miniatures illustrating the Scriptures. The period of the sculptured crosses seems to have been chiefly confined to the ninth, tenth, and eleventh centuries, and from those monuments in Great Britain our knowledge of Early Christian art in this country is principally derived. Space fails to allow of our following Mr. Allen through his graphic and detailed descriptions of the high crosses of Ireland, such as those at Clonmacnois, Monasterboice, and Kells, co. Meath; and we can but name the figure-sculptured crosses at Donaghmore, Ardboe, Tynan, Armagh, Clones, Drumcliff, Tuam, Termonfeckin, St. Kieran, Durrow, Kilcullen, Castle Dermot, and Moone Abbey, with others too numerous to mention. Among some very curious representations of the Crucifixion are those on metal plates in the museum of the Royal Irish Academy and in the St. Gall Gospels, or on the sculptured stones found at Kirkholm and at Monifieth, where, on the last-named, King David is playing a harp, a favourite subject in Psalters, especially Irish ones. On the shafts and bases of the Irish crosses, too, among the more popular subjects, are "Daniel in the Lions' Den," the "Flight into Egypt," "Noah's Ark," the "Miracle of the Loaves and Fishes," and the "Baptism of Christ." The stone-roofed oratories of Ireland may be reckoned as old as the seventh century, and are the earliest ecclesiastical buildings in Great Britain; but on these we find no trace of ornamental architectural details or sculpture of any kind. On the round towers of Donoughmore and Antrim, in Ireland, and Brechin, Forfarshire, in Scotland, furnish the first sculptured symbolic details to be noted; but the practice of placing a cross over the doorway of a Christian building may be traced back to the sixth century in Palestine, where the Chi-Rho monogram occurs on the lintels of the doorways of the houses, and over Coptic churches in Egypt (see BUILDING NEWS, April 24, 1884). Of Saxon buildings in this country presenting symbolic carvings of early date the best known are Barnack and Earls Barton, Barton-on-the-Humber, Bradford-on-Avon, Sompting, Deerhurst, and Worth. After these followed the Norman buildings of the 11th and 12th centuries, which period, especially the days of Stephen and Henry I., are characteristic for richly carved architectural details, as at Rochester Cathedral, Caistor Church, Northants; Cormac's Chapel, Cashel, Ireland; Shobdon Church, Herefordshire; Porchester Church, Lincoln Cathedral, Stewkley Church, Bucks; Barton Seagrave, Iffley Church, near Oxford, and Stoke-sub-Hamdon, Parwich, and Hognaston, with other numerous minor churches, or parts of larger ones. The cross in the tympana of old church porches and principal entrances we have already referred to, and the Majesty as well as the Agnus Dei are also among the favourite subjects for this position.

Christ in Glory, inclosed within an aureole or vesica, supported by either angels or the Four Evangelistic emblems, is the highest form of symbolic sculpture, and at this time was common, the finest example, perhaps, being on the tympanum of south door of the nave of Ely Cathedral, herewith illustrated. The cross is introduced, and the book is open instead of being closed, as is more commonly the case; Kirkburn, in Yorkshire, being the only other case known to Mr. Allen wherein the book is represented open. The Last Supper, Christ Washing the Disciples' Feet, the Descent from the Cross, the Delivery of the Keys, the Adoration of the Magi, the Massacre of the Innocents, and other scenes from the life of Our Lord are more or less common, and the descriptions of their representations given in the volume before us are exceedingly entertaining, while the grotesques in illustration of legends often reach the verge of the ridiculous, and sometimes are positively absurd both in sentiment and drawing. St. Margaret and the Dragon on Cotham Font, Yorkshire, and on a capital of a column at Bretforton, Worcestershire, are typical specimens of such caricatures. The seasons, months, and signs of the Zodiac are often symbolised, and the use of the calendar, for marking different parts of the ecclesiastical year and indicating saints' days, accounts for the survival of this practice down to a late period. Agricultural operations are frequently represented on Norman fonts to indicate the four periods of the year, as at Thorpe Salvin, Yorkshire, and "the months" occur at Burnham Deepdale, Norfolk, and the Zodiacal signs at St. Margaret's, Walmgate, York; Brinsop, Herefordshire; and Iffley, Oxfordshire. The system of mystic zoology contained in the Mediæval bestiaries was fully recognised by the Church as a means of conveying religious instruction as far back as the eighth century, and besides this a scheme of animal symbolism, corresponding exactly with that of the MSS., was used for the decoration of ecclesiastical buildings as early as the 12th century, side by side with scenes from Scripture, and such devices as the Agnus Dei. One great difficulty with which the artists who carved the animals had to contend was that they were quite ignorant of the appearance of those from foreign countries; consequently they had to draw upon their own imaginations, or follow written descriptions of the beasts they carved. Thus a tiger is described as a kind of serpent, and is actually drawn as a dragon with wings. A crocodile is represented as a quadruped like a bear, and so on. Some of the animals may

be identified by comparison with those occurring in scenes from Scripture and on the signs of the Zodiac, as follows :—

Ass—Nativity : Flight into Egypt : Entry into Jerusalem.
Basilisk—Christ treading on.
Bear—and Children who Mocked Elisha : Slain by David.
Beasts—named by Adam : going into the Ark.
Bull—Symbol of St. Luke : sign of Zodiac.
Calf—of gold ; the Wilderness : symbol of St. Luke.
Camel—Rebekah at the Well ; Joseph sold to the Ishmaelites.
Cock—St. Peter Denying Christ.
Dove—leaving the Ark : (Holy Spirit).
Dragon—St. Michael and ; Christ treading on : of the Apocalypse : (Hell).
Eagle—Symbol of St. John.
Fish — Miracle of Loaves and Fishes : sign of Zodiac : Miraculous Draught of.
Goat—Sign of Zodiac : (The Damned).
Horse—Passage of Red Sea : Ascent of Elijah : of the Apocalypse.
Lamb—Agnus Dei.
Lion.—Samson and : David and : Daniel and : symbol of St. Mark : sign of Zodiac : Christ treading on : of the Tribe of Judah : opening of the Book with the Seven Seals in the Apocalypse.
Ox—Nativity.
Ram—Sacrifice of Isaac : sign of the Zodiac.
Serpent—Temptation of Adam and Eve : Christ treading on.
Sheep—Shepherds and Flock : Nativity : David and his flock.
Swine—Miracle of Healing the Demoniac.
Turtle Doves—Presentation in the Temple.

We print an Irish Zodiac with the names of the Twelve Apostles and the Tribes of Judah from the *Liber S. Isidori* in the Library at Bâle, Switzerland. To those interested in Christian symbolism Mr. Romilly Allen's book will furnish much valuable information, concisely put and ably classified for reference. The illustrations, too, are carefully chosen, while the volume is admirably printed and produced.

ST. JAMES'S PALACE, ITS PRESENT AND PAST.

A ROYAL Palace, wherever found, and of whatever date, may be confidently considered to contain all that is possible and desirable in the matter of house building and decoration that the age in which it is contained and built is capable. All things go to aid in this, and it may be affirmed with confidence that a house so built must needs be expressive to the full of the house building capacity of the day in which it is built and dedicated to its high purpose. Windsor Castle, St. James's Palace, Buckingham Palace, must all afford proofs of this capacity and careful thought and power of house designing and building. It is surely a subject of no small interest to the architect, the builder, and the art-workman, everywhere and always ; but now the more particularly and especially that the public have been privileged to wander through the stately rooms of St. James's Palace, of which so few hitherto have seen aught but the dull exterior. It has suffered since its first building from not a few "alterations and improvements," but yet retains so much of its original character as to be fairly expressive of the time and artistic way of thought of its contrivers and builders. It was at one time, as the guide-book tells us, of "unmixed Gothic," characteristic of the age of Henry VIII., improved by Charles I. and "sadly deformed" by Charles II. and William III., and, moreover, all that has been done since to it has but tended to destroy its original architectural character as a royal residence. But, as we say, it is a royal house yet, and no one looking from its stately and quiet rooms into the park and gardens can think otherwise. At the time of its first building it was called the King's Manor of St. James, and was then inclosed and planted, the King using it occasionally for a residence, though keeping his Court at Westminster. It may seem to many a somewhat dull abode, but it is full of "memories" quaint enough, and taking the mind away from the ever present of things ; for at the time when Lord Burlington built his mansion in Piccadilly, of about the same date, he gave for a good reason of it that "no one could build beyond him," thus to blot out his view of the open country. It was, too, according to Lord Chancellor Clarendon, a fair house of entertainment, whereto the "privileged" met for "exercise and conversation." The tapestry hangings, it may be noted, in some of the larger rooms came from the looms at Mortlake, and are of the times of James I. and Charles I., and with the other furniture of the rooms, from the offices of the Throne Room itself, offer every here and there, with the rooms themselves, objects of interest and instruction, not alone to the house or palace furnisher, but to the architect who builds for the like purpose. But in common with older and yet more venerable structures St. James's Palace has suffered not a little from alterations. It was, says the guide-book, once on a time of "mixed Gothic," characteristic of the age of Henry VIII. This was "improved" by Charles I. and afterwards "sadly defaced" by Charles II. and William III., and all since then done has but tended to destroy its original character. It is curious to note that it is built on the site of a hospital which originally stood there before the Conquest and dedicated to St. "James." In 1100 this was pulled down and rebuilt by Henry III. Thos. Cromwell gave the "design" for the present building ; it was then called the King's Manor of St. James's. It may be noted here, too, that the present park, in which it stands, was then but a marsh ; but when the Palace was built the whole site was drained, inclosed, and planted, the King using the building only occasionally for a residence, he keeping his Court at Westminster. It is to be observed that at the date of the building of the Palace—St. James's—that extended to the open country, and that from its entrance gateway this was to be seen. By comparing a map of to-day with one of the beginning of the century, a clear idea enough idea of what has been done since the Palace was built can be well realised. The chapel here, it may be noted in passing, was designed by Inigo Jones, and goes by the name of the Queen's Chapel. Much more might be made note of, but our object is simply here, in thus calling attention to it, to urge on those who have the charge of it, to make so historic a place more often available for public inspection and instruction, much as there is here that is out of all harmony with the building itself and its associations and memories. St. James's Palace is certainly, in its own way, as instructive a monument, historically and locally, and in its special way, as Windsor itself, and might, indeed, be made yet more so by a little thoughtful looking to.

We have thus glanced but for a moment at this Royal Palace, in the hope that a little attention architecturally may be accorded to it, and it and its "furniture" harmonised. It would be difficult, indeed, to find a subject matter connected with architecture and house building, and decoration in its fine art sense, of more interest and fuller of instruction than as now seen in our various Royal Palaces, which may fairly be said to comprehend all that has or can be as yet thought about and practically realised in the progressive art of house building, and decoration, and furnishing. Here, if anywhere, there is no question of cost ; all is done that may be thought needful, and both the materials used and the workmanship must needs be of the best and of the most advanced and improved kind, and that this is so will be evident to all who look about them, even as casual visitors, with sufficient attention. But with all there is, it is to be feared, a sad enough lack of what may be termed *high art* effort, or even attempts at it. Surely the very walls of a Royal Palace should evidence the designing head and manipulative skill of the artist-workman. But it is not so, for the wall papering is but of the ordinary type of such work, though costly, and the "design" on it, covering so large a space, not a little incongruous and out of place. Very much might without doubt here be done, and but at a trifling cost, thus to make of St. James's Royal Palace a connecting link, architecturally looked at, between the Gothic and Renaissance of the past and the work of the ever present, thus reading to us a most useful and instructive lesson. C. B. A.

THE ARCHITECTURAL ASSOCIATION.

THE opening meeting of the new session of the Architectural Association was held on Friday evening. The change of meeting place made from the Architectural Union Co.'s western gallery in the basement of No. 9, Conduit-street, to the large hall of the R.I.B.A. on the first floor, was amply justified, for the room was crowded, and the proceedings were characterised by animation and enthusiasm. The President, Mr. John Slater, B.A., F.R.I.B.A., occupied the chair. Over forty nominations for membership having been read, Mr. William Emerson, who was a member previously to his leaving London for Bombay, was re-elected unanimously and by acclamation. A letter was read from Mr. E. Guy Dawber, resigning his place as a member of the committee. It was stated that the committee had nominated for the vacancy Mr. P. J. Martin, whose name stood highest of the unsuccessful candidates at the annual meeting, while Mr. W. J. H. Leverton had been nominated by Messrs. A. O. Collard and Max Clarke. The election will take place at the next fortnightly meeting of the Association. A vote of thanks was, on the motion of Mr. T. E. Pryce, hon. sec., accorded to all who assisted to make the recent conversazione a success. Mr. Pryce also announced that the first meeting of the class of design will be held on Tuesday, the 15th of November, and not on the preceding Friday, as originally advertised.

The balance-sheet and report were formally adopted, on the motion of Messrs. H. W. Pratt and H. D. Appleton ; and a vote of thanks was accorded to the auditors, Messrs. Bulmer Booth and F. E. Eales.

The President, having distributed the prizes in accordance with the list published in our columns (p. 574) on the 14th inst., delivered his

INAUGURAL ADDRESS.

After some preliminary observations, Mr. Slater remarked that when an association or society is approaching the fiftieth year of its existence, and numbers on its roll nearly 1,000 members, no one can call in question its complete success, for its position speaks for itself and is beyond cavil. But in this very success lurks an element of danger which, unless carefully guarded against, may threaten the stability of the fabric which has been so carefully reared. This danger is twofold : on the one hand, there is the tendency to point to what has been done and to ignore the ever-changing conditions of the times, and consequently to crystallise ; on the other hand, is the tendency to ignore the past and to rush eagerly and impetuously along new paths without carefully studying the direction which those paths take. We may, he added, guard against this double danger in the case of the Association by occasionally reviewing its history and ascertaining what were the aims and objects of its founders, by seeing how these aims have been varied with the growing requirements of the times, and how in the present day they still require modification. The records of the early years of the Association are most meagre ; but it is a well-authenticated fact that it developed from the Society of Architectural Draughtsmen, which was founded in 1842 by a small band of earnest workers. The objects of this society were threefold : 1. To assist the mem-

bers in obtaining employment. 2. To foster good draughtsmanship, by making it a rule that every member should furnish quarterly a drawing of some executed architectural subject. 3. The establishment of a benefit fund upon which the members could draw in the event of sickness. It would have been a wise thing if the Association could have retained as part of its functions this last object in some form or other. On February 3rd, 1847, a most important and, as the Germans would say, epoch-making paper was read by Professor —then Mr.—Kerr, in which he sketched the outline of an architectural association of students for mutual instruction and improvement. The result of this paper was the establishment of the Architectural Association, which held its first conversazione in Lyon's Inn Hall, on October 8th, 1847, the report of which says that "it was held under very promising circumstances, more than 100 gentlemen being present." In November, 1847, it numbered eighty members. The objects of the Association were stated to be—(1) the development of true principles of criticism in architecture; (2) the advancement of the study of design; (3) the provision of means whereby the student may acquire an aptitude for applying and extending the present materials of the art. The President proceeded to sketch the history of the Association, pointing out that in 1856 it was proposed to dissolve it, there having been much friction between the Association and the Institute. A proposal to amalgamate with the latter body was also rejected; but in 1859 the meeting-place was removed from Lyon's Inn Hall to Conduit-street. In the following year the condition of the Association was again declared to be critical; but measures were taken to increase its efficiency; new classes were formed, a lending library was established, and from that time to the present, with slight vicissitudes, it has gone on increasing its numbers and widening its sphere of action until it has become a large and powerful body. What is the reason that, after completing its tenth year, on two occasions within five years thoughts of closing the operation of the Association were seriously entertained? Fifty years ago design and draughtsmanship were considered almost the sole essentials for an architect. Design was the main object of the Association. The whole scope and objects of the Association were too narrow and were kept too rigidly to the original lines. It was by widening the range of study, by the institution of such classes as those for preparation for the voluntary examination of the Institute, by leaving the old tracks and by entering upon new courses, that failure was averted and success assured. May I venture, most respectfully but most earnestly, to beg some of those old and honoured members of the Architectural Association who sometimes think that we are venturing upon risky experiments to bear in mind the words of the American poet, who says:—

"New occasions bring new duties,
Time makes old things seem uncouth;
They must aye be pressing onward
Who would keep abreast of truth":

and by truth I mean the growing requirements of the time. I do not ignore the opposite danger to which I alluded, that of going too fast and too far in new directions; but there will always be a preponderating inclination towards following precedent rather than departing from it. To turn now from the historic to the more immediate past, it is my pleasant lot to congratulate the members upon a most prosperous session; the meetings have been well attended, the classes have been more numerous than ever before, and the work done has been of a very high order of merit. I must specially mention the masonry class, which Mr. Lawrence Harvey kindly conducted gratuitously, and Mr. Quick's lectures on "Graphic Statics" may also be strongly recommended to the more advanced students. The lectures will be continued on slightly different lines from those of the past session. Mr. Tarver gives up the history lectures, but other short courses will be given by Mr. Sedding and Mr. Stannus, the latter gentleman taking the Classic and Continental styles, and Mr. Sedding confining himself to English architecture. Mr. Lovegrove will continue his excellent course of lectures on construction. By the liberality of extraneous donors, the list of prizes that can be obtained by students has been much enlarged. This is a matter for congratulation. Possibly in an ideal community work would always be pursued for its own sake; but ninety-nine persons out of a hundred work better if they have a goal to aim for, and the healthy stimulus of friendly rivalry for a prize is productive of great good. But this friendly emulation is a very different thing from pot-hunting, which should be guarded against most rigidly. With reference to these prizes, I would specially call attention to the foreign travelling studentship which Mr. Aldwinckle's liberality has thrown open to the members of the Association, the regulations for which have been slightly modified. In reviewing the past session I must not overlook one very pleasing event—viz., the appointment of an old President of the Association, Mr. Blashill, who has shown the great interest which he still retains in its work in the most practical way by founding a studentship, to the important post of Superintending Architect of the Metropolitan Board of Works. To another member of the Association, Mr. Collcutt, has been awarded the high honour of the difficult task of carrying out the important buildings of the Imperial Institute, and it is worthy of remark that of the six gentlemen who were selected to compete for this work four are members of the Association. A word of notice is due to the establishment of the "A. A. Notes," under the editorship of one of the most hardworking, versatile, and efficient officers the Association has ever had, Mr. H. D. Appleton. One of the salient features of the last few years' history of the Association has been the increase of the *entente cordiale* between us and the Royal Institute of British Architects, the outward and visible sign of which is that we are holding our meeting in this room. I propose to examine this closer connection between these two bodies somewhat in detail, because I am most anxious that there should be no misunderstanding among the members of this Association as to its meaning. Now, there is not a single member of your committee who is not convinced that anything tending to diminish the independence and freedom of action of this body, anything likely to make the Association an appanage or dependency upon any larger body, would be to sign the death-warrant of the Architectural Association. I am one of the strongest advocates for making the connection between the two bodies as close and intimate as possible; but I am a stronger opponent of anything approaching amalgamation. Each body has work to do which cannot be done by the other; but each can give the other material and valuable assistance. At the same time, it should be the earnest endeavour of the two bodies to work together for the advancement of education, the furtherance of art, and the general well-being of our noble profession. The proud motto of the Institute, "Usui civium decori urbium," can only be realised by following the motto of this Association, "Design with beauty, build in truth." What the precise form of relationship between this Association and the Institute will be when the latter gets into work under its new Charter and By-laws is not quite clear; but it seems to me that it should be something like that existing between the University and its colleges. These all manage their own affairs entirely and provide for their students the means of obtaining instruction; but the University, by the establishment of degrees and shaping the examinations, and by grants for lectureships, exercises considerable influence upon the curriculum, and always avails itself of the advice and co-operation of the executive of the colleges. Of course, the analogy is not complete, as a University has to do exclusively with teaching, whereas a society like the Institute has much to do with practice as well as with education. But the examination which was set on foot by the Institute has shown most clearly that architectural training and education are the subjects which emphatically require attention. The difficulty of providing adequate means of acquiring professional knowledge for the young men who are coming into the profession every year in shoals is almost appalling in its magnitude. I do not ignore the existing means, but when you take the average yearly number of students at all the various institutions and classes for the past few years, and compare it with the number who enter this Association, it is perfectly evident that the educational forces do not reach one tithe of those who are preparing themselves for architectural practice. In this matter of education the Association has for some time been well in the van. But the question arises whether its voluntary work is adequate and whether it is the best. Is there any reason why it should not be supplemented by more extended educational work of a higher kind, and which cannot be obtained gratis? I confess I can see nothing derogatory to this Association in accepting grants for lectureships supposing funds were available from the Institute, for I believe that the limit has been very nearly reached of the voluntary work of the Association. It has been pertinently asked what provision does the Association make for preparing its members for the Institute examination, and sweeping reforms in the methods of imparting instruction have been suggested. It is not a complicated arithmetrical problem to ascertain what 1,000 half-guineas amount to, and a glance at the revenue account will show what balance the Association has, after paying the absolutely necessary outgoings, for increasing its usefulness in this way. I think the suggestions alluded to worthy of serious attention. The committee would willingly do more to assist with the preparation of candidates for the Institute examination if they could, but I fear they have got to the end of their tether. And, after all, the question forces itself upon my mind, Do we get the best work of one individual in a thousand if it is given voluntarily? Some people consider the Institute examination a success, others vote it a failure. But no two opinions exist as to the immense amount of good which has been already done by its establishment. I believe every candidate, whether successful or otherwise, will tell you that the mere preparation for the examination has done much to widen his horizon and to increase his interest in everything connected with his professional work. I am not saying that either the general scheme or the details of the examination are perfect, because I believe both require modification, and I hope to see improvements made in it before another year has expired; but passing the Institute examination, and the subsequent if not the consequent Associateship, should be considered as essential a part of the training of an architect as being articled or learning to design. I should like to endorse the recommendation of Mr. I'Anson that the examination should be recognised by a clause in the indentures of every articled pupil. And this applies not only to London, but to the provinces also. I should strongly advocate increasing the number of provincial centres of examination, even though the candidates were very few at first, and I see no reason why, supposing funds were available, the Association should not assist in this work. We have for a long time had one country branch affiliated to ourselves, and I do not think it would be difficult to devise a scheme whereby other provincial societies might enter into relations with us, somewhat on the lines of affiliation, to the mutual advantage both of them and of ourselves; in fact, I think it quite possible that this Association may turn out to be the medium for bringing about that consolidation of all branches of the profession which is aimed at by the various suggestions for federation which have been so much discussed during the last twelve months. There is, however, one warning which the student should ever bear in mind in reference to the examination. Look at it not as an end, but as a means; not as the climax of your studies, but as an incentive to fresh ones; and if you take this view of it there will be no fear of its becoming anything but an unmixed good. We may, however, go on improving the facilities for architectural education in vain unless the absolute necessity of a thorough and first-rate general education for an architect is fully recognised. Many lads are articled to an architect at the age, say, of sixteen or less, and are expected, after three years, to be able to earn their own living. Such a system as this is not only unwise and ineffective, but is extravagant, and it will pay better in actual pounds, shillings, and pence to keep a boy at school for another two years and then give him a course at a technical college or at one of the universities before he is articled to an architect. Just look at what is required of an architect

nowadays. And yet, though many things are required of him by the public, will anyone say that in very many cases the public recognition of an architect's services and position is all what he ought to expect if he be a capable man? But let us bear this in mind, that the recognition of our profession depends upon each individual one of us. The outward display which is so striking a feature of our times has affected the architect, and is seen not only in the palatial exteriors which mark some of our new buildings, but also in the excessive elaboration of modern draughtsmanship. It is not so much elegance of drawing as knowledge of details that is required in practical work; comfort and substantiality in the erected building will be more appreciated by the client than the appearance of the plan and elevations on paper; so that while not neglecting draughtsmanship—don't imagine that I am disparaging that—try and make it only a means of assuring more accurate knowledge. We have responsibility not only to our clients but to a ourselves and our colleagues, and a delinquency on our part, a lapse from the high standard which we should set up for ourselves, or even only a manifest display of incompetency in work which is intrusted to us, may do far-reaching harm and is a slight upon the other members of our profession. We should bear in mind, as Bacon says, that we have "as well to create good precedents as to follow them," and although we cannot all be a Michel Angelo or a Brunelleschi, and hand our names down to posterity "in records that defy the tooth of time," we can all earnestly endeavour to do thoroughly and well the work that comes immediately to our hand; and if this spirit animates us, whether as students in our preparation or as principals in our practice, we shall do what lies in our power to uphold the dignity of our profession, and to hand on the Lamp of Architecture with its lustre undimmed to those who are to come after us.

On the motion of Professor Kerr, seconded by Professor Roger Smith, and supported by Messrs. T. R. Rickman, E. C. Robins, and J. Douglass Mathews, a cordial vote of thanks was accorded the President for his address.

MASONRY AND STONE-CUTTING.*

By Lawrence Harvey.†

FIRST LESSON.

THE art of masonry comprises the solution of two questions:—

Firstly. Which are the shape and the dimensions a stone structure should have to insure its stability, and to satisfy the requirements of taste and convenience?

Secondly. The shape and dimensions of a structure having been determined beforehand, how to produce the structure out of an aggregate number of blocks of stone of moderate size and of such shape that, placed side by side in a given order, they will support one another as if the whole structure consisted of one single stone?

The first question depends on the laws of statics, on the toughness of the stone used, on the artistic rules of architecture. This is, therefore, a vast subject of study, which includes nearly all the science of construction and the history of architecture. For this reason we do not intend to treat this part of our subject, but will confine ourselves to the second question only—viz., the scientific operations of stone-cutting, or the methods by which the mason obtains, from the designs of the architect, the exact shape of each stone in a building, so that when set in its place it shall exactly fit the adjacent stones without previous reference to them.

THE SCIENTIFIC OPERATIONS OF STONE-CUTTING.

The masonry of walls and trabeated architecture is of so simple a character that it offers no interesting geometrical operations, and we beg to begin at once by studying the construction of vaults.

The scientific operations of stone-cutting then comprise three problems:

Firstly. To find the most advantageous system of voussoirs to subdivide a given vault.

Secondly. To determine the arrises and the true shape and dimensions of every face of the voussoirs. The limits of these faces are of course the intersections of the divers surfaces given by the former operation.

Thirdly. To apply the lines found to the working the stone, so that the stone be cut to the shape given by the working drawings.

The first of these operations, or the system of the division in voussoirs, differs according to the shape of every vault; but there is one general rule which must be followed as much as possible—viz., *the joints* (that is, the faces of the voussoirs which come into contact with one another) must be made *normal* to the *intrados* of the vault (that is, must be in every point made perpendicular to a plane tangent in that point to the inner surface of the vault). It is evident that, if this condition be not fulfilled, of two contiguous voussoirs the one would present an acute angle, the other an obtuse angle, and the first would inevitably be broken off by the pressure of the latter, and thus disfigure the inner surface of the vault. This might even sometimes endanger the stability of the structure.

To carry out the second operation, the intended vault has to be delineated, full-size, on a platform prepared for that purpose. The utmost accuracy is required in making these full-size drawings; the method and means for producing them are fully explained in Mr. Dobson's *very short* treatise of masonry, to which we beg to refer our readers. This done, the arrises which form the outline of every face of each voussoir, are determined in projection; then the stonemason gets the real size and shape of these faces by the methods usual in practical geometry. He turns down the faces which are plane, and he develops such faces as are developable: by these means the moulds, templets, and bevels required for working the stone are obtained.

So as to clearly understand the terms we shall employ hereafter we beg to give a few definitions, some of which refer only to the words we use in this paper.

Each one of the stones, which compose either an archway or a vault, is called a *voussoir*.

In each voussoir the *soffit* is the face which forms part of the interior surface of the archway or vault; the *bed-joints*, or *beds*, are the faces *M m*, *N n* (Fig. 1) on which the voussoirs of one course bear upon the voussoirs of the course immediately below them, whereas simply the *joints* are the faces in which two voussoirs of the same course come into contact. The *head* of a voussoir is the name we shall give to the face thereof which appears on the front wall or face of an archway. We shall also, for convenience sake, use the words "back" and "top" for the faces of the voussoir which come in contact with the masonry of the wall supported by an archway or a vault.

In a vault the interior surface is called the *intrados*, but more commonly the *soffit*; and the exterior surface (Fig. 1) is the *extrados*, when such a finish exists. When the vault is comprised in a body of masonry, as in an archway pierced through a wall (Fig. 2) there is no real extrados, but the backs of the voussoirs are cut to fit in with the horizontal courses of the stone wall; the name of "extrados" is then given to an ideal surface, shown by dotted line, which would connect the extremities *a*, *b*, *c*, *d* of the bed-joints of each voussoir. The *jambs* are the sides of an aperture or an archway; but the more general term of *piers* will be given to whatever structure, wall, pillar, or pilaster supports a vault. The *springing line* is the lowest level where the vault begins, and we shall call the *springer* the lowest voussoir next the springing line. In segmental vaults and flat arches we shall give the name of *abutment* to the highest stone of the jamb, because it resists the lateral pressure of the vault; but in semicircular vaults and others, which simply rest on their piers, we shall call *impost* the stone immediately below the springing line.

All rocks are either *sedimentary* or *igneous*. Limestones and sandstones belong to the former, granites to the latter. In quarries of sedimentary stones the strata are generally separated by parallel surfaces; and in extracting the stone, rough pieces are obtained in which the quarry-beds are nearly plane faces. Whenever stone is employed in building, it is important to keep the quarry-beds perpendicular to the direction of the pressure the stones will have to sustain, because the resistance of the stones is in that direction at its greatest to meet the crushing weight to which it is submitted. In a wall, for instance, the quarry-beds should be horizontal; in a vault, the quarry-beds must either coincide with one of the bed-joints of the voussoirs, or form equal angles with both their bed-joints. The reverse holds good when the stones are submitted to flexion, as in architraves. In that case, the stone offers a much greater resistance when its quarry-beds are placed vertically, as was practised by Greek, Roman, and Mediæval masons.

The foreman of stone-cutters makes out the full-size geometrical drawings required, and directs the workmen in applying the results of his drawing, moulds, templets, and bevels to the cutting of the stones. He also marks out each stone, when cut, with certain signs or face marks (in Fig. 8 we give the signs used by the French masons), so that the foreman who directs the laying of the stone may know which are the lower and the upper bed-joints. The face marks are not to be confounded with the ordinary marks which masons use in lieu of signature.

BATTERING-WALL.

To explain the operations of stone-cutting more easily, we have taken for our first example a simple battering-wall, which offers no complex arrangements of masonry whatever. A wall is said to be *battering*, or on the batter, when its face is not vertical (Fig. 3). The angle of the batter is measured from the plumb-line; for instance, in Fig. 3 the batter is the angle Y A Z. This angle is not usually given in degrees, but by the proportion between Y Z and A Z, such as 1ft. in two, or 3in. to the foot, &c. In our drawing, we make the batter of 4in. to 1ft. rise, or one-third.

If (Fig. 3) the horizontal bed-joints were carried through to the battering face of the wall, the lower arrises of the stones would be sharp, the upper ones obtuse. To avoid this defect, the horizontal bed-joints are stopped at a distance of 2in. or 3in. from the battering face, and the ends of the joints are made perpendicular to the face of the wall, as in B C and G H.

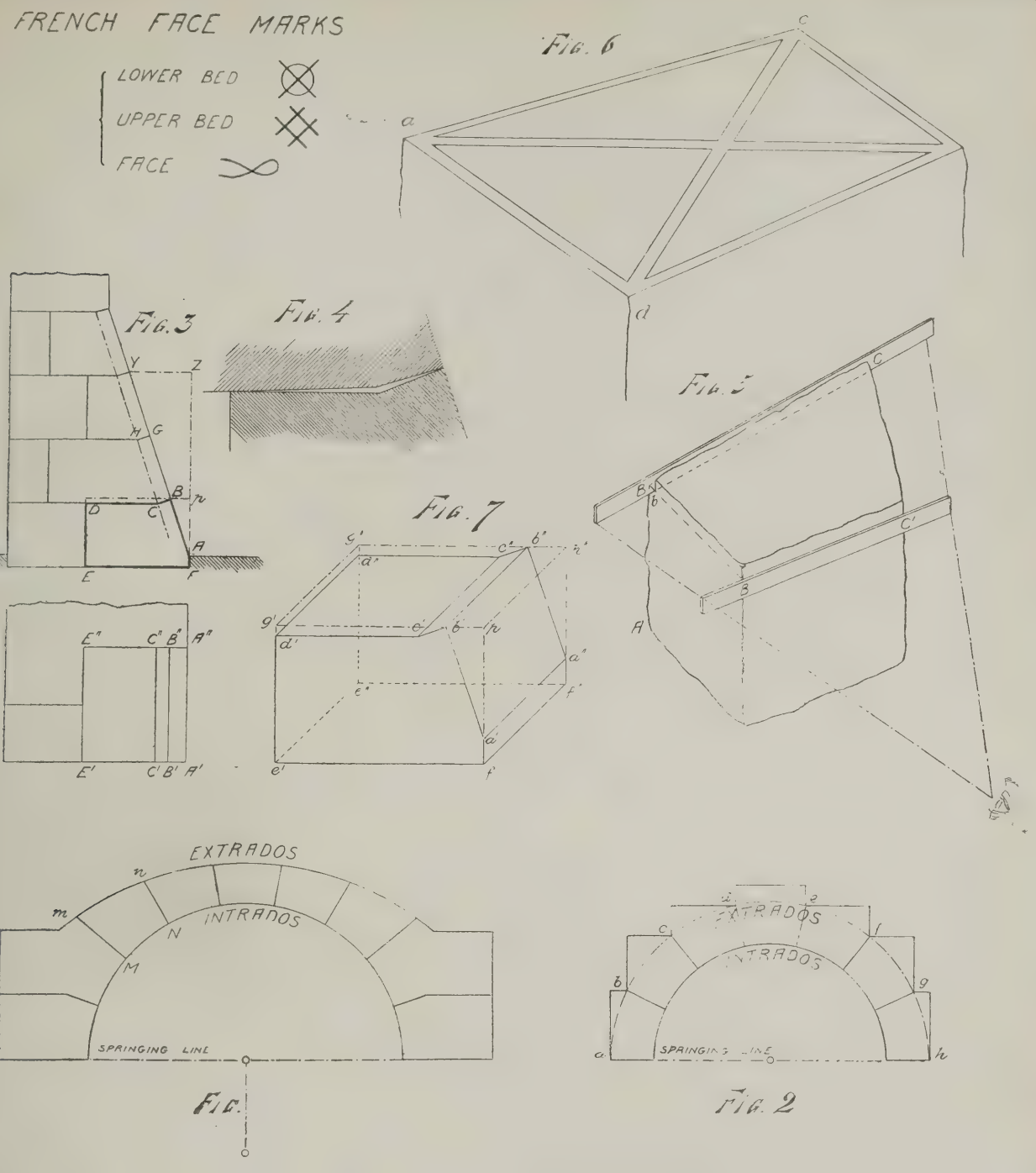
As we have said before, sharp angles should be avoided, yet there are cases where the treatment necessary to obtain right angles is nearly as objectionable as sharp angles. In Fig. 3, for instance, the lower bed-joint of each stone presents a projecting angle which has to fit exactly in the inner angle of the stone below it; such joints are rarely perfect, so that the stone most often will bear on a few points, as in Fig. 4, instead of bearing on the entire surface of the bed-joint. In this case, the mason should allow for a wide joint on the face of the wall, to prevent the stones bearing on the outer edge of the bed-joints, the joints to be filled up with cement after the work is completed. The architect will avoid giving the mason these difficulties, if he will adopt a V-jointed rustication instead of a wall with a plane face, and this will, of course, be a more economical design to carry out than the former.

Before explaining the operations for cutting the stones of a wall, we must begin to show how a plane surface is worked on rough stones such as are extracted from quarries.

(Fig. 5). The blocks of stone extracted from quarries are in the shape of rough prisms. If they be of moderate size, the workman can proceed, as shown in Fig. 5. On the back face, A B C, and close to the upper edge, he will draw with the help of a straight-edge a line B C. This line will not be straight on account of the irregular surface of the rough stone, but it will be contained in a plane. Then with the chisel and mallet, a draft or narrow ledge is cut along

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† As many readers know, this subject—of which there is no English textbook in existence—is now in a fair way to receive the attention it deserves. The City Guilds Institute is taking the matter up, and the Institute of British Architects will probably move one of these days in the same direction. A series of classes for the use of architectural students to enable them to obtain, by the means of masonry, a thorough knowledge of the geometrical operations which find constant application both in architectural drawing and construction, is now being held at the City Guilds Institute, South Kensington, on Monday evenings, from 7.30 to 10, commencing on Monday, October 17th, 1887. The series is divided into three courses of ten lessons each. We have availed ourselves of Mr. Harvey's assistance to place the notes and diagrams of these lectures before our readers, convinced that they cannot fail to benefit students generally.—Ed. B.N.]



that line, the depth B b of this draft to be about $\frac{3}{4}$in. and to be accurately worked to a plane. This done, the workman places his straight-edge upright on the ledge of the draft he has made; he will then place against the opposite face of the stone another straight-edge, so that its upper edge coincides exactly with the lower edge of the first straight-edge, when sighted from a distance. He will then cut another chisel draft along the line B′C′ marked by the second straight-edge. These two chisel drafts are of course in the same plane, and the workman has only to remove the superfluous stone which divides them, until the surface coincides in every part with a straight-edge. This he does by connecting the two first drafts by a draft B B′, and following on cutting away the stone so that a straight-edge resting on the two opposite drafts should touch the whole intervening surface.

To form a plane surface, when the surface is of considerable size, two diagonal drafts as $a\,b$, $c\,d$ (Fig. 6) are produced across the surface, and connected by cross drafts, as $a\,d$, $c\,b$. The superfluous stone is then knocked off between the drafts.

In working a block of stone, the workman begins by bringing to a plane surface one of its largest sides, usually one of the beds. Without any further explanation, the reader will easily conceive how another face, perpendicular to the first, can be produced by sinking across its ends chisel drafts with the help of a square, then working this second face between the drafts.

(Fig. 3, 7.) Now, let us see how we will work the lower stone of the wall (Fig. 3). The elevation of this stone is shown (Fig. 3) by the outline A B C D E F, and its plan placed below the elevation is contained within the rectangle A′ A″ E″ E′. *

A stone will have to be selected from the quarry, the base of which will be equal to the plan A′ A″ E″ E′, and the height of which will be equal to F p; but all the surfaces of this stone need not be worked, for, as some of them will have to be cut away, this would entail a waste of labour. The workman (Fig. 7) will begin by forming the lower face of the stone which is to become the bed-joint of the same. He will draw thereon the rectangle $f'\,f''\,e''\,e'$ exactly equal to the plan of the stone; he will then work the face $f'\,e'\,q'\,p'$, which is perpendicular to the bed-joint. This done, he will draw on that face the outline $a'\,b'\,c'\,d'\,e'\,f'$ identical to the elevation of the stone. After this by the help of a square, the workman can cut all the faces of the stone perpendicular to the face last worked. He will finish the stone by measuring on the last-worked faces a distance equal to A′ A″, which will give him the arrises of the end face, which he will then be able to cut.

This method for cutting the stone would answer; but in our opinion, it would be safer to begin by also dressing the back plane, $f''\,e''\,q''\,p''$, and marking thereon the outline of the elevation. In that case, the other faces can be worked with a straight-edge guided by the arrises of the outline. When, as in a wall, many stones have to be similarly worked, a mould cut out by the foreman to the shape of the elevation is generally used.

Of course, the method indicated for cutting the stones of the lower course applies equally to the stones of the courses above. The geometrical operations required to obtain a stone of a given shape out of a rough block are simple enough; but we beg to point out that much judgment is required to cut out the stones so

* Observe that two points or more may be projected in elevation on one point only, for instance, the points A′ A″ on plan have both for elevation the point A. Likewise two points in elevation A and F may have for plans only one point A′. Thus a point is only completely defined when both its projections are named, such as point (A, A′) or point (F, A″); but for shortness sake we will often be content with defining a point by its sign on the plan, and call it the point A′ or E″, thereby meaning the point itself in space.

as to waste as little material as possible, and a good foreman of masons can save his employer large sums of money.

ARCH CONSTRUCTION.

IRON construction has so completely superseded masonry for bridge-building that it would appear almost unnecessary to discuss the question of the equilibrated arch for any large span. But the mathematical principles of the arch have always been an interesting subject with geometricians and theorists, and the theory, at any rate, ought to form one of the subjects of the architect's and engineer's education. As a problem of the equilibrium of forces, the theory of arch construction is instructive, inasmuch as it presents us with a concrete example of three forces balanced in a structure. The other day, at the opening of the Engineering section of the Bristol Naturalists' Society, at University College, Bristol, the president, Mr. Charles Richardson, C.E., read a paper on Arch Building, in which he advocated the employment of arches of equilibrium for bridges. The author referred to the well-known and elegant property of the balanced arch, which is derived from the principle of the catenary or suspended chain or inverted polygon of bars, each bar or link which assumes the position (inverted) that the arch stones of an equilibrated arch would have. In Dr. Hutton's valuable "Tracts on Bridges," this principle is followed in his elucidation of the arch, and readers of that work will remember the diagrams given of various kinds of balanced arches, and the curves of extrados necessary to insure equilibrium. The theory, indeed, is older than Hutton. Belidor and Dr. Hooke both investigated the form of the extrados from the nature of the curve, and this theory has been made the foundation of a very interesting system of designing arches. According to this theory of the question, the stones are considered free from all friction—a condition which does not hold in practice. Mr. Richardson follows, as far as we can see, this theory. He enunciated the theorem that the weight on any point of the arch is proportional to the vertical line from the road line to the intrados at that point; that the horizontal thrust is the same throughout the arch, and is equal to the weight on the crown per unit of area multiplied by the radius of curvature there; and also that the bed-pressure at any point is equal to the horizontal thrust multiplied by the secant of the angle the curve makes with the horizon at that point. This rule is thoroughly mathematical and true for arches of equilibrium, and the author exhibited an instructive model of an arch equilibrated, and showed by inverting it, and suspending a chain weighted by steel rods representing the loads at each point, that the latter coincided with the road line. But the engineer architect have to do with arches in which the element of friction enters: the stones are cemented, and, therefore, the theory, however beautiful, does not hold good in every case. Instead of the separate arch stones or voussoirs, he has to deal with segments of the arch which turn upon certain edges. Thus, an arch which fails breaks into four parts, the crown sinks, and the haunches rise, the joints at those points opening. One of the questions to decide is the points at which rupture occurs, that being found to find out what horizontal pressure each of those lower segments have to sustain. From knowing the thrust and its point of action, the stability of the arch will depend on the mass and weight of the pier. The experiments of Rondelet and others have proved that the voussoirs unite into segments of the arch, and tend to overturn the abutment, acting rather as levers than wedges. He found, also, that the greatest thrust was in arches with an even number of voussoirs or a point at the vertex; that a keystone lessened the thrust. Nevertheless, the theory of equilibration should be known by all architects and bridge builders.

In alluding to the materials, the author showed the impossibility of dressing and bedding stones accurately. Practically, the stone-built arch is difficult to execute with precision: the facing stones only are cut to the true curve, the backing being filled-in with rubble and roughly executed. With brickwork the bricks can be all bedded in cement, being more convenient for handling, and a vitrified brick is equal at least to the best stone in resistance. The brick arch should be built in vertical bond, not in rings. Mr. Richardson finds that, taking the safe load in cement at 5cwt. upon the square inch, that an arch 15in. thick at the springing, and 12 5-6ths at the crown is sufficient for a span of 85ft. with a rise of $\frac{1}{8}$th of the span. He says: "As all loads and thrusts on such an arch are in direct proportion, if each dimension were multiplied by four we should have a span of 340ft. with a rise of 42ft. and an arch thickness of 5ft. This 5ft. thickness would give a sufficient margin of safety for the moving load, because 5ft. is only the necessary thickness at the springing, while that at the crown would be 9in. less. The total weight of this bridge would be 100,000 tons." Ring-built arches are advisedly objected to, as the rings tend to separate when any settlement takes place. Mr. Richardson does not rely too much on friction, and he is right: there can be no scientific arch construction that is not based on the principle of equilibrium, the line of thrust being kept within the middle third of the arch thickness, and in designing arches of brick or stone the engineer should always be able by diagram to satisfy himself of this condition. Whenever the line of thrust passes close to the lower edge of the arch ring at the haunches there must be undue pressure and a tendency to open at the other edge; in other words, the arch is inclined to drop at the crown. When it passes out of the arch failure must take place sooner or later. Instead of first deciding upon the curve and road-line, as is frequently done, the right course is to find the line of thrust for the given span and loading, and then make the arch conform as nearly as possible to this line. We agree with the opinion that brickwork, if correctly applied, would be found to excel iron construction in strength, durability, and economy—certainly in appearance. In the construction of masonry arches sufficient care is not always bestowed upon the drainage of the arches—a cause, we imagine, of many failures.

"BUILDING NEWS" DESIGNING CLUB.

AWARD OF PRIZES, 1886-1887.

THE following is a list of the subjects given in the past series of designs competed for, with an analysis in brief of the positions taken by the leading members:—

Subject A.—A Solicitor's House in a Country Town—
1. "Protoplasmic Globule."* 2. "Hugh."* 3. "J. R."

Subject B.—An Organ-Case for a Small Country Church—
1. "Laborare est Orare." 2. "Diapason." 3. "Eblana."

Subject C.—A Lych Gate for a Country Churchyard—
1. "Loidis."* 2. "Notts." 3. "North-West."

Subject D.—A Dining Room Buffet Sideboard—
1. "Protoplasmic Globule."* 2. "North-West."* 3. "William."

Subject E.—A Hooded Mantelpiece for a Hall—
1. "Protoplasmic Globule."* 2. "Yorkshireman." 3. "W. H. L."

Subject F.—A Small Village Social Club—
1. "Norseman."* 2. "Loidis."* 3. "White Rose."

Subject G.—A Mountain Church to seat 150—
1. "Norseman."* 2. "Protoplasmic Globule."* 3. "Selebi."

Subject H.—A Gamekeeper's Cottage—
1. "Loidis."* 2. "Student Win." 3 "Ierne."

Subject J.—A Rosewood Drawing-Room Cabinet—
1. "Loidis."* 2. "So and So." 3. "Pilliwillick."

Subject K.—A Small Stable for a Country House—
1. "Protoplasmic Globule."* 2. "Eton." 3. "Stability."

Subject L.—An Entrance Lodge and Arched Gateway to a Country House—
1. "Selebi." 2. "Loidis."* 3. "Norseman."

Subject M.—A Wooden Pulpit for a Town Church—
1. "Pilliwillick."* 2. "Protoplasmic Globule."* "Elean."

Subject N.—A Summer House—
1. Norseman."* 2. "Loidis."* 3. "Protoplasmic Globule."

Subject O.—A Pair of Model Cottages—
1. "Loidis."* 2. "Midnight." 3. "Eton."

Subject P.—A Village Publichouse—
1. "Norseman."* 2. "Loidis."* 3. "Clair."

Subject Q.—A Font in Stone and Marble—
1. "Protoplasmic Globule." 2. "Elean." 3. "Truth."

Subject R.—A Small Country Vicarage—
1. "Protoplasmic Globule."* 2. "Loidis."* 3. "Norseman."

Subject S.—A Cricket Pavilion for a Private Club—
1. "Protoplasmic Globule."* 2. "Northumberland." 3. "Lawton."

[* Those designs marked by an asterisk were illustrated in the BUILDING NEWS on the following dates:—Dec. 31, 1886; Jan. 21, 28, Feb. 18, 25, March 18, April 8, May 20, June 10, 17, July 29, Sept. 2, 1887.]

From this table of results, compiled from the several competitions, it will be seen that "Protoplasmic Globule" was placed first seven times out of the eighteen subjects submitted, second twice, and third once. "Loidis" is recorded as having been first four times and second five times. "Norseman" was awarded the first place on four occasions, but never second, though he won the third place twice. Eight illustrations have appeared of "Protoplasmic Globule's," nine by "Loidis" were published, while "Norseman" figured among our illustrations four times. The prizes, therefore, are thus awarded:—

"Protoplasmic Globule," J. H. Cook, 12, St. George's-crescent, Liverpool, first prize of £10 10s.
"Loidis," F. W. Bedford, Sycamore Lodge, Woodhouse Leeds, second prize of £5 5s.
"Norseman," H. T. Hare, 3, Regent's Park-villas, Gloucester-gate, N.W., third prize of £3 3s.

The following are deserving of special mention, and we give their names in order of merit, "Selebi" and "Pilliwillick" being ties, both having come in first once and third twice; both their first designs were illustrated:—"Selebi" is the motto of J. W. Twist, Portholme House, Selby, Yorks. and "Pilliwillick" proves to be W. H. Wood, 53, South-street, Durham. "Hugh" and "North-West" were awarded a second place on one occasion each, and their designs were thought worthy of publication, so they take precedence before "Laborare et Orare," who was first once but failed to secure illustration. "Hugh" is J. H. Goodman, 42, Oxford-road, Reading; "North-West" is J. A. Coe, 56, Elizabeth-street, Cheetham, Manchester; and "Laborare et Orare" is G. F. Terry, 12, St. James-street, Sheffield. "Diapason," "Notts," "Yorkshireman," "Eton," "Student Win," "So and So," "Midnight," "Elean," and "Northumberland" were second once each, and "J. R.," "Eblana," "William," "W. H. L.," "White Rose," "Ierne," "Pilliwillick," "Stability," "Elean," "Eton," "Clair," "Truth," and "Lawton" were each once third.

EXHIBITION OF THE TURNERS' COMPANY.

THE annual exhibition of specimens of hand-turning open at the Mansion House is not so large as we have seen it. In the Wood Competition the first prize of the silver medal and freedom of the company is awarded to C. Humphreys, of George-street, Grosvenor-square, for a pair of mahogany vases turned in a foot-lathe. The prize is taken for beauty of form, symmetry, and general excellence of workmanship. The shape is Greek in profile. The second prize (bronze medal and £4 4s.) is given to John Olley, of Bolsover-street, W., for a pair of satinwood tazze, or card trays or pedestals. The third is awarded to F. Honeychurch, Baker-street, and the fourth to H. Gates, of Lewes-road, Camberwell. Of the other prize specimens we notice a pair of brackets of Gothic design, by Geo. Adam Alderton, of Brighton, a pair of mahogany vases, with satinwood flutings on pedestals, and a set of flower-stands of teak and walnut, showing the effect of eight chuckings, with spiral columns holding glasses, &c., by Stephen Thwaites, of Hastings, who takes the ninth prize. A tenth prize for this class is awarded to T. Miller, of Preston. A very elaborate pair of Gothic candlesticks of pollard oak and ebony in a glass case forms a centre object of the table. We cannot admire the design, or commend this exhibition of industry misapplied to such articles. In the first instance, the design is not a judicious treatment for wood, and the ornament, traceried work of the stages, and the spikes, all meaningless. The designer says he has used 1,600 pieces of turned wood in its production—so much the worse, we say, for his commonsense as an artist.

In the competition for glass, which includes blowing, cutting, and engraving, the first prize in Class C (glass engraved by wheel only) is worthily bestowed on Paul Oppitz, of New Wandsworth, for a very chaste set of glass vessels, jug and goblets delicately engraved with the City arms, festoons, and other devices, including a glass vase having a medallion with figures, designed with much taste, and delicately executed by wheel and hand. The precious stones competition include some beautiful specimens of diamond-cutting, and brilliant work, also intaglio and cameo. Signor Guiseppe de Giovanni exhibits a cameo sculptured bas-relief upon a helmet shell, which includes Classical figures, illustrating Amphitrite on her way to marry Neptune, seated on a shell drawn by dolphins. The design is in ex-

cellent keeping and taste. Another, a conch shell, represents in bas-relief "The Toilet of Venus," with her attendant nymphs and tritons, in which the delicate rose tint of the background and the white reliefs make a very charming work of art. G. De Giovanni, the designer of these, also sends a carved glass tankard of flint crystal, representing a Bacchanalian subject engraved as a cameo. This wonderful specimen of art workmanship has taken the artist several years to finish. Signor Giovanni is a master of cameo engraving, and these works exhibit very high artistic ability.

In class E the first prize, silver medal and freedom of company, is given to W. Schmidt, of Hatton Garden, for a carved crystal bust, representing Britannia on a pedestal, with pearl helmet. The amateur and apprentice work in wood include several very creditable examples. The first amateur prize is given to Rev. C. C. Ellison, of Lincoln, and the first prize for apprentice work to George Willis, of Bethnal Green, the second to F. Nicholay, of Marylebone-lane. The glass competition we may mention is the first that the company has included in their yearly exhibition, but only two classes—viz, glass blowing without use of mould, crimp, or other tool, and glass engraving by wheel only—have been represented. The judges observe very judiciously with regard to the wood competition, that a vast amount of labour and ingenuity have been thrown away upon some of the articles, and we think that the qualities of beauty of design, utility, and other artistic principles should be steadily kept in view in awarding prizes for the future. The presentation of prizes by the Lord Mayor takes place to-day (Friday) at 12 noon, in the Egyptian Hall of the Mansion House.

HOLLOW BUILDING CONSTRUCTION.

THE hollow voussoir or tubular arch brick has found a large demand in the United States, and several companies are manufacturing the fireproof tile. The patent Doulton-Peto fireproof floor, formed of pottery blocks, and well known to our readers, is one of the best forms of flat arching for floors, as the rolled iron joists or girders are protected by the springing blocks which fit on the lower flanges by means of grooves. The soffit of the arching, when finished, presents a continuous surface of the blocks with dovetail grooves, which form the key to the plastering of the ceiling. Similar grooves are cast at the sides of each block, so that when they are put together with cement the grooves form dowels. Floors constructed with these hollow blocks are found to carry great weights, all thrust being counteracted, and, in fact, an arch constructed upon this system forms a solid block or lintel rather than an arch in which thrust is felt. It may be as well to remark that there are in this kind of floor high resisting qualities and great lightness combined which are not found in many of the patented systems of fireproof floors in which solid brick arching is employed. The air space formed by the cavities is of advantage. The introduction of this kind of floor for dwellings built in flats is to be much desired, and architects intrusted with buildings of this class would, we are sure, find them desirable both as a fire-resisting and sanitary floor, capable of deadening sound as well. For warehouses and shops the hollow tile flooring possesses many advantages over timber construction, though for large and heavily-weighted floors the solid brick or Dennett arch is certainly the best. Several forms of hollow bricks and tiles are to be met with, some for building walls, others for arches and piers. Wherever lightness is a consideration, we believe the architect would be doing well to avail himself of their use. In many positions where the foundations are not very reliable, the hollow brick can be employed, and we know of one architect who has used them in churches over the chancel arch to lessen the thrust. For vaults, the old Italian architects wisely employed hollow pottery, and we know that Soane used hollow tiles in vaulting some of his apartments at the Bank. There is another obvious use for hollow bricks, that is in building walls or piers over breastsummers or girders, and partitions between rooms. As a lining to stone walls the hollow brick is invaluable in arresting damp, and superseding battening. In the BUILDING NEWS for 1858, a very exhaustive paper on the subject will be found illustrating the English and French systems of manufacture, to which we may refer our readers. Light-arched floors and roofs are common in India, where several buildings have flat roofs formed of tiles about 1 foot square and 1½in. thick, in two layers, breaking joint upon beams about 3ft. apart. A sort of concrete, 6in. thick, is laid over the tile surface of broken bricks and lime beaten down, plastered, and then rubbed to a fine surface, which is said to be impervious to wet. A double thickness of bricks laid flat with the joints broken makes a very strong dub. For groining and vaults the hollow pottery set with gypsum affords the architect every facility, combining lightness with solidity and strength; indeed, such vaults, with the haunches filled up with rubble stone in plaster, possess no destructive action on the abutments, and in time become compacted shells that may be carried bodily at the four points of support.

The well-known Dennett system is, for all purposes of vaulting, perfectly free from lateral pressure, and as it can be used to form groins, domes, and vaults without ties, the architect has in it an excellent substitute for masonry. When builders of theatres and other edifices divided into floors have these materials ready to their hand, it is extraordinary that they still adhere to the old systems of constructing their floors and roofs. The expense is looked at, but we have no doubt whatever that it would be found the cost on a large building would be really less in the saving of labour, timber, and iron. Every theatre would be safer if its auditorium roof were a flat dome of concrete or hollow pottery, and its tiers and galleries constructed upon the principle adopted at Mr. Terry's new theatre and at the Alhambra.

HOW A MARBLE STATUE IS MADE.

MR. JOHN A. P. MACBRIDE, sculptor, who was introduced to a large audience, chiefly of working men, by Sir James Picton, gave a practical lecture on the above subject on Tuesday week, at the Rotunda Lecture Hall, Liverpool. After giving a sketch of the art and its great antiquity, the lecturer drew a profile in chalk on the blackboard, which he filled in with clay, and proceeded to demonstrate the building up and modelling of a portrait bust of soft clay. He stated that there was a general and erroneous opinion that in taking a portrait bust it was necessary to take a cast of the face. This was a mistake, for the head lost all the spirit and go by such a mechanical process, that should distinguish an artist's work. The truth was not always that which appeared to be true, and the sculptor had to convey some idea of the character as well as of the mind of the sitter; and a man who knew his work ought to be able to do so with his fingers. Carving was a secondary consideration. The lecturer then explained the process of pointing a marble statue. In this process, the model and the block of marble were each fixed on a base called a scale stone, to which a standard vertical rod could be attached at corresponding centres, having at its upper end a sliding needle, so adapted by a movable joint as to be set at any angle and fastened by a screw when set. The sculptor having marked the governing points with a pencil on the model, the instrument was applied to these, and the measure taken. The standard being then transferred to the block base, the pointer, guided by this measure, cuts away the marble, taking care to leave it rather larger than the model, so that the general proportions were kept, and the more important work then left for the sculptor's hand.

CHURCH BUILDING IN CHISWICK.

A NEW parish hall was recently opened at Bedford Park, from the designs of Mr. Maurice B. Adams, F.R.I.B.A. The buildings include the north aisle to the church of St. Michael's, and the style adopted agrees with the earlier work. Red brick is used for the walling both internally as well as out, with stone dressings, the cornice and gables being of Doulting stone. Cliff's glazed bricks are employed for lining the walls as a dado inside the hall, and give a great variety of tone in reds and brown, which harmonise well with the red facing bricks above. The roof is coloured a rich green, with cream panels, and the woodwork below is of Indian red. A gallery is situated at the west end of the room, with balustered front and solid uprights. Wrought-iron grilles occupy the arches over the main entrance, to which there are fixed some running gates on a steel tramway inclosing the porches when not in use. The carving to the pediments over the doors, &c., was executed by Mr. James Frampton. Messrs. Gregory supplied the wood-block paving, and Messrs. Godwin and Son, of Lugwardine, the encaustic tiles. At the end of the hall is a raised class-room, shut off by a pair of sliding doors suspended on wheels. This room serves as well for theatrical performances, concerts, and lectures. A cookery adjoins, with top light and ventilation, and there are store rooms, coal cellar, &c., in the basement. The roofs are covered with the Coalbrookdale Company's Broseley tiles. In the church the great east window has been filled with stained glass (by Mr. Bell, of the firm of Messrs. Davison and Co.), representing the Majesty with St. Michael below, and round the throne are Principalities and Powers, and then hosts of Angels. The east window also just erected in the south aisle represents the angels at the Sepulchre. A marble mosaic pavement from the architect's designs is being carried out for the chancel by the same firm. Messrs. Adamson and Sons, of Turnham Green, are the builders who have carried out the several contracts. Near Bedford Park on Acton Green during the past month a new church, dedicated to St. Alban, has been started, from the plans of Mr. Edward Monson, jun., A.R.I.B.A., of Acton. Mr. J. Dorey, of Brentford, is the builder, whose contract is about £3,500. The site adjoins the old school rooms. At Turnham Green Mr. J. Brooks is erecting a chancel to Sir G. G. Scott's church, built about 40 years ago by the munificence of Mr. Sich, the brewer. The new work is in agreement with the main fabric with lancet-like windows in stone, and walling of flints set in black mortar. The interior is more pleasing, and is characteristic of the architect. Part of the scheme is being left over for a further contract. Messrs. Chatfeild Clarke and Son are the architects for a new church, of which the nave has been consecrated, on a site adjoining the high road at Gunnersbury. It is dedicated to St. James. The nave is of bold proportions, with simple lancet windows for the clerestory, and low built aisles. At the west end is a semi-circular baptistery and a porch. At Chiswick, Messrs. Newman and Newman, of Tooley-street, are about to build a nave to St. Mary Magdalene's Church, transforming the present church into a chancel. The scheme is to cost £6,000 when complete, and will provide accommodation for 500 people, exclusive of the choir. Messrs. Powell, of Whitefriars, are erecting three new stained-glass windows in the south aisle of the parish church, under Mr. Pearson, R.A., who restored the building. The Roman Catholic Church recently built in the High-road, Turnham Green, to our Lady of Grace and St. Edward, was from the designs of Mr. John Kelley, of Leeds. The builders were Messrs. Priestley and Gurney, of Hammersmith. Their contract was £3,400, and the plan of the church is said to be that of a Roman basilica. It is constructed in brick entirely, and faced with Bracknell "reds," supplied by Messrs. Lawrence and Sons. The campanile is not yet built, and the church suffers in consequence. Adjoining, a large block of shops is building; but we hear so well is the work done that shores have already been introduced to keep them from falling.

RAIN-WATER TANKS.

THE capacity required for tanks collecting rain-water is necessary to be known before provision can be made for them. It has been stated on good authority that the tank may contain half a cubic foot of water for each square foot of roof surface, the minimum being 2in. in depth, or one-sixth cubic foot to every square foot of roof. Provision should be made for at least six weeks' consumption in summer. The yield from a slate roof is found to be about 10 per cent. more than from a tiled roof; but the tank should be large enough for sudden and heavy downpours. It may be of service to say

something of rainfall. Mr. Symons, the chief authority on the subject, observes that an inch of rain is equivalent to a gallon of water over a surface of two square feet, or a fall of 100 tons per acre. An inch of rainfall upon an acre is equivalent to 22,622 gallons, according to Mr. Bailey Denton. For the computation of rainfall over a given area, the rule is to multiply the inches of rainfall by 3,630, which will give the cube feet per acre. We have observed large buildings with extensive roofs very badly provided with gutters and stack pipes, as if these matters were of no importance. The large surfaces of slate roof ought to be made to drain to well-distributed points, so that one stack pipe should not have to do the work of two or more. The plan of a roof, with its ridges, hips, valleys, and gutters, represents a watershed; the ridge and hip lines divide the areas of the roof to be drained by separate pipes, and these should be properly proportioned to carry off the heaviest rainfall. Instead of this division of the surface, the arrangement of stack pipes is a matter of guesswork: the largest surfaces are badly provided, and the water, overflowing the gutters, finds its way through the roof, or saturates the walls. If more care were taken over these parts of buildings, and tanks erected for domestic purposes with "separators," there would be greater skill probably shown in the planning of roofs, and the rain-water gutters and stack pipes would be made part of the architect's elevations, instead of left to chance.

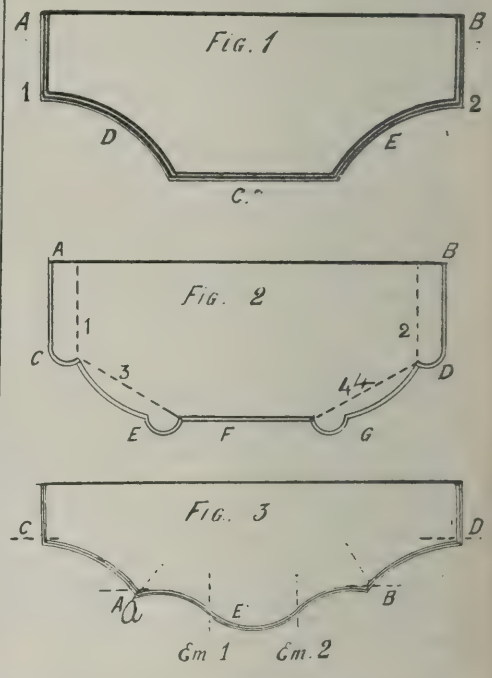
FURNITURE BEADS AND MOULDINGS.

(*Continued from p.* 506.)

THE class of beads known as "cock-beads," applied to the face of work like drawer-fronts, are glued to the edges both top and bottom. They are got out wide, and worked down the requisite amount by a plane made specially for the purpose. After these are worked, the sides are fitted and mitred to them, and treated in the same manner. A series of beads arranged vertically are now frequently used in cabinet-work to replace carving. For this purpose the wood is jointed up in sections for turning, being afterwards cut where previously jointed. You can readily see the number of sections most suitable and the diameter the work should be finished, by comparing it with the space or width where it is to be placed.

Mouldings.—Among the many forms which occur, the following are the most important: Those worked upon a plain top, or applied to a veneered top or surface. In the latter case, their preliminary arrangement will have to be considered. Those intended for shaped work, such as door-heads—circular and elliptical, &c. —corners, backs, and the manner of strengthening these in the larger kinds of work. In addition to these are plinth, cornice, rabbeted, projecting, or bolection, veneered and ormolu mouldings. Other forms of moulding are seen in general shaped work—brackets, pateræ, pillars, &c.; also in drawer-slips, pen hollows or trays, glass frames, table-flap joints, shelf edges, and other things. The formation of mouldings and the method of lining them up I shall also make a few remarks upon. I will take them as far as possible *seriatim*. You will require for your work, besides a saw, chisel, a hard wood (beech or lime) mitre-block, and mitre shooting board. It is preferable to have, especially for larger kinds of mouldings, an iron mitre-plane, although an ordinary trying plane will do for most purposes, if in first-class order. The shooting board should not be less than 18in. or 20in. long. It is, of course, possible to make the mitres with mitre-cutting machines, several kinds being in use; but I am not considering this class of work at present. There are several other tools and articles in addition to the above; but it will be more convenient if I speak of them as occasion for their use arises. If it is required to mould a solid top or surface having straight edges, it should first be planed over and taken to the requisite size it is finally to be. That is, square it up to the fullest size the moulding projects, making also an allowance for the amount it is to hang over from the work, at each end or sides, foot and back, as the case may be. In doing this you should be careful to see that it is set for trying perfectly true, and if any part, such as a door shutting in front, for example, is to be afterwards added, make due allowance for its thickness in front. This is always best done by offering the part itself to the carcase, and you are less likely to make an error than by simply making a measurement allowance. The next process is to gauge round the top from the outer squaring, the inner line to which the moulding is to be worked. In cabinet-work very few cases arise where a moulding is worked level from the surface; even if it be one of a simple nature like a plain chamfer it is always sunk. In some classes of inside work like shelf edges it might be so, and they would be merely rounded, but it is not of frequent occurrence. After gauging, the gauge marks should be deepened with a chisel. The edges are now roughed out—that is, they are worked with the trying plane approximately to the final shape they are to be. Thus, suppose we intend having a thumb moulding upon the edges: after squaring and gauging, the upper part of the edges may be planed off, leaving less to be finished; rounded over with the rabbet plane, or shaped with the moulding plane if a different one were required. The upper part should be carefully removed with and then finished with the rabbet plane. In roughing mouldings, you must be particular not to work them too bare, and for the sake of saving a little labour leave insufficient for the final shape. You will readily see by looking at a moulding how far to go with safety, and also the most suitable inclination (bevel) in planing to take. The moulding should now be finished by papering; for this purpose a piece of wood the reverse shape of it will be required. This operation I have described previously and need not repeat. With a veneered surface the process would be varied. The top which it is intended to veneer would be planed over and squared if its edges were to be straight. It should be got out smaller than usual; the addition of the other will make it the required size. After squaring, the edges are bevelled to about an angle of 40° to 45° and toothed. The wood corresponding with that with which the top is to be veneered should be cut in lengths, planed, and the under-side toothed. Its width must be greater than the top thickness (you may with advantage increase it by half, as this will facilitate fitting). The thickness of these edgings must be sufficient for the moulding intended to be worked, with an allowance of one-third or one-fourth added. They should be glued on, care being taken to fit them true. At the corners they are mitred. It is advisable to allow one side, the front or back, to set before fitting and gluing the others to it; by this means there is less likelihood of any shifting. When all are glued round they may be levelled to the top, which can be veneered. The mouldings are then worked and finished as in the first example.

With Shaped Solid Tops.—I am employing the term "shaped" with reference to the edges alone, the surface being seldom so except in small work. The preceding remarks are applicable, but there are one or two points I can better explain from simple figures. Fig. 1 is the plan of a cabinet top; its edges, with the exception of the back, which is straight, being moulded. After squaring the edges A, B, and C, and the ends A 1 and B 2, the curves at D and E should be marked. This is done with a striker, after placing the top upon the work. The wood is now cut out with a bow-saw roughly to shape; this is then levelled and finished with a spokeshave. The inner gauging from the moulding can now be marked from this, the edges bevelled and finally hollowed with the gouge, or rounded, as the case may be. Figs. 2 and 3 are also examples—Fig. 2 of a top, Fig. 3 of a bottom board intended for a cabinet open at the bottom. Both are supposed to be veneered. The wood for each will be got out and prepared in the ordinary way. I may here mention that it is advisable to neglect the shaping at first, and treat it simply as rectangular, the preliminary working being easier from so doing. In Fig. 2 the edging at A, B, C, and D is best glued on the width represented by the dotted lines 1 and 2. This will allow sufficient material for shaping at these points; that for the curves C E and G D taking the direction of the lines 3 and 4 as shown. From these two the whole shaping should be made, leaving the front F straight. You will find it best to apply the pieces at C E and D G first, and fit the remainder to them. With Fig. 3 there is no necessity to make mitres at A, B, C, and D, as the board, being supported by legs, is joined to them at these points, and if made they would have to be afterwards cut out. With the slips, however, you should allow about



½in. more than the leg width. This amount will enable you to fit them truer. The front, from A to B, is worked as follows:—Round the board at E as drawn, and hollow the slip to it, then shoot the edges from A and from B, glue them on, allowing them to intersect at E *m* 1 and E *m* 2. T. H. S.

(*To be continued.*)

MUNICIPAL ENGINEERS' ASSOCIATION.

FROM the papers we have received relating to the fourth examination of candidates for the offices of municipal engineer and local board surveyor, carried out under the Municipal Corporations and Local Government Acts by the Association at the town hall, Manchester, on the 7th and 8th inst., we can entertain little doubt as to the practical character of the examination. In the paper on building construction the candidate is given ten questions: the names of the woods used in building, and their qualities and uses, the composition of good mortar, and the faults of mortar used in "jerry" work are required amongst others. One of the questions is—"What are the chief precautions to be taken in arranging the exits from a theatre as regards doors, passages, and stairs?" The last relates to the requirements of the Model By-laws as to thickness of house walls; these the candidate is supposed to give in his own words. Another of the examination papers gives the fourteen test questions in "Engineering as Applied to Municipal Work." These include questions on the adjustment of the theodolite; the main lines and ties in chaining the streets shown on a given sketch plan, which includes a large area of Government property that is inaccessible; levels of surfaces and sewers. Others refer to hydraulics or sewerage; the calculation of capacity of outfall sewers from certain data is the most difficult of those given; reasons for adopting a certain kind of paving in streets, and the meaning of "average meter indication" in lighting. In sanitary science the candidate is examined on ventilation, with respect to width and length of streets without cross streets; minimum area of space behind building; modes of ventilating buildings; the conditions necessary to secure a healthy site; and how to deal with subsoils and sites, positions of w.c.'s, sinks, and baths. Under sewage disposal as another sub-heading, the candidate is required to state the conditions under which chemical treatment, intermittent filtration, irrigation, and other methods may be adopted. The

sewering of towns is another division. Such questions are how to find the maximum dry-weather volume of sewage, and the provision for rainfall per hour; the minimum velocity required in sewers. Other questions relate to house-drainage, which is also made a division of the subject. These are generally simple, though of a practical kind. We have already published the names of the examiners and those gentlemen who have been granted certificates of competency.

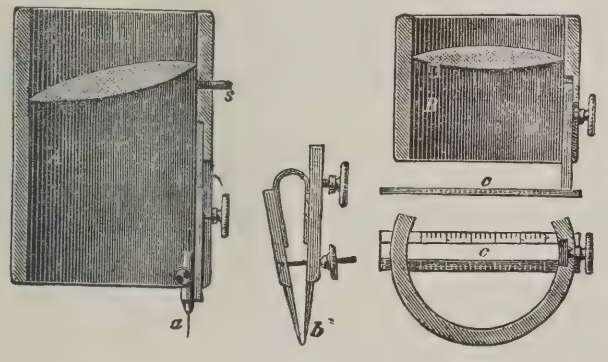
BOOKS RECEIVED.

The *Architectural Association's Notes* for October gives as a frontispiece a good portrait of Mr. John Slater, B.A., the new president; also a biographical notice, from which we learn he has just attained his fortieth year. A very suggestive letter, signed "B.," on the fewness of candidates who go in for the compulsory examination of the Institute is worth reading. The writer thinks the work of the Association requires amending in three directions, which are summarised as (1) want of an efficient system of personal supervision; (2) a mode of testing knowledge acquired at stated periods; (3) a more satisfactory system of imparting information. These are excellent suggestions upon which the Association may base their future action, though we are very much afraid that all facilities will fail to create students. A studious habit is born, not acquired, and our experience is that young men will not join classes or take to reading unless they have an inclination. We should lay particular stress on personal supervision as the most important of the three suggestions. A preliminary entrance examination for the A. A. might insure that more men of the right sort entered; but, on the other hand, it would deter many young men from joining, and the Association would lessen its power for usefulness. Sessional examinations are useful, and certainly could be adopted. An illustrated account of a town in Calvados, France, is resumed—the sketches are clever—and there is also a useful paper on "Strains in Structures," by F. W. Quick.——*The Decorators' Assistant* (Second Edition), published by Crosby Lockwood and Son), has been revised. As a guide for decorative artists and amateurs this little compilation will be found of service. It is full of useful receipts of value to decorators, painters, gilders, and students of art. The introduction is written by Mr. H. Atkinson, architect, on "Painting applied to External Architecture." Many of the hints are judicious, as that external colouring of a house should depend on and be subject to the surroundings. For red brick cream white is recommended; but we prefer light and pea green. "Internal Decoration" is the subject of another chapter by A. Hessell Tiltman, M.R.I.B.A., in which will be found many useful hints. The remarks on "Colours and their Combinations," "Instructions for Mixing Colours," and Chevreul's remarks on "The Properties of Oil Paints" are of value, and the book contains in a small, handy size the gist of larger treatises on colour and technical processes.——*Vestiges of Old Newcastle and Gateshead*, by W. H. KNOWLES and J. R. BOYLES (Newcastle: A. Read). We have received Part 1 of this excellently got up small quarto, illustrative of the remains of Mediæval architecture in the twin boroughs on the Tyne. The work is to be completed in twenty parts, published at 1s. 6d. each, and each containing three full-page plates. Those to the issue before us are all by Mr. W. Harry Knowles, and illustrate the vicinity of the quaintly-named "Side" on the northern bank of the river—viz., the Black Gate, Temperley's Court, and the Sandhill, and smaller sketches inserted in the text of the letterpress show the plastered houses, with slightly projecting upper stories, which still form so picturesque a feature of the district. The work is written in an interesting style, and bears evidences of careful research. It will become increasingly valuable in future years. ——*The Work of the Nevilles Round Darlington.* (Whiting and Co., Sardinia-street, W.C.) Mr. J. P. Pritchett has reproduced in pamphlet form a paper read before the British Archæological Association at Darlington in July last. The paper described the many works of the great family of Neville by which Darlington is surrounded—the castles they built or enlarged, the cathedral, conventual, collegiate, and parochial churches they founded, erected, or added to, and in which they had their chantry chapels. Clearly drawn plans, specially made for the purpose from measurements, are given of Raby, Barnard, Brancepeth, Middleham, Snape, and Sheriff Hutton Castle, and Staindrop and Middleham Churches, greatly adding to the value of the well-written historical paper.

DRAWING INSTRUMENT FOR ACCURATE WORK.*

THIS arrangement consists in a cylindrical metal or horn mounted lens two to four centimètres long, and magnifying two or three times, and two or three centimètres in diameter, whose side is provided with a contrivance for holding after it has been pushed into place a copying needle, a protractor, &c.

While hitherto the architect, in using millimètre paper, must hold separately in his hands a magnifying glass and needle, while the engraver holds the engraving tool inclined in one hand and the magnifying glass in the other, or must work under a large lens standing on three feet, it is now possible, by a firm connection between the lens and needle or other instrument, to draw directly with one hand, and under the lens. In the accompanying cut one of these lenses is shown in section A, in which the glass is set obliquely, in whose focus the needle *a* is held, and the field of view is enlarged. A longer description is unnecessary, as the illustration gives the best explanation. It need only be remarked that the stud *s*, projecting a little near the glass, is for the purpose of preventing the instrument from leaving the position coinciding with the plane of the drawing. For architects and engineers is provided a small compass *b* of about 2cm. diameter, for laying off parallel widths, for making smaller scales, and the like. In these cases it is substituted for the needle. In like manner for calculating cross profiles by graphical methods, for reading parallel divisions, for estimating areas, or revising maps, a finely divided, prismatic, ivory rule *c* can be placed under the glass B, and will do good service. In this case the plane of the lens must be perpendicular to the axis of the tube.



For draughtsmen a parallel drawing pen, something like *b*, is used, which gives several lines at once, perfectly parallel and close together; or a drawing pen with which the smallest signatures, such as boundary stones and figures, can be made neatly and exactly, which is secured like the needle *a*, and for which the cylinder serves also as pen-holder, offers a great advance.

Thus a whole series of instruments can be used with the lens. For instance, a naturalist can use with it a knife or other instrument. To avoid injury from the instruments, one should, in laying down the cylinder, place it on its side. It is also recommended that on the outer tube of the frame, which is appropriately lacquered of black colour, white arrows should be placed in the direction of the points of the instrument, so that the eyes shall be protected from injury in handling the instrument, as by the points being stuck into the pupil, owing to lifting the instrument in an inverted position.

* By J. LEURKE, in the *Zeitschrift für Instrumentenkunde.*

CHIPS.

The first section of the work of rebuilding the parish church of Chatham, the new chancel and transepts, will be dedicated by the Bishop of Rochester on December 1st. Mr. A. W. Blomfield, M.A., is the architect, and the cost of the present section has been £3,000, another £6,000 being required to complete the work.

The Carpenters' Company announce a second exhibition of works in wood, to be held at Carpenters' Hall, London-wall, in May and June next, when medals, money prizes, and certificates will be awarded.

The Countess Cowper laid on Saturday the memorial stone of the Church of the Holy Redeemer, which is being built in Exmouth-street, Clerkenwell. The Marquis of Northampton has given the site, and the church will cost about £9,000.

It has been decided to erect at Bradford a memorial statue of the late Mr. W. E. Forster, in an open space between the Post-Office and the Midland Railway Station, which has been named by the corporation "Forster-square."

The Government has sanctioned the definitive adoption at Chichester Barracks of the iron process for the purification of sewage, invented and patented by Mr. Conder, M.Inst.C.E.; and the War Department has taken over the supervision of the works, which have been conducted by Mr. Conder for the last fifteen months, under the order of the Secretary of State for War.

The memorial stone of a new Baptist chapel in Linthorpe-road, Middlesbrough, was laid on Friday. The chapel will cost £24,000, and is being built from the plans of Mr. Lofthouse; Mr. Kirks is the builder.

At the last meeting of the Court of Common Council a report was presented by the Officers and Clerks Committee recommending that the office of City Architect should be abolished, and that only a City surveyor should be appointed at a salary of £800 per annum. An amendment in favour of the appointment of another architect was negatived by 79 votes to 71. The report was ultimately adopted by a majority of eleven. Mr. G. Shaw gave notice of a motion to rescind the resolution.

A new district church is about to be built for Easington, near Loftus-in-Cleveland, from plans by Mr. C. Hodgson Fowler, F.S.A., of Durham. The church is to seat 220 persons, at a cost for erection of £2,400.

The foundation stone of St. Luke's Church, Moorbottom, Cleckheaton, was laid on Saturday. Designed by Mr. Medland Taylor, of Manchester, the church will be Geometric in style, and will seat 643 persons. The building contract has been let for £5,040.

The highest honours have been awarded to Messrs. John Hall and Co., Stourbridge, at the Adelaide Jubilee Exhibition, for their exhibit of white and coloured glazed bricks, patent porcelain fireclay bath, and fireclay goods, all of which were their own manufactures.

The centre portion of the reredos for Lillington Church, near Leamington, has now been placed in position. It is a representation of the "Lord's Supper" in high relief, the figures being carved out of a solid block of Caen stone about 18in. thick. The panel is surmounted by a battlemented cornice, with a string of Early English carvings beneath. This is supported by columns of Devonshire marble of rich colouring. The structure is not yet completed, inasmuch as side wings (which are designed to rise to a much greater altitude than the centre portion) have yet to be added. The whole of the work has been intrusted to Jones and Willis, of Birmingham and London.

The terminus site of the Roman Wall at Wallsend, which had been threatened, is in a fair way of being preserved from the encroachments of the modern builder. The land, which contains an area of an acre, is valued at £1,000, and Sir Benjamin Browne, the present Mayor of Newcastle, has offered it to the Wallsend Local Board for £250. The terms will be accepted. The course of the moat and the outline of the ancient wall are clear and well defined; but, except where broad trenches have been recently cut, the stone work is hidden from gaze by a dense covering of luxuriant grass.

WAYSIDE NOTES.

EVERY architect will regret the death of Mr. Beresford-Hope. He was a man of a class that we can ill afford to lose, and for whom the whole profession may well mourn in spirit.

If I remember aright, the last time that I saw Mr. Beresford-Hope was in the committee rooms of the House of Lords, when the question of the proposed alterations to Westminster Hall was under consideration. It was easy to distinguish the intelligence of the questions of the man who was, in effect, no mean architect, from those of others of the Committee who were so far less conversant with the matter under discussion. On this occasion, I remember, I could not but help thinking that there was a touch of sadness almost in his face—such a disheartened expression as might well come over one who had, single-handed, to meet the arguments, and endeavour to outweigh the prejudices, of the uninformed.

Now that Mr. Beresford-Hope is dead we shall doubtless, as is the wont of humanity, realise the value of a Member of Parliament who, being of ample means, had no object to make politics a business, but who, in working for the well-being of his country, became, also, a champion of art and letters, and a friend of the architect and artist. We may at present, however, look in vain for a second Beresford-Hope—for a counterpart of the man who has so lately gone to his last rest.

I noticed last week that the parish church of Detling, in Kent, had been restored. There is, I believe, a good old sepulchral cross of the 15th century at Detling. It figures, it will be remembered, as the frontispiece to Bloxam's "Gothic Architecture"; and it is to be hoped that it is still to be seen, as, from the illustration, it has always appeared to me to be a remarkably neat cross. There is so much that is hideous and dreadful in the sepulchral memorials that the "monumental" stonemason turns out, that to come across an object like the Detling example must be very refreshing. It is not a little astonishing that our churchyards and cemeteries should be so disfigured at present by slabs and monuments of such terrible design as we everywhere find. Taste, which of late years has so improved in most branches of art, seems to have missed the churchyard monument.

It is true that at times we find some special cases in which the skilled designer's services are called in; but these are quite the exception, and even in them we cannot all of us agree with the taste displayed. But the small sepulchral monument seems to have been wholly relegated to the care of the so-called monumental stonemason, both as to its design and execution. Consequently the appearance of our cemeteries and churchyards are, *æsthetically*, a disgrace to the age. It is rarely, indeed, that we find a small modern cross, tablet, or slab that is worth looking at.

Mem.: Perhaps the most satisfactory form for an unassuming sepulchral monument is that which is modelled after the manner of the old Irish crosses. If designed with a good outline, and of substantial proportions, with detail on the old lines, but modified to suit the age, they may be made objects of extreme beauty. There is a very beautiful memorial of this description—a modest little cross that may be found by any wanderer in the Isle of Thanet, in the north-west corner of Margate cemetery. It was designed by a gentleman as a memorial to his wife, and has always appeared to me a singularly pleasing object, being executed in a delicate green-tinted variety of stone, and of excellent outline and proportions.

The information about the alterations at the Nottingham Theatre Royal is timely. Judging from the plan that Mr. Hine gives, it would appear that the sooner these alterations are effected the better. The existing arrangement certainly looks bad enough, and the appearance, on plan, of the relative proportions of gallery and exit quite makes one shudder.

As regards the suggestion to employ inclined planes in lieu of stairs, it might be a beneficia alteration in some cases; but should the gangways become at all slippery they would be most dangerous. It does not, therefore, appear to me to be much good to reply upon the inclined plane. People are used to stair-mounting, and the sudden arrival of a panic-stricken crowd upon such a gangway might cause confusion worse confounded, unless every person knew of its existence, and had practised ascending and descending it. In the case of warehouses and buildings, such as Mr. Murray instances, it is a different matter. For a *few* persons only the gangway would be three or four times as quick as the staircase, but in the case of a crowd it is to be doubted whether it would not be rather a source of danger. The flat treads of a stairway afford, at any rate, a grip for the foot should one fall, which the inclined plane of 1 in 2½ or so might not do. At least, so it appears to me. But we should be thankful for the suggestions made last week, as it is only by obtaining many ideas that the cause in question can be advanced. So now, gentlemen, please, the next suggestion.

The City Fathers, I see, have decided not to re-appoint an architect, but are to have a surveyor, as they before proposed.

There appear to be some curious points in the advertisement of the Newchurch-in-Rossendale Board School competition. But it seems straightforward enough, or it would do, if the paragraph about the commission which is "*to be agreed upon*" were a little clearer. It would be as well if the board were to decide upon this point without delay, if they desire a successful competition.

I wish the scheme for a Provident Institution for Architects' Assistants every success. The architects themselves might help the assistants in this way in return for their labours on their behalf. The architectural assistants form too useful and honourable a body of gentlemen to want for such an institution. They toil much, and deserve help if their aim be a mutual assistance society, to aid their distressed fellows, and to enable them to keep their own minds free from over-anxiety as to what the morrow will bring forth.

It may be considered that the wholesale use of constructional ironwork received a condemnation at the conclusion of the inquiry into the recent disaster at Westbourne-grove. But the practice has long since taken deep root in modern civil architecture, and, though so destructive of all art in most cases, we must fall in with the general demand, and peg away at the hard nut referred to some months back. Would that we could as easily and, I may perhaps say, coolly put aside the question as Mr. Ruskin has done in the "Seven Lamps."

"In Normandy." I fancy I was in Normandy a short time back. At least, there is an impression left upon me to that effect. Certainly I have a recollection of seeing something that was not unlike the sketch given last week. And the Bishop's Palace at Evreux it *is*, sure enough, unless there is some "double" of this edifice in Normandy. Well do I remember making a "highly-coloured" sketch of the very same part of this building—the said sketch being executed with some difficulty, thanks to the thunderstorms that would occasionally come from over the hills of Normandy. A very beautiful picture did this palace form, with its great slated roof and grey stone walls, its green weathered buttresses, and bright red bricks in the chimney stacks. And I remember that the Bishop himself appeared upon the scene whilst I was engaged in sketching. Tripping lightly down from his carriage and pair, he made a fine point of colour in the picture, as he ascended the doorsteps in gorgeous purple robes.

GOTH.

The new cemetery at Windermere was consecrated on St. Luke's Day. It has been laid out from plans by Mr. Robert Walker, of that town, who also designed the chapel, which is Late Perpendicular in style, the lodge, and other buildings.

The market and music hall at Barnstaple are about to be enlarged, from plans by Messrs. Gould and Webb, of that town.

LONDON BRANCH OF THE CO-OPERATIVE WHOLESALE SOCIETY (LIMITED).

THIS building is situated in Leman-street and Hooper-street, Whitechapel, in close proximity to the new goods station of the London, Tilbury, and Southend Railway. It has a frontage of 150ft. to Leman-street, 110ft. to Hooper-street, and 160ft. to Rupert-street, with a total area of 18,000ft. The Leman-street front is shown in the illustration; the lower portion is built of granite and Portland stone, with blue Pennant stone pilasters, the upper portion being of red brick, with Portland stone dressings. Each floor is fireproof, constructed of iron joists, placed about 3ft. apart, and filled in with concrete, and laid with Lowe's wood-block paving. The basement and ground floors are used for the receipt and delivery of goods, and are faced with white glazed bricks. The basement extends under the pavement where it is lighted with Hayward's daylight prisms. A vanway runs through the centre of the building, having an entrance in Leman-street, and an exit in Hooper-street, in which are five loading doors, fitted with hydraulic cranes. The official department is on the first floor, having an office with accommodation for 70 clerks. Sale-rooms, buyer's offices, strong-room, and lavatory, &c.; the latter is lined with glazed tiles, and fitted with automatic flushing apparatus. This and the principal floors are lighted by the Wenham ventilating lamp, and warmed by hydrocaloric coils. On the second, third, and fourth floors are the drapery, boots and shoes, and furnishing departments respectively. The fifth floor contains a large dining-room for the employés, and an assembly room, 65ft. by 37ft., the walls of which are elaborately fitted up with walnut framing, pitch-pine and sycamore panels, with mahogany mouldings. The ceiling is divided into panels, and filled in with fibrous plaster having floral designs in relief. Walnut pilasters, with carved cantilevers, support the principal beams. The centre of the ceiling is formed into a coved dome, with a flat light of stained glass. Messrs. W. H. Lascelles and Co. executed the joinery for this room. The kitchen is partly in the roof, and is fitted with every convenience. The stove was supplied by Messrs. Ashton and Green. A double lift communicates with the dining-room beneath. Every precaution has been taken to render the building fireproof, and, in order to insure this result, all the stairs are of stone, and iron doors shut off each department. The contractors were Messrs. Martin, Wells, and Co., of Aldershot and London. Mr. Boyce was the clerk of works, and Mr. W. H. Sharpington the general foreman. The lifts and cranes were supplied by Messrs. Waygood and Co. The building was designed and carried out under the supervision of Mr. J. F. Goodey, architect, of Colchester.

CHIPS.

A Wesleyan chapel and schools are about to be built at Goose Green, Wigan, from plans by Messrs. Isitt and Verity, of that town.

The West Bromwich School Board have adopted plans by Mr. E. Pincher, of High-street, in that town, for the erection of schools for 1,400 children in Spon-lane.

New stalls of English oak and other fittings, the work of Mr. Harry Hems, and designed by Mr. Medley Fulford, have just been placed in St. Sidwell's Church, Exeter.

A large clock, with Cambridge chimes, was completed last week in the parish church of Powerstock, Dorsetshire, of which Archdeacon Sanctuary is rector. Mrs. Sanctuary formally started the clock. It has two 5ft. dials, and is fitted with all the latest improvements brought out by the makers, John Smith and Sons, Midland Clock Works, Derby.

The whole of the red terracotta work for the exterior of the New Victoria Courts at Birmingham, under Messrs. Aston Webb and Ingress Bell, has been placed in the hands of Mr. J. C. Edwards, of Ruabon. This, and Mr. Waterhouse's New Royal Infirmary in course of erection at Liverpool, also intrusted to the same firm, together with the Constitutional Club in Northumberland-avenue, will form the three largest and most important terracotta works of recent years.

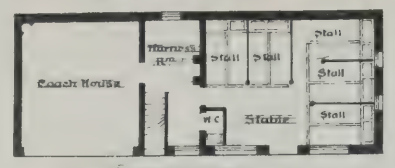
A new Congregational Chapel at Marple Bridge, built at a cost of over £2,000 from the designs of Messrs. Barker and Ellis, architects, Manchester, was opened on Friday.

Premier Buildings: Islington.



Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

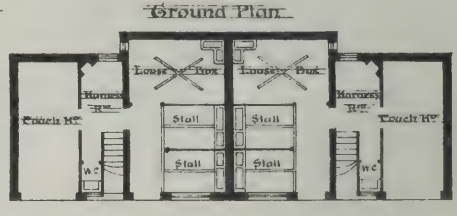
Ground Plan





New Stabling Drayton Mews South Kensington S.W.

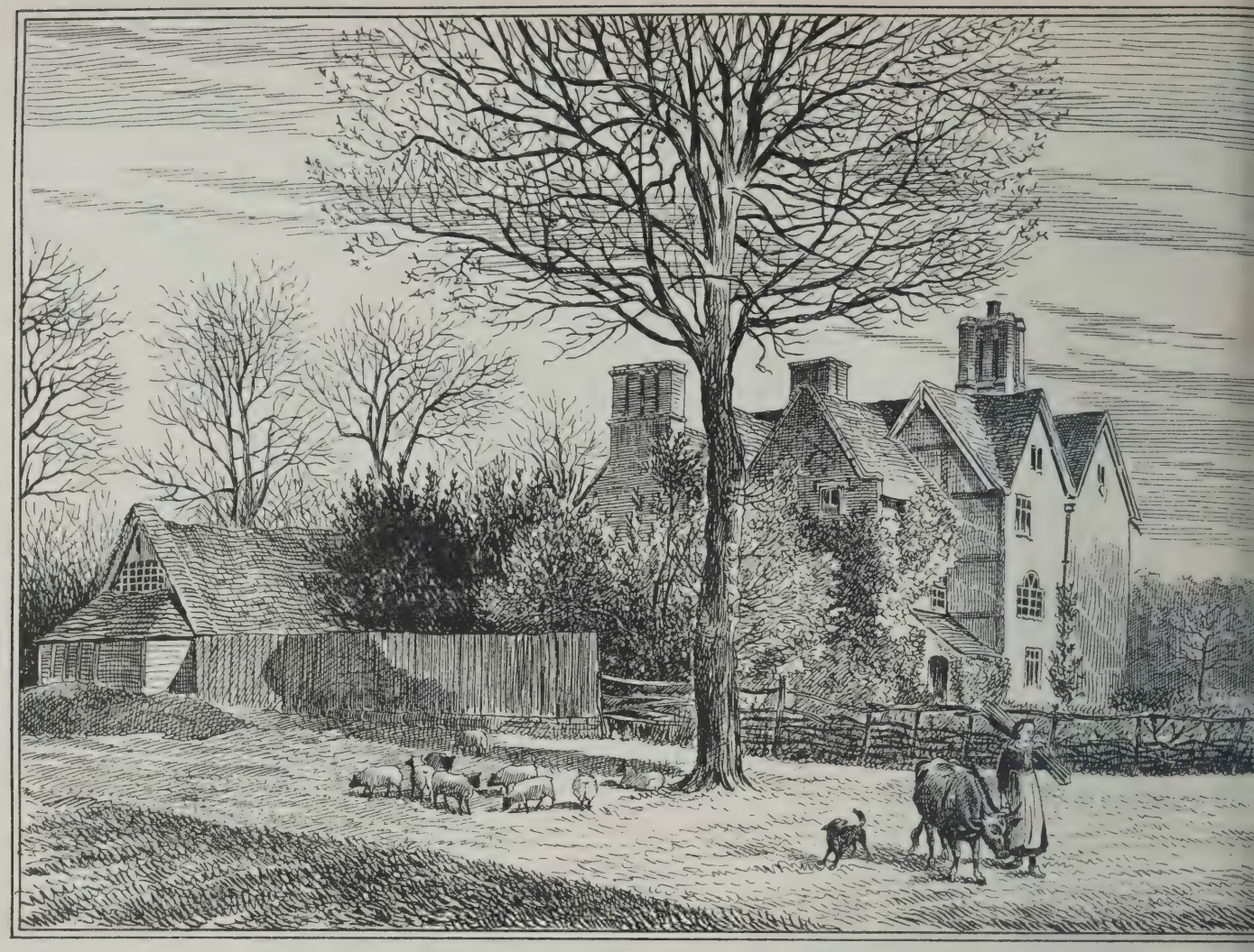
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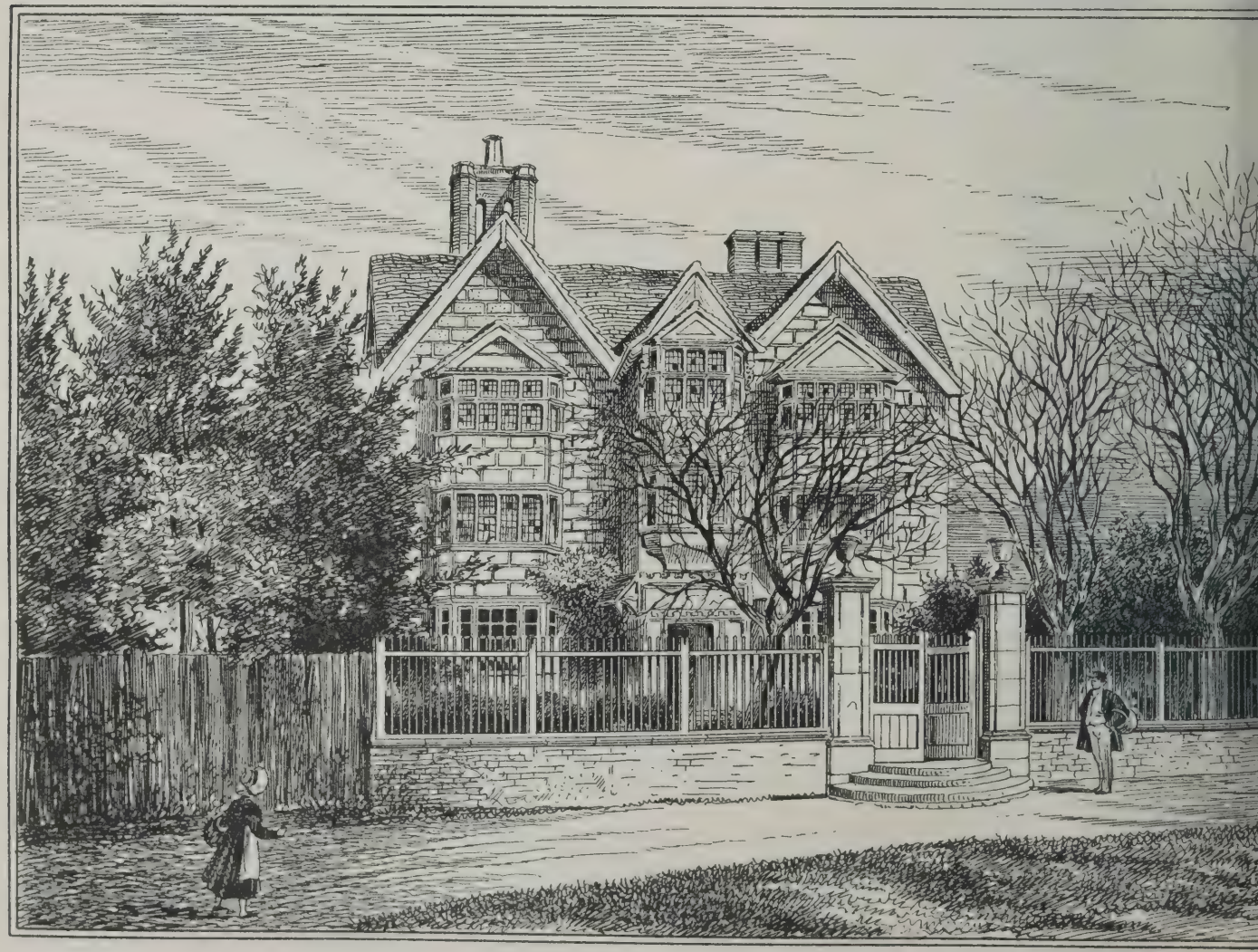




H. Phelps Drew Circus
99 Gloucester Road S.W.

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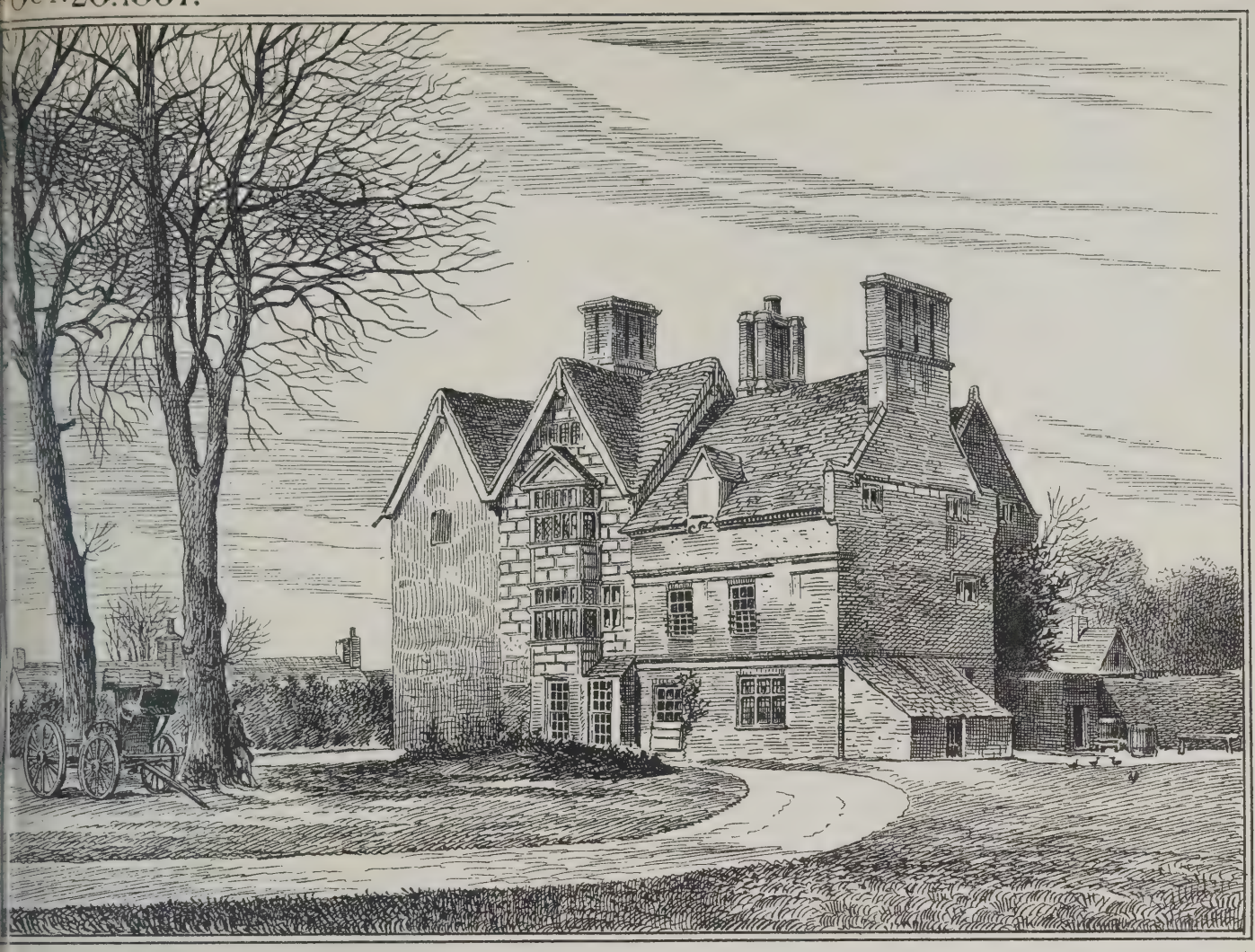




MANOR HOUSE, BRAMPTON, HUNTINGDON. AN

DRAWINGS BY MA

OCT. 23. 1887.



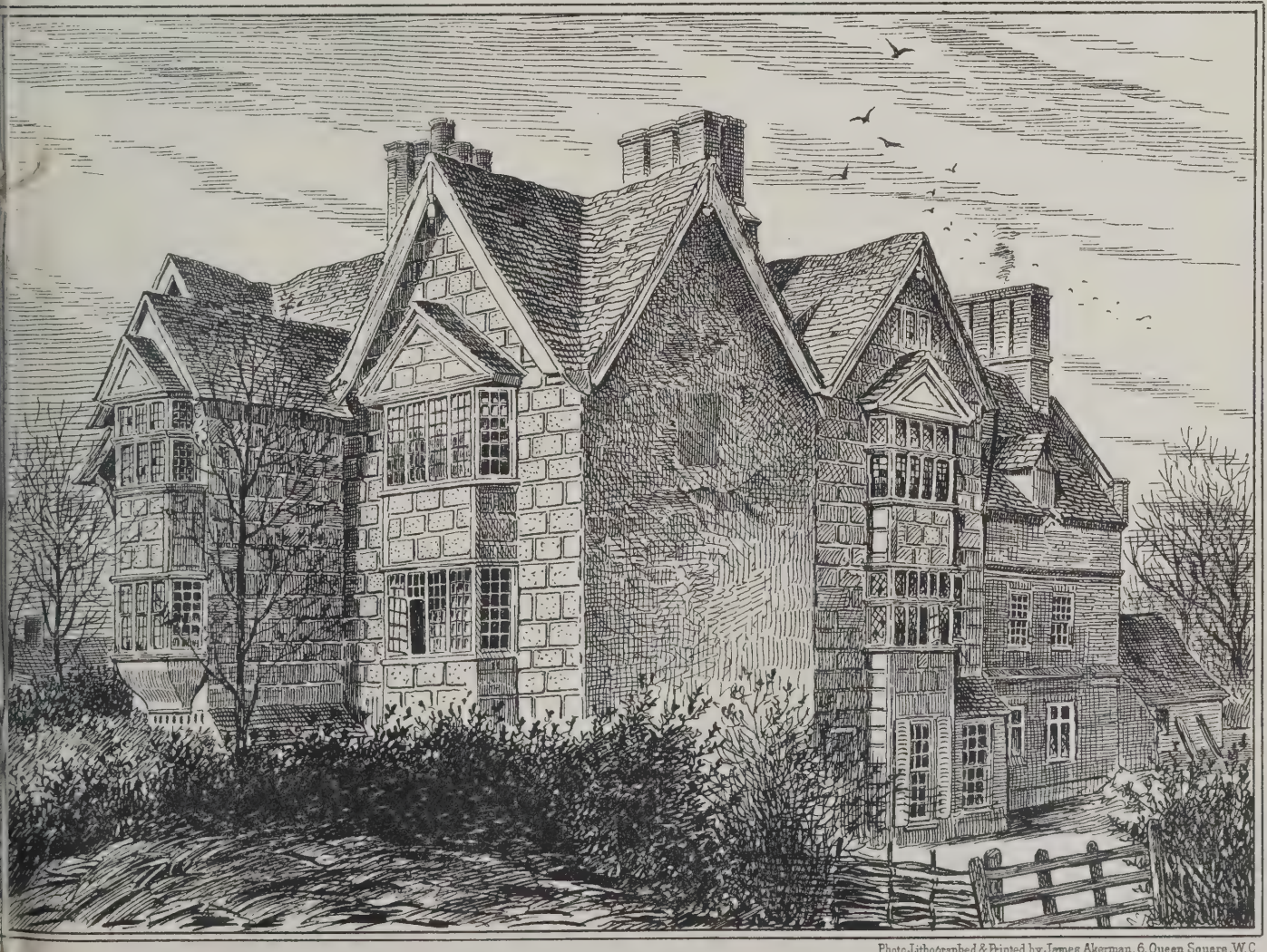


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PLASTER & BRICK MANSION NOW DEMOLISHED, 1887.

B. ADAMS F.R.I.B.A.

UNIVERSITY OF ILLINOIS

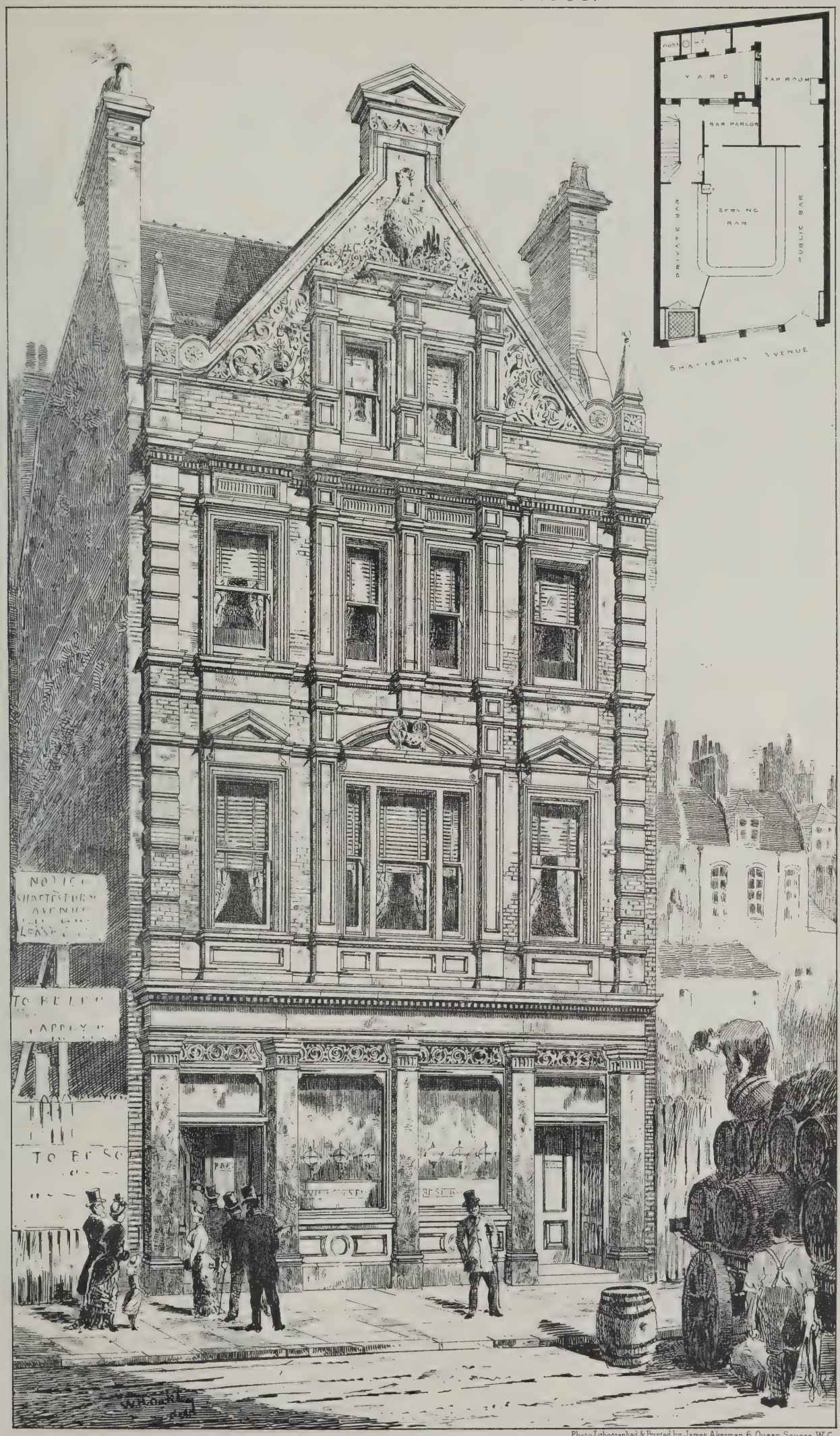
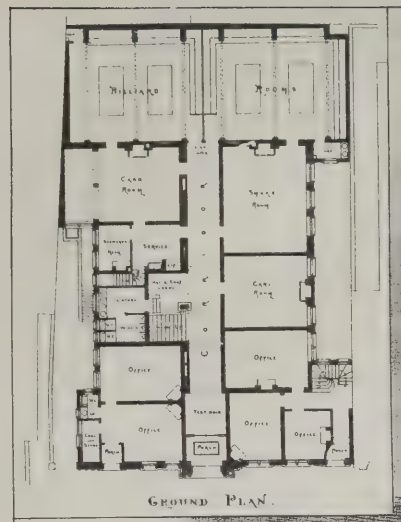


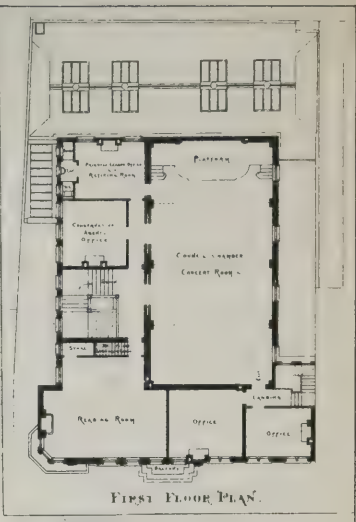
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THE "COCK" TAVERN ERECTED IN SHAFTESBURY AVENUE,

UNDER THE SUPERINTENDENCE OF WYLSON & LONG, ARCHITECTS.



GROUND PLAN.



FIRST FLOOR PLAN.

CONSTITUTIONAL · CLUB · BUILDINGS · SCARBOROUGH

H · A · CHEERS · ARCHT

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C

TERRA-COTTA PANEL BY



MADE BY M

OCT. 28. 1887.

GE · TINWORTH · SCULPTOR



· DOULTON & Co

"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C

CONTENTS.

An Architect's Authority ... 637
The Shop Window: Commercially and Architecturally ... 638
Old Church Signs and Mediæval Bestiaries ... 638
St. James's Palace, its Present and Past ... 640
The Architectural Association ... 640
Masonry and Stone-cutting ... 642
Arch Construction ... 644
BUILDING NEWS Designing Club ... 644
Exhibition of the Turners' Company ... 644
Hollow Building Construction ... 645
How a Marble Statue is Made ... 645
Church Building in Chiswick ... 645
Rain-Water Tanks ... 645
Furniture Beads and Mouldings ... 646
Municipal Engineers' Association ... 646
Books Received ... 647
Drawing Instrument for Accurate Work ... 647
Wayside Notes ... 648
London Branch of the Co-operative Wholesale Society (Limited) ... 648
Our Lithographic Illustrations ... 669
Competitions ... 670
Schools of Art ... 670
Architectural and Archæological Societies ... 670
Building Intelligence ... 671
Engineering Notes ... 672
Correspondence ... 672
Intercommunication ... 674
Statues, Memorials, &c. ... 675
Stained Glass ... 675
Water Supply and Sanitary Matters ... 675
Our Office Table ... 675
Legal Intelligence ... 676
Meetings for the Ensuing Week ... 676
Tenders ... 676

ILLUSTRATIONS.

"RELEASE OF BARABBAS."—MANOR HOUSE, BRAMPTON, HUNTS.—THE "COCK" TAVERN, SHAFTESBURY AVENUE.—PREMIER BUILDINGS, ISLINGTON.—CONSERVATIVE CLUB, SCARBOROUGH.—NEW STABLING, DRAYTON MEWS.

OUR LITHOGRAPHIC ILLUSTRATIONS.

"THE RELEASE OF BARABBAS."

In this large terracotta panel, by George Tinworth, Pilate, who occupies the centre of the piece, is pronouncing sentence on our Lord, who is delivered to be crucified, and is being led away bound by the soldiers in attendance. Directly behind the Saviour, the Virgin Mary and the Apostle John appear as spectators, together with some of their friends. A Roman officer is speaking to another spectator on the left of St. John, and on the extreme right, the Apostle Peter, in an agony of remorse, is restrained from approaching the Lord by another soldier. On the right and left of Pilate are attendants, holding the water and towel that he may wash his hands, and so disown complicity in the guilt of what he has done, while Pilate's wife, with a Roman companion, stands behind. On the left, Barabbas is released, amid the congratulations of the bystanders; and persons of various nationalities appear behind. To the left is a Roman watchman, denoted by the bells upon his dress; and a negro is attempting to speak to Barabbas, and is addressing a soldier with a view to obtaining the desired interview. The place of the trial is set forth by the architectural embellishments in the background, and a broken vessel and a fallen capital in front are introduced as symbolising the decay of the old dispensation. A palm branch is lying on the ground, recalling to memory the recent triumphal entry of the Lord into Jerusalem. The makers of the panel are Messrs. Doulton and Co., Lambeth.

MANOR HOUSE, BRAMPTON, HUNTINGDON.

This picturesque and interesting old mansion house no longer exists; it has been demolished to make way for a new residence, which bears the original name. The loss of such a unique specimen of plaster work is indeed much to be regretted; but inasmuch as the old house has once and for ever been improved out of existence, words are but wasted in recounting its loss. Some efforts were made, we believe, to save it, but without success. The four views herewith published to-day afford an accurate record of the building, with its quaintly gabled façades and elaborated "rough cast" masonry, massive central chimney stalk, and projecting oriel bays. The history of the house is chiefly comprised within the family records of the Burnabys, who have owned the manor for about three centuries, "The Burnabys of Brampton" being the description given in Burke and other like works concerning this notable family. The present owner of the estates is Mr. T. F. A. Burnaby, an uncle of the famous soldier. He inherited the place from his uncle, Dr. Sherard Beaumont Burnaby, Vicar-General of the Province of Canterbury, who succeeded his father, the Venerable Archdeacon Burnaby, D.D., of Leicester, and Vicar of Greenwich. He in turn succeeded his father and grandfather. The deeds relating to the property contain no specific description of the old house, which, however, is mentioned by Dickens in one of his works. Before it was pulled down the building was permitted to fall into a sadly neglected condition, and a few balusters alone remain now from the ruins of this historic manor house. Students of our old English Domestic architecture need scarcely be reminded of the once favourite practice among house-builders of using "rough cast," made of lime, hair, and coarse sand or small pebbles, sometimes studded with fragments of glass, for the external finishings of the gables and plasterings between the framings of half-timbered buildings. The elaboration of such work with shields, scrolls, and swags is often met with, as at Ipswich and Lavenham, for example, in the Eastern Counties. In Essex, also, plaster rendering was employed at Layer Marney Hall, among other places, and again in Kent, as at Rochester and Maidstone, where there still remain some good specimens. The most remarkable example, however, of enriched plaster work of which Maidstone could boast was Bliss House in the High-street, which was pulled down about six years ago. An illustration of this building appeared in the BUILDING NEWS for April 7, 1882. In Oxfordshire, at Banbury, there are some plastered fronts, with simple treatments, more or less in imitation of masonry; while other instances occur to us at Newark particularly, and also at Worcester, Ledbury, Hereford, and Norwich, and, besides these, in Cheshire and Lancashire several others could be noted, such as Moreton Hall, Holford Hall, Rufford Old Hall, Astley Hall, Aldington Hall, Smithells Hall, Carden Hall, near Broxton, Tonge Hall, and Standish Hall, near Wigan. Shropshire also furnishes not a few specimens of the kind referred to, and Warwick figures in our sketch books with others. But nowhere do we remember in England to have seen a house corresponding exactly with Brampton Manor House in the treatment of its plaster work. The Egyptians, Greeks, and Romans, as everybody knows, plastered the walls of their buildings, and we still have examples in England of Saxon and Norman work incrusted with plaster, such as Little Braxted Church, Essex, where a thin layer of fine plaster, ⅛in. thick only, was used over the rubble walls to keep out the weather. The moulded brick windows in the churches of the 15th century were often plastered to resemble stone, and good plastering between moulded ribs in imitation of vaulting is seen in some Second Pointed work, as at Rochester Cathedral. The grange or manor farm, the residence of the inferior gentry in the 15th century, is exemplified in the Grange, at Whalley, Lancashire. The ceilings of the Tudor period, which were followed by the elaborated and sometimes panelled work of the days of the Stuarts, afford endless examples of rich and beautiful design, executed in plaster, like the ceilings at South Wraxall, Wilts; the Feathers Hotel, Ludlow; the animal friezes at Hardwick Hall, Derbyshire; the old houses at Great Yarmouth; St. John's Church, Leeds; the Library at Blickling Hall, Norfolk; or at Knole, in Kent. Much of this work was due to the Italian masters preceding Buonarroti and Raffaello, whose pupils followed their lighter style, while ceilings of another manner were introduced by Italians employed by Le Pautre and Gibbs. This plaster decoration was worked by hand, and lingered in England in buildings erected by Stuart, Adam, Chambers, and Wyatt, until the beginning of the present century, when the plasterer's art gave way to castings and applied ornament. In Dublin much beautiful plaster work was still carried out during another quarter of a century. Italy first revived the use of plaster and stucco, then France, and next England. Now every domestic or public building of any pretensions to architectural importance furnishes instances of its extensive and, generally speaking, satisfactory use. Of external treatments in London we may name among the earlier instances the gables and oriels of New Zealand Chambers, by Mr. Norman Shaw, R.A., Mr. Philip Webb's works, and Mr. T. E. Collcutt's façade in Fleet-street, for Messrs. Collinson and Lock. Near Windsor the late Mr. F. P. Cockerell erected a large house in concrete, which he very cleverly finished in plaster; and the Royal College of Music at South Kensington, though shockingly ugly in general outline, is a remarkable instance of the extensive use of elaborated plaster by Lieut. Cole. The frieze of the Albert Hall, too, should be mentioned. Mr. Penrose, in the Choir Schools, which he built for St. Paul's Cathedral, in Knightrider-street, has shown how ornament in stucco may be carried out; and at the South Kensington Museum, behind the science schools, other sgraffito work is to be seen, as well as at All Saints, Winkleigh, and in Downe, St. Mary's Church, Devonshire, or St. Catherine's Church, in Savernake Forest, near Marlborough. Scratch work of a ruder kind was frequently employed by the old builders in Sussex, as at Ditchling, Lewes, and Pevensey. At Brampton the treatment of the plaster is mainly confined to an imitation of rusticated masonry.

THE "COCK" TAVERN, SHAFTESBURY-AVENUE.

This building, which is one of the earliest erected in Shaftesbury-avenue, replaces a former tavern on nearly the same site. The front is executed in red Corsehill stone and T.L.B. bricks, supplied by Messrs. T. Lawrence and Son, of Bracknell, rubbed and gauged, and the gable is richly carved in bold relief. Messrs. W. Oldrey and Co. were the builders, and the works were carried out under the superintendence of the architects, Messrs. Wylson and Long, of 21, King William-street, Strand.

PREMIER BUILDINGS, ISLINGTON.

This large and commodious block of dwellings for the working classes, which is now rapidly approaching completion, has been erected upon one of the sites prepared by the Metropolitan Board of Works for buildings of this description. It is situated in Waterloo-terrace, near its junction with Upper-street, and within a stone's throw of the Vestry Hall. The principal elevation is of brick. Bright yellow stocks form the basis of the design, and the bays, piers, cornices, aprons, &c., are of red brick, of which a very considerable portion is gauged work. All the rubbing bricks have been supplied by Messrs. T. Lawrence and Sons, of Bracknell, Berkshire. Each tenement consists of entrance lobby, two bedrooms, living room, wash-house, and w.c., and is provided with large food cupboard ventilated into the open air, coal-bunker cupboards, copper, sink with drip-board, dust shoot, &c. The roof is flat, and has been covered with asphalte. Each staircase leads directly on to the roof, which will be utilised for drying areas, as well as a recreation space for children. The sanitary arrangements have been very carefully considered, and the system advocated by Captain Papier has been adopted, by means of which the soil-pipes are utilised for inlet shafts, the exhaust being from other pipes carried up from the last inspection chamber. The advantage of this system is obvious, as it will at once be seen that the current of air which is continually passing through the pipes has not to contend against continual obstructions from water and soil rushing in the opposite direction, as is the case where the soil-pipes do duty for exhausts. The whole of the works have been executed by the owner, Mr. J. H. Mollett, under the personal supervision and direction of the architect, Mr. Henry W. Dobb, of 110, London Wall, E.C.

SCARBOROUGH CONSTITUTIONAL CLUB.

We understand the erection of the above building has been in contemplation for several years, the company's premises having for a long time having proved too limited for the number of members; but it has only recently taken practical shape, when five or six months back designs were advertised for by the directors, with the result that out of over 100 sets of plans submitted, those by Mr. Cheers, of Twickenham (which we illustrate to-day), were selected. Considerable additions have been made to the original plans, in enlarging the rooms and the height throughout, though the general arrangement is still kept almost precisely the same as in the competition set of drawings. The works are to be proceeded with at once, Lord Londesborough laying the foundation-stone early next month.

NEW STABLING, DRAYTON MEWS, S.W.

These stables have been arranged to meet the requirements of the occupiers, and to harmo-

nise with the adjacent new residences in Drayton-gardens. The upper floor, in each case, being used for dwelling purposes, is completely cut off from the stables, having a separate staircase and entrance from the mews. A stable-helper's bedroom and forage store are also provided upstairs. Special attention has been given to the drainage and ventilating arrangements, the foul-air shafts being collected and carried up with the central chimney stack. The walls are faced with Acton red bricks, and the roofs covered with Broseley tiles; the stalls and boxes are laid with the St. Pancras Company's grooved Staffordshire bricks, and have stall divisions and other fittings by the same company. The structural work is by Messrs. Warren and Bates, of Stevenage, and the plumbing and internal finishing by Messrs. Knight and Co., of South Kensington. The architect is Mr. H. Phelps Drew, of 99, Gloucester-road, South Kensington.

CHIPS.

A drinking-fountain was unveiled in the Public Park, Dunfermline, on Saturday. It has been executed from a design by Mr. Robert Cameron, Assoc.S.A., 20, George-street, Edinburgh, selected in competition, by Messrs. J. Whitehead and Sons (who carry on the sculptor work of Messrs. John Fraser and Son), Aberdeen and Westminster, London. The fountain is square, with bevelled corners, and stands on an octagon foundation of dressed Aberdeen granite. The four-sided pyramidal mass above the four basins ends in a finial, the lower part formed of granite, and the upper consisting of a bronze lion rampant, bearing a bronze shield with the Dunfermline arms. The entire height of the structure is 16ft. 8in. With the exception of the foundation work and finial, the fountain is formed of polished Peterhead granite.

The water from the Wakefield Corporation's new works at Rushworth Moors was formally turned into a large reservoir at Ardsley on Friday. The works have been carried out from designs by, and under the supervision of, Mr. Rolfe, C.E., of Leeds.

The Mayor of Oxford inaugurated, on the 20th inst., the new aqueduct which has been constructed for the improvement of the water supply of Oxford. The new system, by which water is brought through pipes from the Thames above Oxford for four miles, will provide for four million gallons per day, delivered into the lake, or a direct supply of two and a half million gallons, more than double the quantity required for present needs. Mr. Hawksley is the engineer of the works.

The statue of the late Mr. Samuel Morley, at Bristol, was unveiled on Saturday. It stands on a granite pedestal near Bristol Bridge. The statue is of Sicilian marble, and is 8ft. in height. It is the work of Mr. Havard Thomas, and the polished granite pedestal, which is 11ft. in height, was provided and erected by Messrs. Arthur Lee and Brothers, of Canon's Marsh, Bristol.

The last stage in the restoration of St. Peter's Church, Nottingham, which has been in progress in sections for the past ten years, has now been reached, and the edifice has been reopened. The present works cost £2,000, and include the replacement of the high pews by oaken seats, erection of inner north porch and screen in the tower archway, both of oak, and new pulpit, lectern, and heating apparatus.

The foundation stone of the new infirmary which is to be erected in Liverpool from designs of Mr. Waterhouse, R.A., and which promises to be one of the most imposing Gothic structures in that city, will be laid to-morrow (Saturday) by the Earl of Derby. We illustrated and fully described the building, which will contain 290 beds, in our issue of the 1st July last.

The memorial stone of a new church for Strathbungo Parish, near Glasgow, was laid on Saturday afternoon. Designed by Messrs. M'Kissack and Rowan, architects, in the Transitional Norman style, the church, which will be seated for a thousand persons, is to cost some £5,500.

Out of 100 applications for the appointment of clerk of works for the outfall sewerage works at Burnham, Mr. A. E. White, of Westminster, has been elected. Mr. Henry Hill, of High Wycombe, is the contractor.

St. Bartholomew's Chapel, Sandwich, was reopened on Tuesday week after restoration, including the rebuilding of the north transept, new altar rail and steps, entire reseating the seats, as well as new oak fittings, restoration of the ancient altar screen, brass lectern, &c. The restoration has been carried out by Messrs. Wise, of Deal.

COMPETITIONS.

Indianapolis.—A competition is in progress for a soldiers' and sailors' monument, for the State of Indiana, to be erected at a cost of 200,000 dollars, on Circle Park, in the centre of the City of Indianapolis. The assessors, or experts, are—Professor W. R. Ware, of New York; Professor John L. Campbell, of Wabash College, Ind.; and Gen. T. A. Morris, of Indianapolis. The commission has invited Messrs. Richard M. Hunt, of New York; George B. Post, of New York; Van Brunt and Howe, of Boston; Cabot and Chandler, of Boston; T. P. Chandler, of Philadelphia; Burnham and Root, of Chicago; Frederick Baumann, of Chicago; Jas. W. McLaughlin, of Cincinnati; Adolph Scherrer, of Indianapolis; and Peabody and Stearns, of St. Louis, to prepare sketches for the proposed structure, for which each of those invited will be paid the sum of 200 dollars. The commission will receive and entertain designs by other architects and sculptors not so invited. Sets of five unmounted drawings, consisting of a plan, elevation, section, perspective, and plan of park, are to be delivered, flat, on or before Dec. 12 next, to the Board of Commissioners at Indianapolis. The successful architects will be paid a commission of 5 per cent. on total cost, and the competitor placed second will receive 500 dollars. Should a second competition be instituted each competitor will receive a premium of 400 dollars. A number of sets of particulars have been sent to us. Any architect can have one by sending three stamps for postage to this office.

Maynooth.—Mr. William Hague, of Dublin, has been chosen the architect for the new works at St. Patrick's College, Maynooth. This gentleman has been the architect to the college, and it seems had, previous to the competition, prepared plans for the contemplated improvements. Perhaps it was, after all, unnecessary to hold a competition, as in the Brompton Oratory scheme, seeing that the authorities had the ultimate design already before them; but of this there is no evidence before us. The work consists of finishing and furnishing the chapel with altars and stalls. The cost will be from £5,000 to £6,000.

St. Leonard's Hospital Charity, Newark.—Fifteen sets of plans were received from architects for the new almshouses to be erected at Newark, and the design under motto "Charity," by Mr. E. W. Farebrother, F.R.I.B.A., architect, Great Grimsby, has been accepted.

SCHOOLS OF ART.

Rotherham.—The committee of the Rotherham Science and Art School have followed the advice of the newly formed National Technical Education Association in seeking the counsel of an expert as to the kinds of education which they should give, in view of the special necessities of the district. Sir Henry Roscoe, M.P., who with Mr. A. H. Dyke Acland, M.P., is secretary of the association, has sent down Mr. J. H. Reynolds, secretary of the Manchester Technical School, to confer with them, and the result has been that they have come to the conclusion to build a school, making special provision for theoretical instruction in chemistry, metallurgy, and physics upon the science side, with further provision for the higher teaching of mathematics. The plans which the committee's architect had already prepared had made provision for the teaching of science subjects. They have now so amended their plans as to provide for lecture rooms for graded sets for chemistry and physics respectively, and for two distinct laboratories respectively for practical work in chemistry and metallurgy. To the chemical laboratory there will be attached a balance-room as well as a demonstrator's preparation room. The metallurgy laboratory will be fitted with appliances admitting of experiments explanatory of the fundamental processes in the reduction and testing of metals. The South Kensington Department is continually producing fresh models of laboratory fittings, and the committee are in direct communication with Professor Thorpe in that department in the hope of securing fittings of the most recent type.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Association of Public Sanitary Inspectors.—The fourth annual report of this association congratulates the members on the movement commenced during the past year for the affiliation of branches and for representation of branches upon the council of the association. These efforts will be followed very shortly by the formal enrolment and affiliation of two strong and important branches, which are already formed. One, "the North-Western District Branch," has its headquarters at Liverpool, and a membership of 52; the other, "the Midland District Branch," has its headquarters at Birmingham, and a membership of 48. This example will, it is expected, be speedily followed by the formation of other branches This gives promise of, at no distant date, a federation and representation, in one council, of all the sanitary inspectors in the kingdom, numbering nearly 2,000. The monthly meetings, which were held at the Town Hall, Westminster, during the past year (and will be continued there in future), were highly successful. The list of members now numbers 200 names, in addition to 27 honorary members, and 13 associates.

The Glasgow Institute of Architects.—The twentieth annual general meeting of the Glasgow Institute of Architects (Incorporated) was held in the Religious Institution Rooms, Glasgow, last week; Mr. David Thomson, president, in the chair. The report of the Council, which was read by Mr. William MacLean the secretary, gave an account of the work of the Institute during the year. The financial statement, submitted by Mr. T. L. Watson, showed a balance in favour of the Institute of £289 1s. 5d. The chairman congratulated the members on the flourishing state of the society. As to the proposed Registration Bill, he had attended a conference in London, and had expressed the opinion, on behalf of the Council, that they would oppose the formation of a central association in London for the regulation of all professional matters in the provinces.

Institute of Auctioneers and Surveyors.—A meeting of this recently-formed body was held at the Cannon-street Hotel on Wednesday. Mr. J. M. Klenck, chairman of the council, presided, and having reminded the members of the circumstances in which the institute was formed a year ago, stated that since the meeting at which a council was appointed nine months ago nearly 700 members had been admitted. The present meeting had been convened with the view to report to the profession generally the result of the inaugural meeting. Several members expressed their satisfaction at the progress which had been made, and a resolution was passed to the effect that the entrance-fee should be dispensed with until 1,000 members had joined.

The R.I.B.A. "Kalendar."—The "Kalendar" for 1887-8 of the Royal Institute of British Architects, like the A.A. "Brown Book," and other annuals of similar character, shows a progressive increase in bulk, and now numbers 156 pages, against 100 last year, and 80 in the issue for 1885-6. The new features in the present kalendar are four in number—the supplemental Charter recently granted to the Institute; a section on professional practice, consisting of a reprint of the Schedule of Charges, as agreed to in 1872, the Heads of Conditions of Builders' Contracts, and the Suggestions for the Conduct of Architectural Competitions; a section dealing with the Architectural Association, in which brief particulars of the various classes are given, and the "Suggestions for the Guidance of Students" are reprinted from the "Brown Book"; and lastly, information respecting the Architects' Benevolent Society. A sign of the times is that the Association meetings are announced in the almanack. The meetings for the ensuing session are as follows:—Nov. 1st (Monday week), address by the President, Mr. E. I'Anson; Nov. 21, Dec. 5 and 19, Feb. 6 and 20, March 19, April 23, May 28, and June 11 and 25, ordinary meetings for the reading and discussion of papers, the last mentioned date being the night for the presentation of the Royal Gold Medal and prizes; Jan. 16 and 23, March 5, April 9, and May 7 (the annual meeting) are

meetings for business purposes only. The list of members shows a total of 1,266, made up of 13 Hon. Fellows, 428 Fellows, 89 Hon. Associates, 681 Associates, 52 Hon. Corresponding Members, and 3 Hon. Members. At the corresponding period last year the total, by a curious coincidence, was precisely the same, the change in the relative proportion of classes being that there are now nine more Fellows, while the numbers of Hon. Associates and Associates have decreased by one and eight respectively. Two years ago, at the commencement of the session 1885-6, the list of members numbered 1,259 names, of whom the Fellows enumerated 404 and the Associates 694. The change in the relative proportions of Associates and Fellows is evidently due to the fact that admission to the former class is only to be gained by passing an examination, which will not be obligatory on Fellows until five years after the granting of the Supplementary Charter.

CHIPS.

On Saturday, at the village of Eastgate, Weardale, the foundation-stone of a new church was laid by its founder, Mr. Hildyard. This church has been designed by Messrs. Austin and Johnson, architects, of Newcastle, and Mr. Ralph Sanderson, of Durham, is the sole contractor. Its cost will be about £5,000.

Mr. J. Oldrid Scott informs us that the Union Building at Glasgow University has not been built from his designs, as stated by us last week.

The first of a series of lectures on Plumbing and Sanitation, in connection with the Edinburgh College of Science and Technology, was delivered on Friday night in the Central Chambers, 21, St. Andrew-square, Edinburgh, by Mr. Thomas R. Proctor, president of the Master Plumbers' Association. There was a good attendance of young men belonging to the plumbing trade. Mr. Walter Brodie occupied the chair.

A new Liberal Club is in course of erection in Clifford-street, York, from plans by Mr. W. G. Penty, of that city.

The memorial window at Upton Pyne Church, erected in memory of the late Lord Iddesleigh by parishioners and residents of Exeter and the county, was formally presented to the rector and churchwardens on Saturday. The window is one of three lights, the first depicting Moses giving the Ten Commandments; the second, our Saviour on the Mount; and the third, St. Paul preaching at Athens. In the wall near by has been placed a brass tablet, bearing an inscription. The window was the work of Mr. Drake, of the Cathedral-yard, Exeter, and the brass tablet was provided by Messrs. Wippell Bros. and Rowe.

Shipton Moyne parish church, Gloucestershire, has just been fitted with a clock, as a Jubilee memorial. It has an engraved slate dial 4ft. 6in. diameter, and strikes the hours. Messrs. John Smith and Sons, Midland Clock Works, Derby, carried out the work.

A stained-glass window is about to be placed in the organ transept of St. Andrew's Cathedral, Inverness, to the memory of the late Mr. Alfred Denison, of Ness Side House. The window, which is to cost £500, is the gift of Sir Walter Phillimore, Q.C., M.P., a nephew of the deceased.

Last Friday, Mr. John Grundy, of 30, Duncan-terrace, City-road, London, gave his annual treat to the aged of his native town, Tyldesley, near Manchester, at which place his extensive heating apparatus foundry is located. More than 600 persons whose ages were 60 years and upwards sat down to a very substantial repast. The whole of the guests afterwards repaired to the large assembly-hall of the Conservative Club, where a most enjoyable evening was spent—an excellent concert being given, which was interspersed with short addresses. The chair was occupied by Mr. W. Ramsden, J.P., and a great many of the *élite* of the town were present. For the very aged and infirm, Mr. Grundy had thoughtfully provided conveyances to fetch and take to their homes.

The Leland Club, a branch of the British Archæological Association, visited Rochester on Monday week. They were met by Mr. Roach Smith, F.S.A., and taken to the Cathedral and Castle, after which they drove out to Kits Coty House, which Mr. Roach Smith described as probably from 2,000 to 4,000 years old, and the burial place of some chief or petty king. He believed it was originally covered with earth, as no doubt had also been the fallen and larger cromlech at the foot of the hill. Mr. George Wright, F.S.A., agreed with Mr. Roach Smith's remarks. Subsequently the party inspected Restoration House, Rochester, where Mr. Stephen Aveling, the owner, cordially received them.

Building Intelligence.

ACTON GREEN.—The memorial stone of the Church of St. Alban the Martyr, Acton-green, was laid on Tuesday, October 18. It will consist of nave and chancel, with north and south aisles, vestry, and organ-chamber, with heating-vault under morning-chapel, 12ft. by 29ft.; a semi-octagonal baptistery, 20ft. by 10ft.; two porches at the west end; and an entrance at the north-east corner of the nave. There will also be a lofty clerestory on an arcading of five brick arches springing from quatrefoil columns, and the height from floor to ridge of nave will be 55ft. The building is to be in the Early English style, and is being carried out from a design and under the personal superintendence of Mr. Edward Monson, jun., A.R.I.B.A., of The Vale, Acton, W. The walls are to be built of brick, faced externally and internally with best red local bricks, with dressings of Bath stone and blue Staffordshire brick bands. The cost of the building, including seating, lighting, and warming arrangements, is estimated at £5,000; but it is only intended at present to erect the nave, aisles, and baptistery, and to inclose the site with a substantial brick wall, and the contract for this has been taken for the sum of £3,500 by Mr. Joseph Dorey, of Old Brentford.

CHOBHAM, SURREY.—The council of the Gordon Boys' Home visited Chobham, near Brookwood station, Surrey, on Wednesday, to inspect the new buildings which will be complete by the end of the year. The buildings, which are of red brick picked out with Bath stone, are built from designs by Mr. W. Butterfield, the honorary architect. On the southern side of the parade ground, which measures about 750ft. by 150ft., stands the dining-hall, flanked on either side by two buildings containing the dormitories. These are all detached. The dining-hall is a double-gabled building, with an interior measurement of 64ft. by 24ft., and will admit of extension should the necessity arise. On one side of the entrance is the instructors' mess-room, and on the other side a writing and recreation room for the boys. The four dormitory buildings each consist of two floors, with two dormitories of 20 beds in each, affording in all sleeping accommodation for 160 boys. These rooms are fitted at each end with ventilating fireplaces of the ordinary barrack pattern. Between the two rooms on each floor is an inspection room for a sergeant. The northern side of the parade ground is occupied by workshops and offices. These include ablution rooms, carpenters' shop, smiths' shop with double forge, quartermaster's store, laundry and bath-room, bakehouse with steam oven, kitchen, guard room with cells, the commandant's and adjutant's offices, shoemakers' and tailors' shop, and schoolroom. The whole of the parade ground is surrounded by a brick wall, outside which are the commandant's and staff-officer's quarters and two five-roomed cottages for the instructors. There is also a hospital in course of erection. The cost of the building will amount, roughly speaking, to about £12,000.

EDINBURGH.—Sir James Gowans, in retiring from the office of Lord Dean of Guild, gave an address on Friday concerning the work done in his Court during the past year, remarking that it might be regarded as an index of the state of the building trade of the city, and indeed of trade generally. It showed the direction and extent of the city's progress and the provision that was being made in the way of dwelling-houses for the various classes of society, from the poorest upwards. During the official year now ended there had been 539 applications presented to the Dean of Guild Court, and in 508 of these cases warrant was granted. The number of applications made this year exceeded last year by 48, and the number of warrants granted exceeded last year by 117. Of the more important public buildings sanctioned during the year, mention might be made of Heriot-Watt College, the Warrender Private Baths, and board schools in Torphichen-street, Castle-hill, and East London-street. In connection with the inspection and testing of sanitary arrangements, he expressed the hope that the present movement for the registration of plumbers would be carried through successfully. The institution of a proper board of examiners in Edinburgh would go far to purge the craft of the non-efficient hangers-on. He mentioned what he considered a defect in the Police Act—namely, that the Dean of Guild Court had no control over the architectural appearance of the building. Such a power, wisely exercised, would undoubtedly tend to the beautifying of the city. Another weakness in their powers was that they could not control the use of materials. This led to the mixing up of brick and stone in the exterior of buildings exposed to view, which was gradually tending to such erections having a patched appearance. They had to regret the absence of powers for insisting on the subdivision of houses and flats into small houses. In many such cases the arrangements as regards sanitary conveniences, light, and air space were of the most insufficient kind. The building up of already insufficient open ground was a highly reprehensible practice, and required to be prevented by law. The education of the people as to the value of well-built, healthy houses would do more to force on the erection of complete dwellings than the intervention of the local authority, or even Parliament.

IPSWICH.—The foundation-stone of the Edward Grimwade Memorial Chapel in the Back Hamlet was laid on the 20th inst. The chapel will replace a smaller one, built in 1872, on the opposite side of the road, which will be converted into a lecture hall. The new chapel, which will be 70ft. long by 50ft. wide, and nearly 50ft. high, will run from east to west. It is to be Gothic in style, of red brick, with slated roof, and will accommodate 800 people. The main entrance will be from the west end of the south side, by the side of which there will be a second entrance leading up, through a small red brick tower with hipped roof, to the gallery. The west gable is occupied by a five-light window, flanked by a pinnacled buttress on each side. Six windows will light the north and four the south side, the window sills being in each case of weather-bed Ancaster stone in relief to the red brick. The Æolus water spray ventilating apparatus will be employed, and the chapel will be lighted with sunburners. The contract has been signed for £2,600, which will include the benching. This will be throughout of pitch pine. Mr. William Eade, of Ipswich, is the architect, and Mr. Frederick Bennett, of the same town, the builder.

KENDAL.—The foundation-stone of the new Grammar School was laid on the 20th inst. on the new site in Lound-road. The style adopted is a Scholastic type of Gothic, and the building will be faced with local limestone rubble, with ashlar dressings of Prudham freestone, and the roofs will be covered with green Tilberthwaite slates. The chief rooms are the assembly hall, 50ft. by 32ft. and 28ft. high to open timber roof of pitch-pine; school library, 23ft. by 14ft.; numerous classrooms on the ground and first floors, varying from 29ft. by 21ft. to 21ft. square, while suites of apartments are provided for the head and assistant masters. The chief contractors are: Mr. W. Dixon, mason, and Messrs. Thomas Thwaites and Son, carpenters and joiners. The designs were selected in competition, and are by Mr. Stephen Shaw, Kendal.

PLYMOUTH.—The consecration of St. Matthias' Church took place on Tuesday. The building is in the Perpendicular style, and consists of nave, north and south aisles and porches, chancel, with vestry and organ chamber, and tower at the west end of the nave. The tower, about 120ft. high from the pavement to the top of the pinnacles, is of the Somersetshire type, with long belfry windows on the four sides filled with open traceried work, and is terminated by an embattled parapet with crocketed corner pinnacles, and smaller intermediate ones. The nave has five bays of four-centres of Bath stone, springing from moulded piers, and columns with red Mansfield shafts and Bath stone moulded caps and bases, and is lit by traceried square-headed clerestory windows. The side aisles have three-light traceried windows alternated in design. The roof of the nave and chancel (of oak and pitch-pine) are of hammer-beam construction. In the chancel the trusses are borne by angels, sculptured in stone, with outspread wings, and playing various musical instruments. These have been carved by Mr. Hems, of Exeter, who also executed the

carving in pews, stalls, font, and pulpit. The wrought-iron altar standards, gas brackets, front gates, and lamps are by Messrs. Singer and Sons, of Frome. The building is erected of Plymouth limestone, lined with Horrabridge brick, the dressings and moulded and traceried parts being chiefly of Box Ground and Monks Park stone, Portland stone being employed for the more exposed parts, such as copings, battlements, and pinnacles. The church has been erected from the designs and drawings of Messrs. Hine and Odgers, by Messrs. Finch and Son, of Plymouth. Mr. Waymouth has been the clerk of the works.

Sunderland.—The foundation-stone of a new church dedicated to St. Ignatius, the gift of the Bishop of Durham, was laid on Tuesday, at Hendon, Sunderland. The church is Early English in style, with tower and spire at south-west corner of nave, and built entirely of stone. There will be sittings for 720, and will cost about £8,000 exclusive of site. Mr. C. Hodgson Fowler, M.A., F.S.A., of Durham, is the architect; Mr. Howe, of Hartlepool, the contractor, and Mr. S. Carse clerk of works.

Windermere. — The new cemetery, provided for the use of the parish of St. Mary Applethwaite, was opened on Tuesday last by a portion of the ground being consecrated by the Bishop of Carlisle. The church is of the Perpendicular style, built of the local slate, and freestone dressings, having a five-light traceried window at the east end and a three-light window of a similar character at the west end, with four single-light windows at the sides. A lodge is provided for the caretaker, which is of a Late Domestic character, with half-timbered gables and lead lights to windows. The entrance gateway is of freestone, having moulded splayed pillars and wing walls, with wrought-iron gates and railing. The work has been done by local contractors, from the design, and under the superintence of, Mr. Robert Walker, architect and surveyor, Windermere.

CHIPS.

A Local Government inquiry was held at Burnley on Friday, into the application by the town council to borrow £69,000. An additional £50,000 is required for completing the new reservoir at Cant Clough, £10,000 for the town hall, and £9,000 for enlarging the cemetery.

At a meeting of the Dundee Police Commissioners on Friday tenders were submitted from contractors from all parts of Scotland for the works in connection with the extension of Dundee esplanade. The burgh surveyor had estimated the cost of the works at £20,000, and the tenders ranged from £15,200 to between £25,000 and £30,000. The works include the extension of the present esplanade about a quarter of a mile, the construction of a bridge over the railway line, and a new bathing pond. The commissioners resolved, before arriving at any final decision in regard to the tenders, to allow the electors to express their opinions at the ward meetings.

Mr. Daniel Watney, of the firm of Messrs. Daniel Watney and Sons, 33, Poultry, E.C., has been elected to the post of surveyor to the Mercers' Company, rendered vacant by the death of the late Mr. George Barnes Williams.

The new building for the Keighley Technical Institute, which has cost about £12,000, was formally opened on the 14th inst. by the Earl of Rosebery. The architects were Messrs. W. and R. Mawson, of Bradford; Messrs. Sewell and Co., of London-road, St. Alban's, did the carving.

The little church of St. Petrock, Hollacombe, Devon, was reopened on Monday, after having been rebuilt, with the exception of the tower. The old church was very dilapidated—so much so that the walls and roof were unsafe. The old porch and font—fine specimens of Norman architecture, remain. The seats are open benches of pitch-pine, and the floors are laid with Maw's tiles. The carving of the chancel ceiling and oak altar standards was executed by Mr. Northcott, of Ashwater. The glazing is by Messrs. Beer and Driffield, of Exeter. Mr. Hooper, of Hatherleigh, was the architect for the restoration.

A Local Government Board inquiry was held at Eastbourne on Wednesday in connection with an application for a new loan of £11,500 for a sea front and street improvements. Some ratepayers complained that during recent years no less than £170,000 had been expended in the development of the town. Mr. Harrison, the inspector, reminded them that Eastbourne's repute as a watering place called for a large expenditure.

Engineering Notes.

Liverpool Engineering Society.—The usual fortnightly meeting of this Society was held at the Royal Institution, Colquitt-street, Liverpool, on Wednesday, October 19th, Mr. John J. Webster, M.Inst.C.E., President, in the chair. A paper by Mr. C. Harrison Townsend, entitled "Ornament and Design, their Relation and Subordination in Engineering Works," was read by the author. The author commenced by defining the words forming the subject matter of his paper. He half apologised, speaking as he did to engineers for adopting Mr. Ruskin's definitions of architecture and building. He thought they covered the ground, and begged no controversial question. He proposed to illustrate the conclusions he had arrived at by two specimen pieces of work, intrusted severally to the engineer and the architect. He instanced the line of thought which would pass through the engineer's mind when intrusted with the design and construction of a viaduct across a valley, and by diagrams illustrated the probable outcome of his design. The result of such a piece of engineering work, though nowadays often pleasing to the eye and taste, he was unwilling to give the engineer credit for. The mellowing touch of time and nature's beautiful surroundings were to be thanked for what we now admire in the aqueduct across the Campagna as well as in certain modern railway viaducts he instanced. As opposed to the engineer's work, he imagined an architect and his process of design when treating, say, a cathedral. The requirements were many, and all these first of all had to be met. The simple building of a series of unconnected parallelograms, in fact, would meet material wants; but the true architect is not satisfied with this. He insists that every part of his building, from lofty roof to carved boss, should be pregnant with meaning, and with a message to man. All architecture is charged with something "to say," and even bad architecture that tries thus to speak, but utters nothing coherent nor really of service to man, is in so far better than the work (skilfully constructed though it may be) of him who builds, "and there an end on't." The lecturer showed by diagrams how "thought" on his designer's part, and interest in the spectator's mind, underlie even the simplest detail of a true architectural building. He concluded by pleading that from the savage, with his painted birch canoe, upward throughout the human race there was a desire for beauty, and pointed out that his strictures had been directed against such works of the civil engineer as palpably, and in many cases wilfully, disdained this need in man.

Considerable progress has been made in the erection of the Victoria Courts, at Birmingham, of which Messrs. Aston Webb and Ingress Bell, of London, are the architects. The site has been excavated, and about half of the foundations have been laid. The brickwork rests upon beds of concrete, of varying thickness, according to the character of the ground. The operations of Mr. J. Bowen, the builder, have been going on since the end of June last, and at present seventy-five men are employed on the work. The work will be continued, as far as the weather permits, through the winter. It is expected that the entire work of erecting and fitting the courts will take three years. The terracotta for the external parts of the building will be supplied by Mr. Edwards, of Ruabon, and that for the interior by Messrs. Gibbs and Canning, of Tamworth.

The restoration of Walesby Church is now complete. The work has cost between £1,100 and £1,200. In October, 1886, the nave and aisles, having been rebuilt and furnished with modern oak fittings, were reopened; but the chancel was then left practically untouched for lack of funds, a defect which interfered seriously with the harmony of the whole. Sir John Savile has, however, succeeded to the Rufford estate, and undertook, at his own cost, the restoration of the chancel. The architect was Mr. G. H. Fowler, F.S.A., of Durham, and the builder was Mr. Rudd, of Grantham.

The opening meeting of the Geologists' Association of London will be held on Friday evening in next week, in the Library of University College, Gower-street, when an address will be given, entitled "Fifty Years' Progress in British Geology," by Mr. F. W. Rudler, F.G.S., president of the association.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Received.—French A. Co.—W. B. F. Co.—F. C.—C. I. Co.—T. L. and Co.—M. and Co.—A. P. Co.—H. B. and E.

Correspondence.

PROVIDENT FUND FOR ARCHITECTS' ASSISTANTS.

To the Editor of the Building News.

Sir,—It is satisfactory to notice that the question of a provident fund for assistants has interested some of your readers. This, however, is not the place to discuss the details of a scheme. The next thing to be done is to bring together those who are likely to actively promote the undertaking, and when the assistants show that they are really in earnest, perhaps the organised bodies of the profession will help them. Will, therefore, those who are anxious to prove their earnestness write to me to the Building News Office, putting into practical form any suggestions that they may have to make, and also stating their willingness to attend a meeting to discuss the matter? A room can probably be secured in a central position, free of cost, for this purpose.—I am, &c.,

Provident.

Sir,—I am very pleased to see the suggestion made to form a fund to aid poor struggling assistants in a time of need, and cannot see but that it ought to be carried forward to success. If carried out somewhat upon the lines suggested by "Hopeful" in your last issue, I think it must commend itself to all.

May I suggest that its sphere be extended, so as to embrace assistants in the country? Throughout the provinces there must be a very large number of assistants, many of whom I feel sure would be very pleased to join, if they could have equal benefits, and be represented upon the management. Would it not be possible to have representatives or local secretaries in all centres? Surely someone would volunteer for

such a laudable cause! I would, for one. I would suggest to those who take the initiative that they should communicate with the various architectural societies, where existing, and with members of the R.I.B.A. where not. Through these two sources I think they would be able to reach most of the assistants. I heartily wish the movement God speed.—I am, &c., L. C.

THE FUTURE OF THE ARCHITECT.

Sir,—Lord Shaftesbury said, "If the Church of England fall—and it will be the darkest day that England ever saw when she does—it will not be from the severity of the attack, but from the weakness of the defence," and I venture to assert that if the position of the architect is so weakened that the public arrive at the conclusion that he may be dispensed with, it will be because he has allowed misstatements by those interested in his downfall, to pass uncontradicted and unexplained.

It may be that I take a pessimist view of the future of the British architect; but I know that he is losing ground every day; that very large and important works, as well as those smaller works of alterations and additions, which are so useful to the young architect, are now intrusted solely to the care of the builder without the aid of the architect. I also know that this state of things has been brought about principally by the iteration and reiteration by the builder that the architect is "not practical," and can only make pretty sketches of costly and uncomfortable houses; and, to some extent, by a system in considerable force in the architectural profession, which has nevertheless given colour to those misstatements which have been allowed to propagate without contradiction or explanation. It would not be well, reading between the lines, to disregard the decision of the Corporation of the City of London to deprive itself of the services of an "architect" (in place of the late Sir Horace Jones), and to employ a "surveyor" at the ruinous salary of £800 per annum, and I take the decision to be one which supports my statement that the architect is losing ground. It is also worthy of note that Wormwood Scrubbs Convict Prison and Chapel are being designed and carried out without the aid of an architect.

Fortified by the success which has attended the builder's efforts to oust the architect, that interesting specimen of a day's growth, the "Professor of Sanitation" has indulged in the little game, and by iteration and reiteration *he* has succeeded in impressing the public with the idea that architects are utterly ignorant of drainage and sanitary matters, and so architects have lost, and are losing, not only the sanitary works, but many incidental works which arise out of them, and further is the idea spread that architects are not practical. In the correspondence, which I herewith transmit, it will be seen that I have considered Professor Corfield as one who is taking away the legitimate work of the architect, and, so far as in me lies, I have endeavoured to prove that he, and not the architect, is unable to design and specify the working items of drainage and sanitation. Of course, the Professor does not like the idea of sitting with me in an empty room to prove that he is unable to take the place of the architect; but, nevertheless, he and his brother "Professors of Sanitation" are getting the architect's work, and the architect is losing that and reputation at the same time. In his last letter Professor Corfield quotes, with some force, the letter which Mr. H. R. Gough wrote to the *Times* on the 1st inst., in which the statement of the Professor as to the ignorance of architects in sanitary matters was endorsed. But I now challenge Mr. Gough to prove his statement, and until he does so I shall conclude that it was one having for its object not, I trust, the injury of the profession in the eyes of the public, but the furtherance of the aims of that young Society of which he may be said to be a corner-stone.

But why should it be left to one or two members of the profession to defend it from these serious attacks on its skill and reputation? Where is that "one and only true representative body," the only powerful defender of our interests? Echo answers, Where? Last week only, as if suddenly awoke from that lethargic torpor which sometimes distinguishes it from kindred institutions, the R.I.B.A., in a letter to the *Times*, expressed its views on the proposed removal of the Strand Church, a subject which had been fully discussed, and apparently settled, ages ago. The Institute, with 50 years of tradition at its back, remained somnolent when Mr. Butterfield proposed to cut in half the portico of St. Martin's Church. Notwithstanding that it takes credit to its Council for securing the opening up of Charing-cross into the Mall, that Council failed to take advantage of the announcement that the Government had made provision for that opening in its estimates for the extra accommodation to be provided for the Admiralty and War Offices. The open space of Piccadilly-circus might have been lost for ever for aught the R.I.B.A. cared. Professor Corfield was allowed to bring architects into contempt so far as an important branch of their business is concerned, and the "only representative body" remained quiescent. Mr. Gough has been permitted to make a general statement in the columns of the *Times*, which may or may not have a foundation in fact, but which has naturally been laid hold of by Professor Corfield as a warrant for the statement which I had ventured to contradict, and which must, coming from a Fellow of the Institute, tend to confirm that opinion, which it is, to my mind, momentous should be eradicated, and yet, so far as I am aware, the Council of the Institute have not called upon Mr. Gough for either a confirmation or withdrawal of so damaging a statement.

I have excellent grounds for believing that architects are in need of a strong protective association. I am convinced that if we allow the present public feeling against architects to grow, the bread will be taken out of the mouths of our immediate successors. The R.I.B.A. is the proper recognised body to protect us in every way; but if the R.I.B.A. cannot see its way to more effectually guide public opinion, another institute must be constructed which can; for if the profession fall, it will not be so much from the severity of the attack as from the weakness of the defence.—I am, &c.,

Wm. Woodward.

7, Duke-street, Adelphi, W.C., Oct. 25.

THE ROMAN VILLA, TOCKINGTON, GLOUCESTERSHIRE.

Sir,—The so-called discovery or re-discovery came about thus: Some five years ago I was reading up "antiquities" at the British Museum Library, when I found an allusion to the site of a Roman villa only very partially uncovered, as existing about midway between Bristol and Gloucester, near the high road. It surprised me, as I thought I should have known something about it. When, three years ago, I was in the neighbourhood, I made inquiries. Neither the vicar nor the oldest inhabitant knew anything about it, and my inquiries, puzzling the bucolic mind, brought upon me suspicion and distrust. However, I persevered, and one inhabitant with a greater degree of intelligence than his fellows, informed me where he thought it most likely to be, and then I went about a mile from the village of Tockington, and assured myself it was the place referred to by the old writer, though nothing was visible that could positively be identified with the villa remains.

As the remains were supposed to be under the house yard and farm buildings, I saw no hope of exploration on my part. The visit, however, at length has produced fruitful enterprise. Whilst Roman houses are generally on slopes in high positions, the Mediæval house was most commonly in low a situation. This place at Tockington is remarkable as incorporating both periods, along with a comparatively modern house. From its remarkably isolated position, the materials of the Roman house were not worth taking away, and at a later time the materials were re-used on the same spot, some remains of this Mediæval house still being visible. Probably the modern house also was built of the same stones, though they are not identifiable. Thus a remarkable continuation of occupation has ensued.—I am, &c.,

M.

GANGWAYS v. STAIRCASES.

Sir,—If an internal staircase is to be a *sine quâ non* of a theatre or music-hall, then your correspondent seems, like Cranmer, to "have got the right sow by the ear." The merits of a suggestion may often be best discussed by considering its weakest points, and, as a building catering for the amusement of the public must necessarily be situated in a central locality, where ground rents are high and each foot of space valuable, the increased room required for a gangway may render it possibly objectionable to those directly interested, while so far again as the public are concerned, space is secondary to safety. Another objection to this system is that plats or landings are still necessary, especially in descending from the upper floors of the building. The greater impetus given by an even gradient means increased difficulty in stopping and turning at the landings, changing at the same time from an inclined plane to a flat, and then downward again. True, a spiral gangway would obviate that, but the greater space required renders it inadmissible. I have seen gangways 7 or 8ft. wide used in mills, with cross pieces in the centre, and the speed at which men ran up and down heavily laden barrows was astonishing. Then to see the hands flocking down in crowds at meal hours, with never a fall or accident, affords fairly practical test of its utility. True, at first a gangway is more tiresome to ascend than a staircase, but this is much the result of habit, and the higher one rises in a theatre the less fastidious an audience becomes.

What is first wanted is easy egress in case of panic or sudden alarm, and so far as the means of ascent or descent are concerned the gangway is safer than the stair. In descending, which is the main thing, the chance of a fall is reduced to a minimum, and without a fall or similar cause of obstruction, a block is almost unknown.

Return gangways with a solid brick newel rising from the ground, give all the elements of a stiff, solid, and perfectly fireproof construction.—I am, &c., James A. Morris.

Sir,—Will you allow me to point out an excellent application of the inclined plane instead of the staircase—viz., the Campanile of St. Mark's, Venice. It is constructed within the walls, upon the four sides of the tower, and gives a much easier access to the belfry than a staircase. There is a single step at each turn; but I do not remember the gradient of the incline, only that it is easy and pleasant. It is said that Napoleon I. rode his horse up to the top. This would be quite possible. The advantages of the inclined plane over the staircase are very great; the only disadvantage is the extra space required.—I am, &c.,

William Peachey.

Saltburn-by-the-Sea, Oct. 25.

SANITARY ASSOCIATIONS AND HOUSE DRAINAGE.

Sir,—Referring to letters which have appeared in the Building News of the 14th and 21st inst. on this subject, I shall be glad if you will allow me space for a few remarks.

Whilst giving Mr. Buchan all due credit for the good work he has accomplished in connection with sanitation, it is amusing to note the egotistical style in which he writes. He should remember that other persons can form opinions and ideas. Some of the sanitary associations have as many houses examined, &c., in 12 months as probably any "practical sanitary plumber" examines in as many years, and, as the engineer of one of these associations, I venture to think my experience is not valueless. Mr. Buchan and "Clerk of Works" advocate the use of a separate disconnecting trap on every soil-pipe and branch drain, in addition to the disconnecting trap on main drain; and also that the main drain be ventilated by a special pipe, and not by soil-pipes. I admit there are exceptional cases where it is not advisable to ventilate a main drain through a soil-pipe, such as when the latter is unavoidably inside house, or perhaps when the drain is a very long one. In most cases, however, there is not sufficient ground in the arguments adduced to justify the use of additional traps and special ventilating pipes; and to do so in short branch drains which simply serve gullies is certainly quite unnecessary.

In the first place, there is the question of expense; and I would here point out that the Sanitary Associations (unlike tradesmen or patentees) have no pecuniary interest in the

work they recommend, and therefore have no temptation to advise unnecessary appliances. Then it is one of the fundamental principles of sanitary science that, after efficiency, simplicity is all important. If we put in innumerable traps and pipes where one or two will suffice, it is impossible for the average householder to understand the drainage arrangements as he ought; and there is also greater liability of derangement. Another objection to placing a trap at the foot of a soil-pipe is that the flushing force of the water is seriously interfered with, the energy which should be used to keep drain clean being expended in passing through the trap.

Again, in most cases the soil-pipe is in close proximity to windows and doors, and if a disconnecting trap were inserted here, every time the closet was used the fact would be proclaimed to all near through the medium of the nose. Mr. Buchan speaks about disease germs from one untrapped (ventilated) soil-pipe passing into another and through closet trap. I should like to ask him if he has *proved* this to be possible, or is it only supposition? He also seems to ignore the fact that the air current is not always so obliging as to obey his directions, as shown by arrows on his trap diagrams, and very often the air "inlet" becomes a drain gas outlet. Thus, with a disconnecting trap at foot of soil-pipe, disease germs would escape from the open grating; they would then be really dangerous so close to house. He also writes as if the closets composed wholly of earthenware are less reliable than others; but experience proves otherwise. Mr. Buchan's simile about the water-tight divisions of a ship appears to be far from applicable.

Much of the matter in "Clerk of Works'" letter is beside the question, and contains mere assertions unsupported by argument. There is probably room for improvement in the ventilation of drains, but what he says about the air current often being downward, supports the objection to an open grating at foot of soil-pipe. If a second pipe or a valve be provided, these also present some objections, and should only be employed in the special cases previously referred to.

We must not take one or two isolated cases to prove a general principle, and in house sanitation the whole arrangements must be considered, and not some "fad" pushed forward regardless of all else. Our usual practice here for ordinary houses is to place a disconnecting trap on main drain as close to sewer as possible, with the air inlet carried up a wall if necessary; the soil-pipe we use to ventilate main drain carried to a reasonable height above eaves, and left free from any cowl. This plan is thoroughly tested hundreds of times yearly, and (together with open discharge of waste and rain pipes and trapping of w.c.'s, gullies, and wastes) is found to be perfectly satisfactory under all conditions, in preventing any drain or sewer gases entering house.—I am, &c.,

Oct. 22nd. C. E.

Sir,—I am obliged to "Clerk of Works" for his remarks on page 632, which further corroborate what I said on page 601, to the effect that it was not true, as the engineer of this Association asserted, that "It is now generally acknowledged that no traps should intervene between the trap on the main outlet and the soil-piping."

Since my last letter appeared I have been examining the drainage of Belmont Castle, which has been almost entirely rebuilt and enlarged this year by Mr. James Thomson, F.R.I.B.A., Glasgow, for the Right Hon. H. Campbell-Bannerman, M.P., and I beg to state that the drainage here is executed upon the sectional system—viz., with traps intervening between the main outlet traps and the soil-piping, each soil-pipe, waste-pipe, and rain-pipe or rain-pipes being separately trapped off from the drain, and the drain itself has a special blow-off pipe carried up above the house. Mr. Campbell-Bannerman, Mr. Thomson, and myself were talking over the merits and demerits of trapping off the soil-pipes from the drain, or of using the soil-pipes to ventilate the drain. I am authorised by Mr. Campbell-Bannerman to state that he much prefers the style in which his house is done—viz., with the soil-pipes each trapped at foot and ventilated separately, considering it the safest plan.

Mr. Thomson has been in the habit for years back of executing his best drainage work in this style such as at Tilliechewan Castle, Stracuthro House, Gartshore, &c.; while many other architects throughout the kingdom, as well as surveyors, engineers, and plumbers, work in the same way. Some of the master plumbers who have done work for the above Association have told me within the last few days that they did not approve of the way in which they were ordered to do the work. One of the best master plumbers in the east of Scotland writes me:—"I think you are quite right in your sectional system of drainage, especially with a mansion-house of any pretensions."

As to the extra expense of the 2, 4, 6, or 8 or so more traps, I find gentlemen do not consider that worth speaking about, or the special blow-off pipes either. Their minds are easier, and they consider they soon save the expense off the doctor's bills. As to taking the traps out, Mr. M. G. Neilson, Glasgow, who has had his former and present house drained on the sectional system, says:—"I shall not allow your disconnecting traps at the foot of the soil-pipes of my present house to be taken out while I reside in it."

I think Mr. Rottenburg has done good in causing public attention to be drawn to this matter. These sanitary associations, since their rise in 1878, have done a considerable amount of good in superintending the work where the masons and plumbers were ignorant; but now that plumbers generally are getting better educated there will by-and-by be less use for them. And in a dispute or otherwise between an architect and his plumber, a consulting sanitary plumber will be a better man, in my opinion, to call in to settle it than a civil engineer, who has been merely dabbling in the business, and especially if he is one of the sort that "Clerk of Works" refers to on page 632, as recommending hot-water copper pipes to be taken out and iron ones substituted as an *improvement*.

This raises the idea—How many more foolish mistakes have some of the engineers of these associations made that have yet to be found out?—I am, &c., W. P. Buchan.

Intercommunication.

QUESTIONS.

[9438.]—**Brickmaking.**—Can any practical reader help me with information or advice *re* the following? I have a piece of land in London which will yield, after levelling and excavating, about 5,000 cubic yards of good clay. Would it pay to make bricks of this? All plant would have to be obtained. The bricks would be used afterwards for buildings to be erected on the same site.—T. H. Black.

[9439.]—**Science for Engineers.**—Would some reader kindly give his opinion as to whether it would be to the ultimate advantage of a young man who has served three or four years in the office of a C.E. to take a three years' course of study at the Normal School of Science, Kensington? If so, a few hints as to subjects, &c., would oblige.—Science.

[9440.]—**Roof.**—I am about to put up a roof ½rd pitch, 18ft. span, and 32ft. long, and purpose using couples 18in. from centre to centre, the rafters to be 4in. by 2in., upper collars 3in. by 2in., bottom collars or ties, which will also act as ceiling joists, 4ft. 2in., the bottom collars to be hung up to the 7in. by 1½in. ridge by a 2in. by 2in. suspending piece, which will also be spiked to the upper collars, the couples to be notched to a 11in. by 3in. wall-plate, and to be connected with a 3in. by 2in. piece, running the whole length of the roof and spiked to the backs of the upper and lower collars, as well as by 1in. by 2in. slating battens. I may say that the collars are so arranged as to divide the rafters into three equal parts. If any reader will criticise this construction, I would feel much obliged.—Excalibur.

[9441.]—**Early English Foliage.**—Will any one tell me the natural form of the conventional foliage so universally employed in Early English Gothic?—Fagging for Exam.

[9442.]—**Mortar.**—Which is the best practical way of securing the prescribed proportions of lime and sand or ashes for making mortar in a mill, so that the clerk of works may know that he is getting the specified quantity during his absence, as he cannot constantly be watching the mill, and sometimes may be engaged to give only half his time to that building? As this is a most important matter, replies from practical readers will be esteemed.—Mortar.

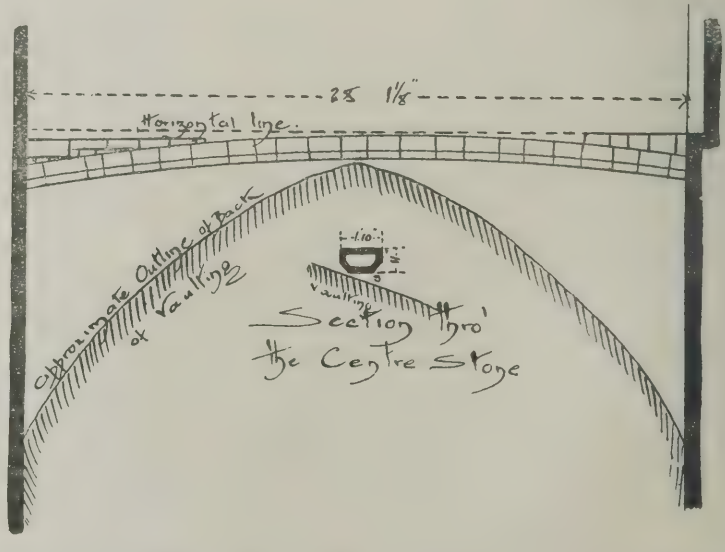
[9443.]—**Perpendicular Style.**—I shall be glad of a few hints on the above, names of architects who flourished at that period, buildings in or near London that I can study, and any other information that will be useful in giving one a help in the study of this style.—City Pupil.

[9444.]—**Cavendish Memorial Tomb.**—I shall feel obliged if any one can inform me where the monumental effigy in marble of the late Lord Frederick Cavendish (assassinated in Phœnix Park), exhibited by Mr. Thomas Woolner, R.A., at the Royal Academy in 1885, was erected? It will be remembered that Mr. Woolner complained of the bad lighting of the place it occupied in the sculpture room, but the architectural journals and Academy catalogue were silent as to its proposed destination. Has it been placed in Cartmel Priory Church?—E.

REPLIES.

[9432.]—**Black Stains in Varnished Stained Deal.**—I judge you used pine, not white deal or yellow deal. Please state which.—Tekton.

[9426.]—**Arch in Lincoln Cathedral.**—This peculiar arch, or "stone beam," as it is generally called, is situated above the vaulting between the two west towers at Lincoln Cathedral. The purpose for which it was built is uncertain; but the usually received opinion is that it was intended as a test to ascertain if the towers, which were then being built, would safely bear the superincumbent weight. The strength of the arch would tend to keep the towers apart, and if they inclined outwards the fact would be at once made known by the arch stones falling in. When stamped upon, it visibly vibrates. The lower course of stones alone follows the curve of the arch. There is no appearance of the stones being tenanted together, but the end stones of the lower course are both built into the tower walls. All the voussoirs are through stones. The extrados of the arch is not hollow, for when levelled the north end is 6⅜in. lower than the south end. The dimensions are as follows:—Length, 28ft. 1¼in.; depth in middle, 11½in.; at the north end, 28¼in.; at the south end, 21in.; the width is 22in. The west side of the arch is about ¼in. above the summit of the groining; the east side, owing to a fall in the groining, is 3in. above it. The lower edge on both sides has a deep splay. The sketch is drawn to scale, and is from actual measurement.—Siamese Twins.



[9433.]—**Damp.**—I should recommend "R." to underpin and insert an air-course of vitrified bricks below the floor level. Sometimes a dry area excavated externally all round the wall has obviated the rising of damp; but this could probably only be applied to one outer wall. The only other remedy is to batten the inside of the hall. It is not probable that the damp will disappear eventually if nothing is done, as the suctional qualities of the bricks are the cause of the mischief.—G. H. G.

STATUES, MEMORIALS, &c.

DUNDALK.—There has recently been placed in a niche in the Convent of Our Lady of Mercy, Dundalk, a life-size statue of St. Joseph, supporting the infant Jesus on his left arm, whilst the right hand holds a spray of lilies. The faces and hands are highly finished, and the drapery is bold and original. The material used is Portland stone. Mr. C. L. Harrison, of 178, Great Brunswick-street, Dublin, is the sculptor.

STAINED GLASS.

DOLFOR.—Two two-light stained-glass windows have recently been erected in Dolfor Church, Newtown, Montgomeryshire. One was in commemoration of Her Majesty's Jubilee, and illustrated the figures of King David and Esther, a medallion of Her Majesty the Queen appearing in the top part of the tracery; the other represents the figures of St. John and St. Paul. The execution of the work was intrusted to Jones and Willis, of Birmingham and London.

WATER SUPPLY AND SANITARY MATTERS.

DALMENY, QUEENSFERRY, AND KIRKLISTON DISTRICT WATER SUPPLY.—The water supply of the eastern district of Linlithgowshire being insufficient for the wants of the inhabitants, owing to the increase of population due to the construction of the Forth Bridge, the local authorities of Dalmeny, Queensferry, and Kirkliston have combined for the purpose of bringing in a new water supply to the district. A sufficient supply has been found in springs at Morton-hall, two miles from Mid-Calder. The pipes will be laid along the public road to Queensferry, a distance of over thirteen miles. The total cost is estimated at between £8,000 and £9,000. The work will be begun very shortly. The engineers are Messrs. Leslie and Reid, Edinburgh.

HALIFAX.—The Corporation of Halifax now supplies water to a population of 140,000 persons, and finds its reservoirs are inadequate to meet the demands made upon them during seasons of drought, although at present the supply is equal to 29¾ gallons per day. Consequent on a report from Mr. G. H. Hill, of Manchester, the Corporation have decided to promote a Bill in the next session of Parliament for receiving powers to extend the Walshaw Dean scheme, and also for the construction of a reservoir on the hill-side below Greave Clough, obtained some years since, but allowed to collapse. Should the Bill be successful, the Corporation will proceed with the construction of three new reservoirs, placed together, in the Walshaw Dean. From the reservoirs the water will be conveyed by a culvert, which at present extends from Widdop. The area to be appropriated covers 2,300 acres, and after allowing for compensation, it will yield an additional supply of about 2½ million gallons a day to the town. The new reservoir at Greave Clough will be designed to catch the flow of water which cannot be turned into Widdop on account of the discolouration of the water as it passes over peaty ground, and the water will be rendered fit for domestic purposes. The construction of the new works will occupy at least four or five years. The cost is estimated at £150,000, which, with the previous expenditure, will bring the total amount of money spent on the waterworks system up to £750,000.

SEWER VENTILATION.—The Wimbledon local board received at their last meeting a report on sewer ventilation, presented by their engineer, Mr. W. Santo Crimp, in which he declares that the system of ventilating it by openings at the street level is an obnoxious one. The movement of sewer gases depends, he finds by experiment, on the temperature; thus in the summer months the gases escape at the openings at the lowest level, and during the winter the direction is reversed, and the outflow of gas is at the tops of the hills. He believed that it cannot be shown that the excessive ventilation of sewers which are too small for men to work in is necessary or of the smallest advantage. All that is required is that sufficient vent should be provided to render the admission of sewer gas into dwellings impossible, and if houses are properly drained this is accomplished even when sewers are unventilated. He suggests that the ventilation of the sewers in the district could be accomplished for £500 by attaching outlet pipes to lamp-posts, houses, and even trees.

Among the receiving orders in bankruptcy announced in Friday's *Gazette* was one relating to Goodman Brown (trading as Brown and Son), Kingsland-green, High street, Kingsland, "builder, surveyor, and contractor."

A district church is about to be built in the suburb of Highcliffe, Chilcombe, near Winchester, from plans by Mr. T. Stopher, of the latter city.

Our Office Table.

THE opening meeting of the Society of Architects for their fourth session will be held on Tuesday fortnight, Nov. 15, in the Society's new meeting room, St. James's Hall, Piccadilly, when an inaugural address will be given by the president, Mr. Joseph J. Lish, of Newcastle-on-Tyne. The principal room is on the first floor, overlooking Piccadilly, and is about 40ft. square, seating some three hundred persons. The suite of apartments, including secretary's office and council room, are being decorated and furnished, under the direction of a committee, Mr. C. Stanley Peach, the hon. corresponding secretary, acting as architect. The chandelier and side brackets throughout are of wrought ironwork, some Spanish 16th-century work supplying the *motif* for the masks and scrolls; they have been executed from Mr. Peach's designs by Messrs. Starkie, Gardner, and Co., 29, Albert Embankment. The floors are laid with felt, executed by Mr. O'Neill, of Watling-street; and in the large room a carved oak chair is provided for the president, the other seats being of Austrian bent wood. The painting and decorations are being carried out by Mr. T. Yeomans, of High Holborn. The members are to be congratulated on the convenience and accessibility of the new premises, in which not the least improvement in the arrangements is that the secretary's office and meeting room are brought together under the same roof.

THE late Mr. Beresford-Hope, whose death was announced at the age of 67 at the close of last week, will be chiefly remembered by architects as one of the earlier lay advocates of the Gothic Revival, of which he was a zealous partisan and supporter alike by voice, pen, and purse. He was one of the earliest members and president of the Cambridge Camden (afterwards the Ecclesiological) Society, and so far back as 1844 purchased and restored the ancient buildings of St. Augustine's Abbey as a college for missionary clergy, and nine years since helped to found St. Paul's Ecclesiological Society, of which he was at the time of his death a vice-president. Professor Kerr told the members of the Architectural Association on Friday evening how, in 1847, when President of that body, then newly established, he invited Professor Cockerell and Mr. Hope to visit Lyon's Inn Hall, to hear his address. At the close, Professor Cockerell spoke in favour of Classical styles, and was followed by Mr. Hope, who characteristically took an opposite view. Mr. Cockerell listened with Olympian indignation to the audacious championship of Gothic by the young M.P. for Maidstone, and when he sat down remarked: "I knew Mr. Hope's father, and he never held such views as these." Mr. Beresford-Hope joined the Institute of British Architects in June, 1850, as an honorary Fellow, and from 1865 to 1867 was President, being the last non-professional and dilettante occupant of the chair. On his retirement from office his portrait, a kit-cat, was painted, by subscription, by the late C. Martin, R.A., and now hangs in the Institute meeting-room. It may be noted that of the sixteen gentlemen connected with architecture whose portraits decorate the walls of the room, all are deceased with the exception of Mr. Charles Barry. Mr. Beresford-Hope's funeral took place at Christ Church, Kilndown, on Wednesday, and was attended by very many friends, including Messrs. Edward I'Anson, P.R.I.B.A., Arthur Cates, and James Brooks as representatives of the Institute, and by Mr. H. Roumieu Gough representing the St. Paul's Ecclesiological Society and the Society of Architects, in which Mr. Hope took a great interest.

THE annual report of the Committee of the Auctioneers' Benevolent Fund, for the year ending June 30, 1887, which will be presented at the annual meeting to be held to-day (Friday), states that the subscriptions amounted to £222 12s., and the donations to £93 9s., the subscriptions amounting to exactly the same sum as that received during the preceding year, and the donations slightly exceeding the amount in the last report. The number of the newspaper proprietors, either as donors or annual subscribers, has somewhat increased, and a donation of fifty guineas has also been presented (through the honorary secretary, Mr. E. Walter Rushworth) by the Select Society of Auctioneers (founded 1800) in commemoration of the Jubilee of Her Majesty's reign. The Society has now seven annuitants, whose annuities amount in the aggregate to £134 per annum, and the annual sum paid under this head has been increased since last year by £24. The account of the treasurer, Mr. Daniel Watney, shows that during the year the sum of £250 has been invested in Consols in the names of the trustees, the investments now being—Consols, £870 11s. 3d. stock; Queensland 4 per cent. Inscribed, £2,979 8s. 6d. stock. The members of the Committee retiring are:—Messrs. Lewis, Newbon, Oakley, Perkins, Roberts, Thurgood, and Walker, all of whom are eligible for re-election.

MR. GEORGE WILLIAM REID, F.S.A., late Keeper of the Department of Prints and Drawings at the British Museum, died on the 20th inst., aged 68 years. He received the above appointment in 1860, having previously held a post in the same department at the British Museum for 18 years. In 1883 Mr. Reid retired from the Keepership of Prints and Drawings on a pension, and was succeeded by Professor Sidney Colvin. For two years before his death deceased had been engaged in cataloguing the valuable collection of works in the possession of the Duke of Devonshire. In addition to being the compiler of several catalogues dealing with various art collections in the British Museum, Mr. Reid was the author of the descriptive letterpress to many illustrated works on art subjects. Mr. Reid was himself an art connoisseur and patron, and leaves behind him a choice collection of rare engravings, examples of the old English water-colourists, &c.

CHIPS.

The county magistrates of Hertfordshire have raised the salary of Mr. Urban Smith, of Hertford, county surveyor, and surveyor of county highways, from £400 to £500 a year.

The new hospital at Rock-place, Hastings, was opened on the 13th inst. It is built of red brick, with stone dressings, and has in either wing two circular wards, with open-air balconies on top, and central ventilating and chimney shafts. The buildings are four stories in height, and contain 72 beds, besides five cots for children. The total cost has been £19,500. Messrs. Young and Hall were the architects.

A special meeting of the Preston town council was held on Friday for the purpose of considering the expediency of promoting in Parliament a Bill for the purpose of securing powers to borrow £510,000 for the completion of the Ribble Works, for having the borough extended, and for giving a site for technical schools. After discussion the motion was carried.

An altar-cross, designed by Mr. J. L. Pearson, R.A., for erection in Truro Cathedral, which will be consecrated next week, has just been executed in the workshop of Messrs. Cox, Sons, Buckley, and Co. (of London and New York), in Esher-street, Westminster. It is of silver, richly gilt and jewelled, its height being 2ft. 8in. In outline and general effect it is similar to many crosses of the 14th and 15th centuries. The "Agnus Dei" is shown in the centre, whilst at the extremities of the arms, as well as at the top and base of the shaft, are angels censing. At the base of the cross is an octagonal boss, round which, under cusped canopies, are statuettes of adoring angels in high relief. The foot of the cross is a cusped octagon; a lower knop on the fluted shaft of the base is set with square-cut amethysts and garnets. The arms and shaft of the cross are set with amethysts, garnets, topazes, and "aqua-marines" in cabochons. Messrs. Cox, Sons, Buckley, and Co., have also executed, under Mr. Pearson's supervision for the same cathedral, a festal frontal of creamy white silk damask and of golden toned "plush" velvet, richly embroidered. It is divided into three panels by four orphreys of golden satin, on which are embroidered cherubim, surrounded by borders of wheat and grapes. The ground of the three panels consists of silk damask, woven with a Moresco-Sicilian design of foliage and birds of Early 14th-century character. On this ground are embroidered in high relief the symbolical flowers of the Blessed Virgin, such as the lily, marigold, and the "mystical" rose. The superfrontal of auburn golden velvet is embroidered with a continuous pattern of roses and flowers-de-luce; whilst the centres of many of the flowers are set with bosses of real amber, which serve to accentuate and give harmony to the whole effect. The frontal is 10ft. long and 3ft. 6in. high.

LEGAL INTELLIGENCE.

A Surveyor Convicted. — John Leslie Weston, a surveyor, was indicted at the Central Criminal Court on a charge of obtaining from Mr. A. P. Payne £153 2s. by false pretences. The prosecutor is a solicitor, practising in Essex-street, Strand. The defendant asked him to advance the sum of £153, which the defendant said he had to pay on certain work on an estate of ten acres near Tilbury, for which the defendant said he had paid £4,300. It was subsequently found that so far from there being, as defendant said, no further encumbrance on the estate, the defendant had obtained other sums of £600 and £361 10s. The prosecutor found the property was not worth more than £500, as it consisted chiefly of a gravel-pit. It was contended, in defence, that the defendant acted throughout in perfect good faith. The jury found the defendant guilty, and sentence was postponed.

In re Blunderfield and Aide.—The bankrupts, builders carrying on business at Fulham and Hammersmith, applied to the Court of Bankruptcy on Wednesday for an order of discharge. The unsecured debts were £2,413, with a surplus in assets. The debtors commenced business in 1880, with a joint capital of £1,000. The Official Receiver having reported that the bankrupts had not kept proper books of account, Mr. Registrar Giffard suspended the order of discharge for six months.

MEETINGS FOR THE ENSUING WEEK.

Saturday (to-morrow).—Association of Municipal Engineers. Meeting at Luton 12.45 p.m. Paper by W. H. Leete, borough surveyor, on "Luton Sewerage, Past and Present."

Tuesday.—Manchester Architectural Association. Address by the President, A. H. Collies-Davey.

Thursday.—Builders' Benevolent Institution. Annual Dinner, Carpenters' Hall, London Wall, 5.30 for 6 p.m.

Royal Archæological Institute. Papers on "Work of the Egypt Exploration Fund in the Spring of 1887," by F. Ll. Griffiths; and "Antiquities in Brittany, lately Visited by the Royal Archæological Institute," by Herbert Jones. Oxford-mansions, Oxford-street, W.

Friday.—London Architectural Association. "Architectural Modelling," by J. C. L. Sparkes. 7.30 p.m.

Geologists' Association. "Fifty Years Progress in British Geology," by F. W. Rudler, President University College. 8 p.m.

Birmingham Architectural Association. Conversazione at the Assembly-rooms, Edgbaston.

Saturday.—Association of Public Sanitary Inspectors. Address by the Chairman of Council, Hugh Alexander, of Shoreditch. Westminster Town Hall. 6 p.m.

CHIPS.

The Edinburgh Improvement Trust have accepted an estimate for the erection of a memorial tablet to Sir Walter Scott, to be placed in a tenement now in course of construction at the corner of Chambers-street and Guthrie-street, on ground the property of the Improvement Trust. The tablet will bear the inscription: "Near this spot stood the house in which Sir Walter Scott was born; August 15, 1771. Erected by the Magistrates and Town Council; Sir Thomas Clark, Lord Provost. James Lessels, architect."

A Jubilee Fountain has just been completed at Stafford. It is Early English in character, and follows the general style of the Eleanor crosses, in having four gables surmounted by a spire, all crocketed. It is approached by four steps of York stone, and the base is of polished grey granite. The shafts are of red granite and green serpentine, and are surmounted by an order of moulding in the arch, with dog-tooth ornaments. The gables and the spire are of Hollington stone. The basins are of red granite, with grey granite supports. The lions' heads from which the water issues are of bronze, cast by the Coalbrookdale Company, Shropshire. A recessed panel on either side, with a trefoiled head, bears an inscription. There are also recessed troughs for dogs on each face of the base. The whole has been designed by Mr. George Wormal, and the work has been carried out by the contractor, Mr. G. J. Benton. The carving has been executed by Mr. J. Hollister, of Bath-street, Birmingham.

Mr. W. T. Blackmore was elected secretary of the Institute of Painters in Oil Colours on Wednesday night.

A structure is being erected on Manchester Racecourse for Buffalo Bill's show, which will open in December. Messrs. Mangnall and Littlewoods, architects, of Manchester, have designed the building, the erection of which has been intrusted to Messrs. R. Neill and Sons.

St. Lawrence's Church, Pudsey, was reopened on Wednesday week by the Bishop of Ripon, after being restored and internally painted and decorated. A stone chancel screen has been erected, and oak choir stalls have been fixed, also oak-panelled moulded screens to the vestry and side of organ, and the chancel floor has been raised and laid with mosaic pavement. The whole of the work has been executed from the designs, and under the superintendence of Mr. Thomas Winn, architect, of 5, Park-lane, Leeds, by the following contractors: —Painting and decorating, Mr. J. T. Pollard, Leeds; stone screen wall, Messrs. Thompson and Sons, Leeds; marble steps to chancel, Mr. A. Welsh, Leeds; choir stalls and oak screens, Mr. Thomas Haton, Pudsey; mosaic pavement, Messrs. De Crelle, London; wrought-iron stall railings, Mr. A. Jones, Manchester.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

Depression of Trade.—Complaints about the falling off in consumption of many articles are loud and universal, but there is one exception to the prevailing dulness, viz.: GRANT'S MORELLA CHERRY BRANDY, for this popular liqueur not only maintains its position, but continues to increase in favour notwithstanding the efforts to supplant it by rubbishy imitations. Observe our branded corks and capsules. Sold by Wine Merchants, and by THOMAS GRANT and SONS, Maidstone, and 46, Gresham-street, E.C. Makers of the delicious Morella Marmalade. Sold by Grocers.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

Ashford, Kent.—For new shop-front and repairs to 9, New Rents, for Mr. C. U. Savage. Mr. H. J. Jeffery, M.S.A., of Ashford, architect and surveyor. Quantities by the architect:—

Knock, H.	£390 0 0
Howland Bros.	329 0 0
Tournay and Son	308 5 0
Giles, Burden, and Giles (accepted)	300 0 0

All of Ashford.

Barnes, Surrey.—For erecting a mission-hall in Railway-street. Mr. W. H. A. Berry, A.R.I.B.A., 35, Bedford-row, W.C., architect. Quantities by Mr. J. Kennedy, 31, Great James-street, Bedford-row, W.C.:—

Adamson and Son, Putney	£900 0 0
Hill, J., Barnes	890 0 0
Sale, A.	786 0 0
Hunt, A.	733 0 0

Birmingham.—For the erection of thirty-six houses and cottages, for Mr. E. Riley, in the Chain-walk, Lozells Birmingham. Mr. T. G. Price, architect. Quantities by the architect:—

Williams, Aston	£5,330 0 0
Hughes, Handsworth	4,930 0 0
Hulbert, Handsworth	4,886 0 0
Bloore, Aston	4,881 0 0
Archer, Birmingham	4,850 0 0
Barker, Handsworth	4,831 0 0
Bamfield, Aston	4,775 0 0
Twigg, Birmingham	4,700 0 0
Pritchard, Handsworth	3,900 0 0
Johnson, Nechells	3,580 0 0
Hopkins, Aston (accepted)	3,470 0 0

Birmingham.—For the erection of two semi-detached houses in the Hampton-road, Birchfields. Mr. T. G. Price, Birmingham, architect:—

Hopkins, J., Birmingham (accepted)	£740 0 0

Builth.—For building a new farmhouse at Cwmwynthe near Builth, and alterations and additions to the Bank House, Builth. Mr. S. H. C. Coles, Rhayader, Radnorshire, architect:—

	A.	B.
Dore, G., Rhayader—	—	£430 0 0
Meredith, A., Newbridge-on-Wye—	£69 0 0	430 0 0
Jones, J. M., Builth (accepted)—	33 0 0	380 0 0
Price, H., Builth—	66 10 0	306 0 0

A.—Alterations, &c., to Bank House. B.—Cwmwynthe Farm.

Burnley, Lancs.—For new Congregational Sunday-school, Hollin Greave-road. Mr. C. Parsons, 9, Grimshawe-street, Burnley, architect. Quantities by the architect:—

Mason's work:—	
Smith and Bell	£1,608 13 3
Heap and Harrison	1,585 0 0
Hargreaves L. and J.	1,475 1 4
Parker, J. and A.	1,455 0 0
Nightingale, L.	1,326 0 0
Smith and Kippax*	1,275 0 0
Carpenter and joiner's work:—	
Smith, G., and Sons	525 5 0
Dean, R., and Sons*	490 0 0
Brown, R.	435 0 0
Plumber and glazier's work:—	
Smith, J.	143 18 6
Shoesmith, J.	121 10 0
Lang, J.	96 0 9
Owen and Co.*	92 0 0
Plasterer and painter's work:—	
Aspinall, W.	94 0 0
Watson, H.	83 19 6
Radcliffe, T.	83 0 0
Preston and Sons	79 0 0
Slater's work:—	
Stanworth, W.	120 0 0
Whittaker and Schofield	115 0 0
Pickles Bros., Leeds*	90 19 0

Rest of Burnley.
* Accepted.

Canterbury.—For iron roof, Greengrocery Market Canterbury. Mr. F. Baker, C.E., surveyor:—

Hodson	£426 10 0
Wiltshire (accepted)	395 0 0
Jukes and Co.	386 0 0
Roof only:—	
Rendle and Co.	359 10 0
Newton and Co.	356 0 0
Willey and Co.	345 0 0
Pocock	328 0 0
Goddard and Massay	320 0 0

Colne, Lancs.—For new Liberal club, lock-up, shops &c., New Market-street. Mr. C. Parsons, 9, Grimshawe street, Burnley, architect. Quantities by the architect:—

General tender:—	
Craven, T., Blackburn	£2,098 0 0
Mason:—	
Naylor, Padiham	1,320 0 0
Hargreaves, L. and J., Burnley	1,199 12 9½
Lancaster, P., Colne	1,100 0 0
Hawley, J., Colne *	1,040 0 0
Carpenter and joiner:—	
Riddiough and Co., Colne	670 0 0
Greenhow and Sugden, Keighley	560 0 0
Watson, I., Colne	556 0 0
Tomlinson, R., Keighley*	498 10 0
Plumber and glazier:—	
Carter, J. H., Keighley	174 13 4
Newbould, B., Keighley	172 10 0
Varley and Sons, Colne*	163 12 10
Binns, R., Colne	155 0 0
Shoesmith, J., Burnley	150 0 0
Plasterer and painter:—	
Hartley, J., Colne	71 0 0
(Nine tenders received.)	
Slater:—	
Whittaker and Schofield, Burnley	48 17 0
Stanworth, W., Burnley*	40 0 0

* Accepted.

Ealing.—For the erection of a house in the Hamilton-road, Ealing, for Mr. J. Lee Thomas. Mr. R. Willey, F.R.I.B.A., 66, Ludgate-hill, E.C., architect:—

Wye, T., Ealing (accepted)	£1,720 0 0

Eastbourne.—For the erection of rocket-apparatus house, for the Eastbourne corporation:—

Coster J., (accepted)	£104 0 0

THE BUILDING NEWS
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ARCHITECTURAL PRACTICE.

THE modern practice of the architect covers a wider and larger field than it did formerly. Take the career of a successful provincial architect. In many instances we find him to have had an aristocratic connection in the county, to have been employed by the leading landed gentry in the improvement of their seats or estates, and to have been the architect, at least, of nearly all the important residences and churches of the district. This class of practice naturally led to a general surveying practice, in connection with improvements of properties, drainage, and other matters. It was a convenient and comfortable kind of connection, with little to distract the mind, as there was always something doing. The class of practice to which this description refers has, to a large extent, ceased to exist. Forty years ago there were many of our leading architects who amassed respectable fortunes in it; but through the vicissitudes and misfortunes which have befallen many of the hereditary nobility, the extravagance of their descendants, many of the faults inherent in the old system of primogeniture, to say nothing of the fall in the value of land, and other social causes, the modern architect has very little to depend on from this source. The number of new mansions and large country residences is yearly falling off, and houses of a different class are required; the age of palatial residences has departed. A new class of building has taken their place. In the provincial centres the architect's business nowadays is mainly confined to residences for successful merchants and manufacturers, and to the construction of commercial and business premises; the higher class of practice is left only to a few. But his requirements are proportionately greater. A greater variety of tastes and businesses have to be consulted in the preparation of designs. In the Metropolis still more is this the case. The architect is now engaged for a number of purposes which formerly were not considered worthy of his attention or taste. Warehouses, breweries, and even such utilitarian structures as factories are seldom built without an architect, not to mention the varied new establishments that have sprung into existence.

In a single article it would be impossible to enter into all, or even a few, of the directions in which the architect is required to give his services; but there are three great divisions of an architect's practice which now call for his chief consideration. These relate to what may be shortly defined as Business, Construction, and Architecture. We place business first, because without it architectural practice cannot be said to exist; for pure architecture is simply an art, and may be taken up as any other study of art or branch of literature. We cannot divest the modern architect of business, for he undertakes not merely the design, but the carrying out of work with which he is intrusted. First as a business agent, then, we must look at him. Surveying so called, and the origin of the term is a little dubious, forms one of the main qualifications. The title of "surveyor" was doubtless originally applied to a superintendent or overseer, in which sense it was certainly used in all early documents. Thus, so early as the 11th century the term was applied to those engaged in superintending buildings and repairs. "Surveyor of the King's Works and Palaces" is a frequent entry in old accounts. We read of surveyors of land; of Inigo Jones having been appointed surveyor of works (1610) to King James I., of Sir C. Wren being appointed the surveyor-general of St. Paul's. The early signification of the term was that of overseer or superintendent; but at a later date the term is applied to measurers of land, and even to architects. Whatever the exact meaning conveyed by the title, the surveyor is supposed to be a man of practice—a business man. It means a great deal more now than formerly. Land surveying is only one branch of the business. Taking the sub-divisions of the profession as now given for the examinations held by the Surveyors' Institution, they are three: Land Agency, Valuation, and Building, in either of which special branches a candidate may qualify. Now, the architect ought in each of these sub-divisions to know enough for his practical requirements. In the improvement of farm buildings and landed estates, not only is land surveying required, but matters relating to drainage and agriculture are essential qualifications. As a valuer of property, the architect should doubtless know as much about building valuations as the expert valuer, if he wishes to become a successful practitioner in a provincial town. Then the laws of landlord and tenant, of fixtures, dilapidations, and easements, are of the utmost importance to anyone engaged in building operations. We know of architects who are almost ignorant of them—but this is a defect of their general education, and cannot remain much longer; for if an architect is never called to negotiate about questions of this kind, he should at least understand the rights and obligations of his clients and those around him. He cannot design with safety any house or business premises in town or country unless he knows something of law. In large towns—in London, for example—the architect must be an adept at meeting all kinds of official law and regulations to make things go smoothly. The client expects him to know the "ins" and "outs" of municipal and sanitary law, and to steer clear of those difficulties and expenses into which the unwary are so liable to be landed. Such, then, is the surveyor-ideal of practice. Negotiation on matters of business is one of the chief duties of the architect. It is as a negotiator that an architect succeeds in his profession, and we have never met with a successful practitioner who has not been a skilful negotiator. If we were asked what makes a good business man, we should say the art of negotiating. The surveyor is a man of figures, a good arithmetician, and it is this habit of mind that begets precision both in statement and in business habits. We have here one of the strongest grounds for advocating quantity-taking as a training for the young architect. Why art is so incompatible with the surveyor's qualifications is not a question to be discussed here; it belongs rather to the domain of psychology. All that we contend is that the artistic function is not injured by such training, but rather improved.

(2) In construction the modern architect is called upon to show his skill in ways far more varied than formerly. The mechanical principles of masonry and carpentry at one time comprised all his knowledge of construction. The word now means a great deal more. It extends to ironwork and various kinds of engineering construction. The engineering work of the architect alone necessitates now a course of instruction. Iron girders, simple and trussed, and iron roofing involve a special knowledge of construction that takes some time to master. We cannot in this space point to the innumerable matters which an architect is called upon to consider and arrange. But one of the most usual forms which it takes is the design and specification for any special class of iron construction—say the roofing and galleries of a hall or a theatre. The architect must be brought into communication with the engineer or manufacturer. It will not do to unburden his mind, and tell the manufacturer that he is perfectly ignorant of how to design; so he explains his wishes and ideas, and asks the manufacturer whether he will supply the needful drawings and specifications. The transaction is easy; the engineer takes all necessary particulars, and prepares a design for the ironwork, which no one questions is the architect's own. Contractors for ironwork are numerous, and competition is now so keen that many firms in the North and West will undertake to relieve the architect of all responsibility and trouble in the matter, and carry out the work for a certain sum agreed upon. The architect gives him *carte-blanche*, and is even prepared to alter his design to make it fit the work.

Though a convenient course, it is not the one which we recommend the architect to adopt. If ignorant of iron construction and details, he had better consult a competent engineer, in the first place, before preparing his working drawings, and afterwards adhere closely to his ideas, simply obtaining a tender for the work in the ordinary way. This is the proper, independent, and only business-like course. The contractor cannot take an unfair advantage of his position, although he might do in the former case, as designer and contractor in one. It leaves the architect free to adopt his own design, subject to the modification suggested by the expert in dealing with the loads or stresses, and architectural engineering has a better chance of being developed when the architect's suggestions are carried into effect. Sir Gilbert Scott's great station roof at the Midland Terminus is an example of this course of proceeding; the architect's general design was carried into successful completion by the engineers who aided him in that work. That the utmost importance exists, however, for the architect to be instructed in the mode of calculating stresses and determining the required sectional areas cannot be questioned. Without such knowledge he is largely at the mercy of the engineer, whose routine patterns are likely to be foisted upon him. In the construction of wrought-iron cantilevers for galleries in theatres, the architect is called upon to show his ingenuity and science. Unfortunately, the architect is too prone to hand over this kind of work to the contractor or expert without reservations, and it is here that those unhappy compromises are made which lead to the disfigurement of our edifices and the reproach of English architecture.

(3) In architecture proper little need be said; the architect is supposed to be master of the situation. Churches and houses have from early ages been the inalienable possession of the architect. As in construction, here also he should be able to assert his opinion in questions of arrangement and artistic design. But in these days of amateurs, ecclesiological societies, and Church Congresses it is very hard for an architect to insist upon his views being carried out with integrity. Even so eminent and skilled an ecclesiastical architect as the late Sir Gilbert Scott found the troublesome and opinionated amateur at his elbows. We know of one architect whose design for a country church was despoiled by the omission of the chancel, so obstinately did the incumbent refuse the traditional setting apart of the sanctuary from the people, though on the death of the incumbent a deep chancel was added to the church, and its design restored to its original intention. It is of little use for the designer of a church to discuss with the rector any question of proper ritual arrangement; if he does, he will probably not be the gainer; but it is necessary that he should be able to fortify his plans by an appeal to examples. The architect's learning on these questions should at least be equal to that of

his employers; he should be aware, too, of those differences in theology and modes of worship which express themselves in the architecture and plan. Nor ought it to be forgotten that the architect is indebted largely to the amateur and outsider; for it is remarkable that many of the greatest improvements and modifications in architecture have been thought of and suggested by the outsider, and have been subsequently appropriated by the profession or forced upon them. We have one forcible instance of this in the suggestion for a "Safety Theatre" by one of our most eminent actors, whose ideal plan, if carried out, would as much revolutionise the regulation theatre as the congregational mode of worship would transform the Anglican type of church arrangement.

NINETEENTH-CENTURY ART SOCIETY EXHIBITION.

THE autumn exhibition of pictures of this Society at the Conduit-street Galleries is full of amateur work, though a few of the old exhibitors of the gallery are to be noticed. H. Maurice Page paints broadly his Wargrave-on-Thames (2), a favoured spot for the artist. "Sunshine and Shadow" is a pleasing reminiscence of spring; the meadow and blossoms of tree, with the cottage, are somewhat stiff and mannered. George Jarvis's "Stream near Penzance" is pretty; the glade and rocky channel are painted with feeling. H. Franck, in his cottage interior with old woman seated by the fire (33), has very tenderly expressed in the face "Pleasant Recollections," and the drawing and colour are satisfactory. In landscape, "Near Shanklin," showing the chalk cliff, by G. A. Williams, and "The Dying Day," a quiet river valley, by Hamilton Marr, will be noticed for their truthful and genial qualities. M. S. Wallace has been less happy in the figure of "Dorothy," whose pretty face in large hat is the redeeming feature of a slender young lady with very diminutive hands and arms. Arthur Dodd in "A Stolen Heart," a dog running out of a butcher's shop with a heart, is a clever piece of satirical humour. "Teething" (29) is another work by the same hand. A rural cottage with a path winding round it to a hill, with a pond and ducks, in South Devon—is pretty; but the faded, low key of bluish-green spoils an otherwise good picture. A. Trevor Haddon's theory of sunlit greens is not happy, if this is an example. Will Anderson sends four subjects, all in his usual clear style, under an evening sky. "An Old Dove Cot" (52) and "Dolly's Ride" (111) are both agreeably solid and natural in tone. Charles J. De Lacy has succeeded in his sunlight effect on a murky-grey river scene, "Grimy Toilers of the Thames," though there is a little want of confidence in the handling. Charles Stuart's "Where Rocks Abound and Torrents Roar" (55), G. S. Walter's scene in Holland, and Robert Gallon's "On the Wye, near Chepstow" (70), an evening mist effect, are the best of a number of inferior landscapes. By far the best study of imaginative portraiture is J. de Steiger's picture, "The Princess Schahrazad Beginning her Story to the King Shahrizar." The attire of the beautiful princess in her long-flowing black hair, adorned by beaded necklaces and jewels, is not wanting in Oriental splendour, though the whole is in a subdued tone. The flesh shadows are, however, too brown and thick, and the handling rough and uncertain. Of other figure subjects, one is by T. K. Pelham (60), and "A Venetian Girl" (71), by W. Blackman, clever in its reflected light on the face. James Rick's "How Happy could I be with Either" is commonplace and exceedingly weak both in composition and colour. "Lady Maxse" (144), a full-length portrait in white dress, with light background, lacks relief. The best portrait is that of Fred. B. Fellows, of New York, painted by Herman Schmiechen, at the top of the room. W. Sidney Cooper's "Summer" (79) a cattle piece, in his usual soft chromo style, is better in its composition and drawing of cows, which are refreshing themselves by the side of the river. His study of "Cottages at Pangbourne" (67) is pleasing. An effective piece of impression is Edgar Wills's "Building the Haystack." Two other studies of coast scenery are sent by him, showing some vigorous handling and nice colour. Robert Morley's "Roses" is rich in tone, and carries away the palm for flower painting. A scholarly little Oriental study, "Biskra" (106), deserves attention for its figures and carving, by Philip Pavy; and Vincent P. Yglesias's deserted windmill, "Past Work," near it, is clever and sympathetic in its treatment. The colour and atmosphere in George E. Corner's "Early Autumn," a meadow scene, may be noticed in coming to the centre subject of the gallery—S. J. Barnes's "The Monarch of the Valley," an alpine peak painted with much power and technique. The snow-clad Alp rises from its valley seat of luxuriant vegetation, the colour and execution worthy of the subject. "Moonlight at Boulogne," by Vincent P. Yglesias (118); Arnold Helcke's open moor, "A Break in the Storm" (129), a cleverly manipulated street view, "Paris" (141), by W. Dauphine McLean; William Padgett's "Camp Fire" (157); "Sketches from Whitby," by Nevil O. Lupton, Hugh S. Shaw's "Disobedience," comprise nearly all the other pictures of remark, if we except the large canvas, "A Hard Chase," by Charles Jones, R.C.A.

The water-colour drawings contain a few examples of merit. We can only notice a few. Amongst the best of these is Henry Terry's "Study of a Child" (248), a little girl knitting a blue stocking—very simple and child-like study, in light dress and background. His old woman enjoying a cup of tea is equally true to nature. "Brentford," by Archibald Webb (253); "Iffley Mill," by W. Matthison; "Towing Path on the Severn," by John Sowden, (260); Fred Burgess's "Wimbledon Common" (291) are clever sketches, the latter for its admirable freshness, clear brushwork in the weeds and ferns, and unlaboured execution. "A Portrait Study: I Think it will do!"—a lady attired in black satin and jacket looking at a picture on the easel—is well drawn, the figure and expression good, and the accessories in keeping. One interesting architectural drawing, "The Doorway of the Church of Notre Dame, Caudebec" (300), by F. P. Barraud, is hung. The subject is a favourite one; the canopied portal and tabernacle work of the Flamboyant style are accurate in detail. By the same hand is a drawing of Tournai Cathedral, Belgium, a four-towered church of Rhenish character with transept and apse, a very interesting specimen. The view of "Lincoln" (369), hardly by the same hand, is, we presume, an early drawing by Mr. Barraud; the drawing is less steady and truthful. John Sowden sends two or three drawings of merit—"The Old Gloucester Hostelry" (374), an old timbered building of note, and "A Gloucester Farm" (358). S. D'Ouseley's "Coronation Chair, Westminster Abbey," and the Percy Shrine, Beverley Minster, by W. J. Boddy, are among other drawings of architectural interest. We may notice in commendation studies and sketches by Archibald Webb (245), Henry D. Shepherd (259), Richard H. Nibbs (312)—a clear, bright drawing—Howard S. Stormont (376), C. M. Dale (430), and K. Macaulay.

SOCIETY OF PAINTER-ETCHERS.

THE annual exhibition of etchings and studies in black and white at 160, New Bond-street, opens with a large collection of impressions, many of which are known to our readers. A society presided over by Mr. F. Seymour Haden, F.R.C.S., and having in its Council the most eminent painter-etchers cannot fail to represent the highest talent. The series of etchings by W. Sickert (2) are brilliant impressions of the Whistlerian kind, and full of expressive light and shadow. Alexis Forel, a well-known Parisian artist, contributes some charming works. His "Dans les Champs," already published, is full of sunlight and atmospheric effect; but there are other studies representing French views, picturesque, and not without that poetry of art which the etcher has it within his power to express. An effective view of "Dordrecht," by C. S. van Gravesande (14), has a great depth of tone. The thirteen illustrations to Bunyan's "Pilgrim's Progress" (19) are replete with life and character. Architectural subjects are frequent. "Durham," by Mrs. Harry Hine, is somewhat spoilt by the heavy shading and reflection of the foliage; the most pleasing examples of architecture being the etchings of Mr. Charles O. Murray. "The Fountain, Great Court, Trinity, Cambridge," is well known by the published prints by Dowdeswell. The "'Prentice Pillar, Roslyn Chapel," published by the Fine Art Society (73), is a very beautiful work of the needle, truthful in drawing and detail. The large view of "Durham Cathedral," now being published by Messrs. Dowdeswell (87), and the charming view of the west front of "Canterbury from Gateway," also published, and the "Chapel, Charterhouse," are among the impressions exhibited. For its depth and colour, "The Return from the Fair" (48), by Axel H. Haig, will be noticed. Charles J. Watson's "Whitefriars Bridge, Norwich"; Edward Slocombe's "Winter" (54), and Fred. Slocombe's "Avon at Warwick," especially the last, are admirable renderings. We prefer F. Slocombe's striking contrasts and drawing of leafless elms. David Law is represented by several landscapes; the architectural detail of the "Tower of Hereford" (65) is not very strong, but as pictures his views of "Chepstow Castle (59), of "Edinburgh" (81), "Warwick Castle," and "Windsor Castle" form an interesting series. A very charming little sketch, "A Sunny Day, Bisham-on-Thames" (78), by Wilfrid Ball, is full of poetic feeling and effect, and of exquisite finish. The effects of light and shadow are very telling in W. Sickert's series (88), and the Belgian series, by Richard Toovey (113-117), are admirable for softness and atmospheric effects.

Herbert Marshall's St. Giles's, Cripplegate, is a bold and vigorous impressson. "Trafalgar Square" (95), by Joseph Pennell; "Shot Towers," by Percy Thomas (101); and his "Thames Below Bridge," and R. Toovey's "Wapping" are charmingly delicate and brilliant productions. Ernest George, whose picturesque series of Continental streets is to be seen elsewhere in Bond-street, has here a very vigorous and sketchy subject, "Gondola Sheds, Venice" (138), and "The Rialto Steps" (157). John Finnie has also three very fine works (mezzotints) full of atmosphere, and resembling in their effects delicately-finished monochromes. The colour of the ink used and the paper have much to do with the effect and brilliancy of an etching, the warm toned tints produced by burnt sienna are generally more pleasing. Hugh Paton and William Strang also contribute some very striking etchings, and several mezzotints and aquatints are exhibited.

TRURO CATHEDRAL.

THE new cathedral at Truro, the first built in England since Wren erected that of St. Paul's, was consecrated yesterday (Thursday) in the presence of the Prince of Wales, the Archbishop of Canterbury, and many bishops. The cathedral is being built from the designs of Mr. John L. Pearson, R.A., which were

selected in a limited competition in August, 1878. The complete design was illustrated, together with a ground plan, in the BUILDING NEWS for May 14, 1880. The section now built, and consecrated yesterday, is the eastern portion, including the choir with its four aisles, the eastern transepts, the great transepts with their aisles, the baptistery, the lower part of the two eastern bays of nave, and the central tower, which just shows above the roofs at the crossing, where it is capped by a temporary conical roof. When complete the plan of the cathedral will comprise a nave and aisles of nine bays, with two western towers and spires, a large western porch, and a south porch; the great transept with its aisles, and a baptistery in the angle between the south transept aisle and the nave aisle; a large tower and spire over the crossing; the choir with an eastern transept opposite the altar, and one bay behind the altar forming a retrochoir; one choir aisle on the north side, and three on the south side of which the outermost is part of the old parish church; a small tower and spire, 135ft. high, at west end of this aisle abutting upon main south transept; and the vestries, which are obtained in a crypt below the choir. It is also proposed to form a cloister court to the north of the nave, and to erect an octagonal chapter-house on the east side of this court. The total length will be 300ft., with a width of about 76ft., the centre span between arcades in both choir and nave being 29ft. The height of the central spire when completed will be 220ft., and that of the western tower over 200ft., and height from pavement to centre of choir vaulting 70ft. In internal area Truro will, when finished, rank about twenty-second in size of English churches, being slightly smaller than Chichester, which contains, according to the useful table in Lord Grimthorpe's "Book on Building," 28,000sq.ft., or Lichfield, the area of which is 27,720ft. It will be, however, larger than Hereford (26,856sq.ft.), and of exactly the same internal height, or Ripon, Tewkesbury, Rochester, St. Nicholas, Yarmouth, or St. Michael's, Coventry.

The Late Perpendicular south aisle of St. Mary's parish church, which formerly occupied the site of the Cathedral, has been incorporated in the new building, and affords a marked contrast with the 13th-century work by Mr. Pearson, and moreover forms a valuable historical link with the past. Externally, this aisle is completely covered with ornament, built of a variety of granite which weathers badly. Internally, the work is very plain. The spaces below and between the windows are simply plastered; on the opposite side is a plain granite arcade, and the covering is a barrel-vaulted oak roof. Between this old aisle and the central portion of the choir is a second south aisle only 6ft. in width, with a wider one beyond, and to the north of the choir is a fourth aisle. The retention of the old work not only preserved unaltered some peculiarities of planning, but also exercised a great influence upon the design of the whole church. The spacing of piers for the old aisle has determined the width of the bays of the choir, as the piers of the new building all across the choir line with these old piers, and the old bays being all of different widths, no two bays of the new are exactly alike. With one exception, however, these variations are not noticeable, but in this one case the bay is so much wider than the others that in the clerestory of the choir a narrow arch has been inserted on each side between the window and the adjoining buttresses. The old aisle will have an altar placed in it, and will become the parish church. At the east end of the narrow south aisle is placed a flight of steps, which descends to the vestries placed in the crypt under the choir, and this narrow aisle will also be utilised as an ambulatory path for processions of clergy and choir. The narrow aisle rises three steps above the ambulatory, and the choir itself is again five steps above this. The steady ascent from the outer south wall to the centre of the church has a grand effect.

When the building was begun a desire was expressed to use, as far as possible, local stone in its erection. It may be remembered that a correspondence was carried on in our columns on the comparative value of granite elvans and Bath stone. Specimens were procured from a number of Cornish quarries, but it was decided that Cornwall did not produce a freestone worthy of use in such a building. The stones finally selected for external use were a greyish-brown granite from Penryn for the ashlar face and Bath stone for the dressings. Internally, the ashlaring is of St. Stephen's granite; the freestone originally selected was Doulting, but the supply of this stone being uneven in quality, Bath stone was substituted for it for the whole of the dressings inside and without, including the massive columns; nearly all this material has been supplied by Messrs. Randell, Saunders, and Co., Limited, from their quarries near Corsham. For thin shafts among the clustered columns a slaty blue stone from Polyphant has been largely used. Another stone of a brownish-grey hue from Duporth has been less freely introduced, and in other cases the shafts have been formed of the brown Ham-hill stone or the yellow stone of Northampton, and in one place of porphyry. The vaulting throughout the completed portion of the cathedral is simply quadripartite, without a ridge rib or bosses of any kind, but the ribs are decorated with dog-tooth mouldings. The windows to aisles and clerestories are long, grouped lancets, with rich mouldings. The great transepts have large rose or wheel windows above three detached lancets, and they are differently treated; a similar diversity in design is seen in the fenestration of the eastern or lesser transepts, although each of these consists of a rose above four equal lancets. The capitals of the columns exhibit over 100 varieties of treatment; indeed, there is proportionately almost as much variety of design in the cathedral as in Mr. Street's Law Courts. The south transept has been built as a memorial to the first bishop of the see, Dr. Benson, now Archbishop of Canterbury. In this transept have been placed some Jacobean and other monuments from the old church. At the south-western angle of the completed building at the end of the two bays of the future nave is a circular baptistery, open to the aisles on two sides, having a domical vault carried on from detached piers, and from others tied on to the external walls; this baptistery, which is lined with various marbles, and paved with marble mosaics, is a memorial to Henry Martyn, a Cornish missionary.

A separate fund has been raised by the women of Cornwall to provide for the internal fittings and decoration of the cathedral, including the stained glass and the marble floor, and nearly the whole of the furniture is now in position. The reredos is Early Perpendicular in style, and is divided into three bays, and has as its central subject the "Crucifixion," with a vesica containing a representation of "Our Lord in Glory"; the material is Bath stone, and Mr. Hitch is the sculptor. The side panels will also illustrate scenes in our Lord's Life; but are not yet undertaken. The altar has been painted by Mr. J. R. Clayton; and besides the frontals and the linen, the cross, vases, and candlesticks, there are four new sets of Communion-plate; one is of solid gold, ornamented with *repoussé* work, two others are of silver gilt and jewelled, the fourth contains a remarkable chalice. This has been entirely made up out of jewellery presented for the purpose. The body is of gold, round the bowl is a band of ringstones in their original setting, on the foot is a pearl cross, and the whole is richly decorated with precious stones. Mr. Hart designed this cup, and most of the other plate has been made by his firm (Messrs. Hart, Son, Peard, and Co.), from Mr. Pearson's designs; but the altar cross in silver gilt, studded with jewels and with embossed figures on the four limbs, is, as we mentioned last week, the work of Messrs. Cox, Sons, Buckley, and Co., who have also executed the festal frontal and other hangings. The upholstery work throughout has been executed by Messrs. Criddle and Smith, of Truro.

The side screens of the choir are of light hammered iron. The stalls are of teak and in the Perpendicular style. There are no return stalls, nor at present any canopies over the stalls, though the lower part of the vaulting shafts has been cut away in the usual manner to provide for them. The Bishop's throne is made in Burmese teak, and has a bishop's seat in centre, and chaplain's seats on either side. Beneath the book front in the centre are three canopied and crocketed niches in which are placed figures of the present Archbishop of Canterbury and the Bishops of London and Truro (Drs. Benson, Temple, and Wilkinson), each sculptured out of the solid. On the divisional ends of the book-fronts are figures of the Four Doctors of the Church. The seats are misereres, and are divided into stalls, while above each is a carved and groined canopy, the bishop's being supported by clustered columns. The work has been executed by Messrs. E. L. Luscombe and Son, of Exeter. The organ is placed over the north aisle, and is at present unprovided with an organ case. The pulpit is circular, overhanging a square base. Its principal adornment consists in six figures seated under canopies, sculptured by Mr. T. Nicholls in Hopton Wood stone. The steps in the choir are of pavonazzetto and Frosterley marble; the floor itself is mosaic, with Egyptian porphyry, green African and other marbles laid in circles, and circular scrolls upon a groundwork of buff Jura marble. Outside the choir the floor is composed of minute pieces of marble laid in concrete; simple patterns in red and green are formed in each bay upon a ground which is almost white. There is a good deal of stained glass by Messrs. Clayton and Bell. The three great lancets in two tiers at the east end are filled with glass of a very blue tone, but the lower tier is almost entirely hidden by the reredos. The principal subject over the altar is Our Lord in Glory. In the two great roses in the transepts are a Jesse tree and the Twelve Apostles. The baptistery windows are also filled with painted glass, and those at the end of the choir aisles; and there is some old stained glass in St. Mary's aisle.

The actual cost of the fabric has been £74,000, but the purchase of the site, legal, and other expenses, have raised the total expenditure of the committee thus far to £95,000, besides £15,000 received for and spent upon fittings. Of the entire outlay of £110,000, about £8,000 has yet to be raised. In the earlier stages of the work, the late Mr. James Bubb acted both as clerk of works and builder; but when the crypt was finished, and the responsibilities grew too great for one man's shoulders to bear, Messrs. John Shillitoe and Son, of Bury St. Edmund's, were appointed builders. On Mr. Bubb's sudden death in May, 1882, Mr. Robert Swain, who had also long been with Mr. Pearson, succeeded him as clerk of works, and in that capacity has shown the deepest interest in the progress of the work, one of his most recent proofs of which is his successful personal appeal in the columns of the daily and professional press for funds to enable the central tower to be carried above the roof-lines.

INFLUENCE OF THE PRE-RAPHAELITE SCHOOL ON BRITISH ART.

A LECTURE on this subject was delivered at the Royal Institution, Manchester, on Friday, by Professor Baldwin Brown, who said the question "What have the pre-Raphaelites done for British painting?" would confront every future historian and critic. Any attempt to find an answer would be based in a large measure on the results of the Exhibitions held in the city of Manchester in 1857 and 1887. On the first of these occasions there was displayed not only a magnificent series of ancient masterpieces such as no other land could boast, but also a representative collection of our national art, covering the first two great periods of its history, the periods dominated by the names of Reynolds and Turner. At present there was exhibited on the walls at Old Trafford the painting of the Victorian era, displayed in a nearly complete series of standard works in all branches of the art. The period covered by the present Exhibition was, from the point of view of the history of painting, an artificial one, as the commencement of the present reign did not mark any natural division in the annals of our art. The year 1850 would probably be the best point of division between the old and the new art, and would mark fairly well the era at which the style of painting most prominent here in 1887 began to show its difference from that prevailing in the earlier collection of thirty years ago. The secret of the difference would be found in the words "tradition" and "naturalism." In the earlier period the power over our art of artistic tradition was very great; in the present epoch tradition could hardly be said to exercise any influence at all, and "independence" was the motto of the school. The productions of the older generation of painters

contained a certain power of generalisation, a certain "style" which they borrowed from the traditions of the past. All must have been struck with the independence of the modern works of art. They were independent one of another, and independent of the past. In their company the student of art history found himself in a brand-new artistic world which had little or no concern with what had gone before. On every side they saw fresh efforts in new directions, combined with a frank disregard of what was once artistic orthodoxy. The pre-Raphaelite movement coincided in time with the epoch of this transformation in the character of our art, and was a movement possessing no little force and persistence, and capable of exercising a marked influence in its time. It would, however, be rash to conclude that British art since 1850 had been made what it was by reason of pre-Raphaelitism. The naturalistic movement of the last 40 or 50 years was a wide-reaching movement, and had in different measures influenced all European schools alike. It was a significant fact, and explained much in the pre-Raphaelite movement, that it was not purely artistic, but was in a large measure a literary movement. The works of members of the school in very many cases were graphic illustrations of some theme which had presented itself to the painter's mind as an intellectual product, a thought which could be conveyed in words as well as through the medium of graphic design. There was so much symbolism in the accessories in pre-Raphaelite pictures; so many details were introduced which had a recondite connection one with another; they had so much work to do in hunting out and appreciating the different subtle relations of this to that, that they lost the artistic impression of the work as a whole. The pre-Raphaelite school had influenced to a marked extent the landscape painting of our time, for the painters of the modern school, whose work in landscape came home to us with sympathetic charm, were the men who had played with Nature as with a familiar friend, till they had learned her every mood. These men gave us what we really needed from art, the more remote and general truth. Combining style and poetical conception with an intimate study of natural forms, they had enriched the world with a series of master works, and in so doing had enlarged our view and deepened our knowledge both of art and nature. Compared with their massive and serious productions, the works of our modern landscapists seemed but slight studies, wanting both in artistic breadth and in idea. Under the inspirations of the pre-Raphaelites, and partly of Mr. Ruskin, an immense amount of careful foreground work and of conscientious rendering of somewhat insipid themes had been accomplished in landscape without the production as yet of any result of lasting value. Such studies had undoubted freshness and charm; but it needed something more to make a great picture. The art of 1887 differed from the art of 1857 and the half century previous in its striking naturalism and its independence of all tradition. In this difference there was involved a conflict of artistic principles. On the one side there was the principle of pre-Raphaelite realism, and on the other the view of art in its relation to nature which could be gathered from the practice and also from the letters and conversations of artists like Constable and Jean François Millet. They might assure themselves that there must be truth on both sides. If the work of the pre-Raphaelites, like the work of modern naturalists as a whole, was to be regarded as marking a genuine effort in the direction of good art rather than as a result in which to remain satisfied, they were not denying that in its time it performed valuable service. The need for some movement of the kind was urgent. Though the older art had great merits, it also had characteristic shortcomings, and about 1850 these were decidedly gaining the upper hand. The masters of the first rank in that period — Flaxman, Constable, Wilkie, Turner — passed away in the order named between 1826 and 1852. The painters of the second rank, too numerous to mention, but of whom David Cox might be taken as a representative, with all their varied excellences had a common defect — they tended towards mannerisms of various kinds. Below these genuine masters again there gathered a crowd of spiritless imitators, and finally came the connoisseurs, critics, and dealers who patronised their style of art. At the present time, whatever might be the shortcomings of our art, we had entirely banished from our walls and exhibitions both these spurious old masters, and also the miserable modern canvases, varnished to the colour of an old Cremona fiddle, which used to be turned out in imitation thereof. We had also succeeded to a great extent in banishing "mannerism" from the catalogue of our artistic sins. Whatever else our artists may be they were fresh, vigorous, independent, lovers of novelty, and unhampered by academic tradition. For this wholesome change we were in a substantial measure indebted to the pre-Raphaelites. They had not the work alone. We owed much, for example, to the principles followed with such brilliant success by the painters of Scotland. But beyond the service they rendered at the moment, or any actual achievement of which they were capable, there remained as their permanent contribution to the life of the Victorian age the noble unselfishness of their lives and their steadfast devotion, through good and evil report, to the work they believed themselves commissioned to perform.

"BUILDING NEWS" DESIGNING CLUB, 1887-8.

THE following are the rules of the club for the present session, giving exact particulars of all that is to be observed by members, it being clearly understood that the club is open to all readers of the BUILDING NEWS. The first list of subjects follows here, and others will be published on the first Friday of each month. Correspondents are requested to look for all notices intended for members of the club under the heading of Answers to Correspondents; and we cannot undertake to reply by letter to any questions respecting the competitions.

FIRST LIST OF SUBJECTS.

A.—A detached villa residence, to cost £1,500, standing on a right-angle corner-plot of land, having a frontage of 45ft. and a depth of 150ft., situated in a suburban road, the building to be set back from the main road 18ft. There are to be no windows in the wall overlooking the adjoining site. The tradesman's door is to be from the front which faces the side roadway. The basement is to comprise wine, coal, and wood cellars, with a place for a safe and beer besides. The ground floor is to provide a roomy hall entered from an open porch, a dining-room 19ft. by 14ft. 6in., a drawing-room 20ft. by 16ft., a cloak-room out of hall, a kitchen of suitable size, with a scullery to match; also a larder and pantry, and a china closet, all having an external light. A servants' w.c. and dust-bin are to be reached from an open yard, which is to have a door in the wall of the inclosure opening into the garden. The first and second floors are to furnish, besides a bath-room and w.c. on first floor, seven bedrooms and box-room. The w.c. to have a ventilated lobby, and the staircase is to be screened from the front door, so as to be out of view on entering the house. The style chosen is to be suitable for execution in red brick and stone, sparingly used; roofs to be covered with tiles. The drawings are to be drawn to the scale of $\frac{1}{8}$th of an inch, and are to include a plan of each floor, an elevation of the front, a cross section, and a view of the house.

B.—A suite of furniture in oak suitable for the dining-room of such a house as is described in the last subject. The suite to consist of a buffet or sideboard 4ft. 3in. long and 5ft. to its highest part, a draw-out dining table on four legs, an armchair, an ordinary chair, and a dinner waggon. Designs to be drawn to inch scale, with a sketch of the buffet in perspective.

RULES OF COMPETITION.

1. Drawings to be sent in twenty-eight days after the publication of the list of subjects.

2. Usually two subjects will be given every month, from which a competitor may choose.

3. The drawings to be executed in firm black lines on white drawing-paper, in sheets of the absolute size of 22in. by 14in., with no marks or tinting in colour whatever. Outline to be the first consideration; but drawings may be slightly shaded with shadows executed wholly in line suitable for photo-lithography, or they may be outlined in brown indelible ink, and worked with sepia, taking care to keep the effect bright, so that good reproductions may be obtained by the photo-tint process. Sectional parts in either case to be shown in ruled hatching or blacked in. The scale used to be drawn with each subject.

4. Drawings to be forwarded unmounted, by post, care being taken to roll the short way of the drawing, as packages over 18in. long are not transmissible through the Book Post.

5. On entering the class (which may be done at any time) each competitor is required to furnish his name and address, which must be written legibly on the back of each drawing, as a guarantee of good faith, the *nom de plume* the author intends to adopt being boldly marked on the front of each separate drawing.

6. Prizes of £10 10s., £5 5s., and £3 3s. will be awarded to the best series of designs, such series not to consist of less than eight subjects. Our decision to be final.

7. Before awarding the prizes, any contributor will be expected to furnish proof, if necessary, as to his age, and the time during which he has been engaged in professional pursuits, though no candidate need be strictly an architectural student.

8. We reserve the right of arranging the drawings for publication in any manner we deem necessary.

9. A brief critical notice of the designs sent in of each series will be given, with illustrations of some of the chosen plans, in an early issue following the receipt of the drawings.

A DRAUGHTSMEN'S PROVIDENT FUND.

DURING the past few weeks a correspondence has been carried on in our columns pointing out the advisability of starting a Draughtsmen's Provident Fund, and to-day we publish a letter convening a general meeting of architects' assistants to talk over the matter on the 18th inst. in St. James's Hall, Piccadilly. About the issue of this meeting there should be little doubt. Next to the quill-driving clerks, the ordinary draughtsmen, whether employed in architects' or engineers' offices, are the worst paid and the hardest worked men in the kingdom, and anything which would tend to improve their position should have the heartiest support of all. Care will have to be taken that the subscription imposed should not be a heavy one, although, at the same time, it must be sufficient to meet the claims upon the fund and the working expenses of its management. In most similar benevolent societies there is, in addition to the subscriptions of the members, a considerable income from the subscriptions and donations of honorary members, and it is to be hoped that many an architect, remembering the struggle against sickness and poverty which he had in his younger days, may be induced to give an annual something in aid of those now passing through a similar period of trial. By the aid of these donations the scope of usefulness of the Fund could soon be enlarged. At first, perhaps, little more could be done than the payment of doctors' fees in the cases of subscribers who might fall ill during the coming winter, either from insufficient food and clothing (evils necessarily incident to small salaries), or from long hours of labour over the drawing-board. Later on, as the spring advanced and funds became more assured, a cottage might be rented by the seaside to which convalescents might be sent free of charge, and healthy assistants admitted for the short period of their annual holiday on a scale of charges proportional to their small incomes. Properly managed, it would probably be found that the cost of the cottage could thus be almost met, while those who availed themselves of it would find the expense of their holiday curtailed to a considerable extent. This system, once found to answer, could readily be extended in after years, both by the addition of other cottages in architecturally interesting parts of the country, and by the growth of some into convalescent homes. The cottages being almost self-supporting, other outlets for the useful expenditure of the fund would have to be found. The administrative committee, of whomsoever it may eventually consist, must always remember that the money placed in their hands is not to be laid by, but to be used; and that, so long as a

sufficient balance is in hand to meet contingencies, it will be their duty to see that any surplus is profitably expended for the benefit of subscribers to the fund. Probably by the time that such a surplus existed it would be found that some of the original subscribers had, through illness or misfortune, come to require monetary aid. Some of these could be pensioned, while presentations could be bought to some of the larger orphanages to which the children of others could be sent. By extensions of this kind useful employment could always be found for surplus funds, and the original subscribers constantly benefited, for it would naturally follow, upon a pension or presentation falling vacant, that the candidate who had longest been a subscriber to the funds would, other things being equal, stand the greatest chance of election. The advantages to be derived from a provident society are thus evident, and it is to be hoped that assistants will show their appreciation of them by attending in good numbers at the coming meeting, and entering into the matter in a thoroughly practical and business-like manner.

A "SAFETY THEATRE."

SOME days ago a suggestion appeared in our contemporary, the *Daily Telegraph*, for a theatre planned on safety principles, the idea emanating from Mr. Henry Irving, the well-known actor. A plan and section, worked out upon this principle, by Mr. Alfred Darbyshire, architect, of Manchester, accompanied the suggestions, the chief feature of which is the complete isolation of the site, a condition that is almost practically impossible in London, and very seldom to be found in those situations where theatres are built. The complete isolation appears to be an indispensable principle of this plan, Mr. Irving proposing that when such a site cannot be obtained, the theatre should be reduced in area so as to secure carriage ways all round, in addition to external balconies to be used by occupants of the dress and upper circles in case of panic. The structure further is proposed to be only one story high, the top "gallery" is abolished, while the only gallery permitted will be arranged on curved or segmental lines. The farther and upper part is only 24ft. high, being appropriated to the upper circle, and the lower the dress circle. These are reached by four straight staircases directly leading into the street at one end. The ground floor entrances and exits are short and straight, and the entrances are placed along one side, and the exits in corresponding positions on the opposite side, the mass of the audience being confined to the ground floor. The auditorium shown in plan measures 90ft. 8in. in length and 68ft. in width; the walls, instead of being curved in the usual form are rectangular, and run through the stage, which is 68ft. wide and 50ft. in depth, with the green-rooms and property-rooms and entrances at the sides. Between the main entrances to stall, pit, and gallery at the sides are the conveniences and pay-offices for the different sections, and at the front end of auditorium is a central exit from pit and stalls, with saloons on each side. As the entrances and exits from each portion of the auditorium are on opposite sides, the entrances can be turned into exits after the performances, thereby the exits are doubled. These are desirable points; but their directness and position would create draughts that we hardly think any automatic arrangement of closing-doors would obviate. The plan, it will be seen, completely sets aside the traditional horse-shoe plan of the auditorium, and only two boxes are provided. The result of the arrangement may be questioned from the acoustical point of view; in fact, we doubt very much whether the angles would not reflect the sound and create echo. The splayed sides of orchestra somewhat compensate for absence of boxes, and the domical and coved ceiling-landing down to proscenium would no doubt help the sound by confining it at the right point. The main objection to the plan is that the area of a theatre must be greatly increased. We will simply add: Mr. Irving proposes hot air introduced through flues for warming; the electric light as an illuminant; a curtain of asbestos instead of baize working in iron grooves, and a smoke shaft over the stage to allow the smoke to escape in case of a fire. These are useful, but not new suggestions.

At the Liverpool Architectural Society, Mr. Edmund Kirby, A.R.I.B.A., referred to Mr. Irving's ideal plan in his opening address, in which he spoke of the requirements for a safe theatre, and recalled many points and the want of administrative powers, a question to which we lately referred in a special article. Mr. Kirby pointed out that the plan suggested by Mr. Irving incorporates many of the ideas which have been made familiar since the late Exeter calamity. But the difficulty in the way of introducing a new plan is almost insurmountable. Theatrical managers and proprietors are at present much handicapped, and it is not very probable that large areas are likely to be acquired for theatres in crowded towns, the only places where they are likely to be attended. The architect receiving instructions for the planning of a new theatre would, as Mr. Kirby says, be required to cram as many people as he can on the building at the lowest cost. The demands for increased safety, more numerous exits and appliances, will certainly have the effect of checking theatre building for the present.

CHIPS.

The parish church of Kinnerley was reopened on the 20th ult., after restoration from plans by Messrs. Oswell and Smith, of Shrewsbury. Messrs. W. H. Thomas and Co., of Oswestry, were the builders. The work included re-flooring with wood blocks, encaustic tiles being laid in the passages, and re-seating in pitch pine.

New printing works have just been built for Messrs. E. S. and A. Robinson, of Bristol, opposite the National Schools in East-street, Bedminster. They are built of red brick, with terracotta dressings, are one story in height, and cover an area of 240ft. by 120ft. Mr. H. Crisp, of Bristol, was the architect, Messrs. J. Wilkins and Sons the builders, and the heating is by an overhead system of high-pressure steam pipes, carried out by Messrs. R. Dawson and Co., of Stalybridge.

The ratepayers of Bermondsey and Rotherhithe have decided by large majorities in favour of adopting the provision of the Free Libraries Act.

A dedication service was held at Warrington on Friday on the occasion of the opening of a new chapel that has been built for the joint use of the Warrington Training College and the Clergy Daughters' Institution. The building has been erected at a cost of £1,400. Mr. Gibson, Warrington, is the builder, and Mr. Adams, Warrington the architect. It is in the Gothic style, and will accommodate about 200 persons.

Alderman Jones, J.P., of Cardiff, died on Wednesday week, aged 66 years. He was for many years in business in the town as a builder and contractor, and in 1854 laid down the first system of sewers for Cardiff from plans by Sir John Hawkshaw. In 1874 he served as Mayor, and had, at the time of his death for 27 years been a member of the corporation.

A new Wesleyan chapel was opened last week at Heveningham, near Yoxford, Suffolk. It seats 110 persons, is Gothic in style, and built of brickwork. Messrs. R. Gibbs and Son, of Peasenhall, were the builders.

A brass has been placed in Limerick Cathedral to commemorate the late Rev. Joseph Gabbett, chancellor of the cathedral, his wife, and daughter. Mr. J. Vardy, of Wyle-cop, Shrewsbury, carried out the work.

The restoration of the parish church of Coombe-in-Teignhead, near Newton Abbot, was begun last week. Mr. R. Medley Fulford, of Exeter, is the architect, and Mr. Hugh Mills, of the same city, the builder. The 15th-century rood screen is being restored by Mr. Henry Hems, of Exeter.

The Theatre Royal, Wolverhampton, was reopened last week. The internal alterations include the auditorium having been re-painted and decorated by Messrs. Whittaker, Blackburn, reupholstered, furnished, and carpeted by Messrs. T. Edwards and Sons, Wolverhampton; a new stage laid by Messrs. Bradney, Wolverhampton; with the flash system of lighting applied, and a new act-drop, specially painted by Mr. Harry Mapleson.

The directors of the Lancashire and Yorkshire Railway have accepted the estimate of Mr. T. W. Helliwell, of Brighouse, to execute the whole of the zinc roofing and glazing on their intended new station at Rochdale, on his patent system of glazing without putty, and zinc roofing without external fastenings or solder. The total area is about 81,000 superficial feet of glazing, and 28,800 superficial feet of zinc.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

CAMBRIDGE ANTIQUARIAN SOCIETY.—At the meeting of this society, held on Monday night at the University Museum of Archæology, the new president, Professor Alexander MacAlister, M.D., delivered an inaugural address, in which he pointed out that the special function of a local society like theirs was to deal particularly with all that concerned the history of the Eastern counties. He referred to the physical condition under which the former race lived in that part of the country, and especially in the fen lands, and the effects of their habits of life upon the structure of their bodies and limbs. The professor subsequently showed the desirability of collecting all the ancient remains that were found from time to time of the ancient inhabitants of the district, and the importance of having such collection in a central museum such as that of the University, remarking that in that museum they had now the best collection of South English skulls.

LIVERPOOL ARCHITECTURAL SOCIETY.—The opening meeting of the thirty-ninth session of this society was held on Monday evening in the Royal Institution. The president, Mr. Edward Kirby, A.R.I.B.A., delivered an inaugural address, in which he spoke in favour of the registration of architects, and passed on to consider fires in theatres and the many suggestions—inclined planes for exits, fireproof construction, better ventilation, wire gauze or iron curtains, water sprinklers, and other expedients—that had been made since the Exeter disaster to prevent similar losses of life. In the subsequent discussion Mr. G. E. Grayson said it was of the utmost importance that special care should be taken by architects in the arrangement of exits for all public buildings. Mr. Thomas Cook expressed the opinion in regard to most places of worship and schools, that in case of panic it would be almost impossible for the congregation or scholars to get out, as the doors opened inwards. Mr. J. M. Hay was afraid that few public buildings were properly arranged for such a contingency. He suggested that there should be in cities like Liverpool a committee of architects to inspect public buildings. Mr. H. B. Bare thought the danger was that in consequence of recent panics legislative enactments might be made so severe as to make the erection of public buildings extremely difficult and expensive. Mr. A. White mentioned that in one theatre he had visited the curtain was fireproof, and there was printed upon it in large letters an announcement to that effect, and it was lowered between each act. If they could allay the fears of the audience in the event of fires there would be little risk of catastrophes. Mr. C. Aldridge said the great question was how to appease a panic immediately it arose.

MANCHESTER.—The Manchester Architectural Association held its first meeting of the Session 1887-8 on Tuesday, when there was a large attendance of the members. There were several new members nominated, and the secretary handed in a large number of books which had been received for the library. The president, Mr. Davies Colley, presented the prizes (amid applause) to the successful students in the classes of design and construction (Messrs. Ernest Farrar, A. S. Chadwick, and R. Booth). Mr. Mould, the hon. sec., announced that Mr. John Slater, B.A., the president of the London Association, had consented to read a paper on Nov. 29th on "Modern Architectural Education." The hon. sec. also read a number of communications, among them being one from the R.I.B.A., dated Oct. 12th (which was received with applause) thanking the Association "for the excellent step taken" of forming a reading class for the examination in architecture, and stating that in consequence the Royal Institute had decided to hold the Examination in Manchester next February. These preliminaries disposed of, the president delivered the opening address of the Session, which was of great interest (we shall publish an abstract next week), and touched upon a number of topics of general concern. A vote of thanks was moved by Mr. L. Booth (ex-president), seconded by Mr. T. Chadwick, supported by Messrs. Woodhouse, Perry, Mee, Mould, and Maybury, and eventually passed with enthusiasm.

CONTENTS.

Architectural Practice... 677
Nineteenth-Century Art Society Exhibition 678
Society of Painter-Etchers... 678
Truro Cathedral 678
Influence of the Pre-Raphaelite School on British Art 679
BUILDING NEWS Designing Club 680
A Draughtsmen's Provident Fund 680
A "Safety Theatre," 681
Architectural and Archæological Societies 681
Our Lithographic Illustrations 682
Capital and Counties Branch Bank, Landport 682
New Premises, Enderby, near Leicester, for the Enderby Co-operative Society 682
Wayside Notes 703
Building Intelligence 703
Engineering Notes... 704
Correspondence 704
Intercommunication 707
Legal Intelligence... 707
Water Supply and Sanitary Matters 707
Our Office Table 708
Meetings for the Ensuing Week 709
Tenders 709

ILLUSTRATIONS.

WESLEYAN CHAPEL, HINDE-STREET, OXFORD-STREET, W.—MANSIONS IN GROSVENOR-SQUARE.—PARISH BUILDINGS, ST. GILES, OXFORD.—DINING-ROOM, DINORBEN COURT.—HARTWOOD ASYLUM, GLASGOW.—TOMB OF THE TORRIANI, VERONA.—BANK AT LANDPORT.—CO-OPERATIVE PREMISES, ENDERBY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

HINDE-STREET WESLEYAN CHAPEL, W.

THE appearance of the exterior will be seen at once from the perspective view. The Classic, in preference to the Gothic, style of architecture has been adopted, as being better adapted to the requirements of the trustees, and more in harmony with existing buildings in the neighbourhood. The front in Hinde-street and the side in Thayer-street are of stone. The central portico, consisting of Doric columns for the lower story and fluted Corinthian columns above, is finished by an ornamental pediment. At the west corner a tower and steeple rise to the height of 100ft. Access to the body of the chapel is gained from the central portico, and to the galleries by two separate entrances, right and left, with stone staircases. The internal length is 64ft., and the breadth 56ft., providing ample accommodation for 455 people on the ground floor and 347 in the galleries, which are on three sides, making a total of 802 sittings. Heating is on Grundy's hot-water combined with hot-air system, and abundant and effective ventilation without draughts will be secured by double-hung sashes, and vertical flues as fresh air inlets. Gas fumes and vitiated air will be carried off by tubes in the ceiling, and constant exit ventilation is provided by shafts carried above the roof, capped with extracting ventilators. At the rear of the chapel is the chapel house, with a frontage of 32ft., and a spacious entrance in Thayer-street. In the basement are two classrooms—a large, airy, and well-lighted infants' classroom with double arrangement of galleries—and a kitchen well fitted with all the usual appliances. These rooms are approached from the main schoolroom and from the street. On the ground floor are the minister's vestry, and lavatory and three classrooms. On the first floor, overlooking Thayer-street, is a large room, which may be termed the "church parlour" or reception room, and which it is intended to have well furnished, with special reference to the meetings of ladies and young people. It measures 31ft. by 15ft. On the same floor is a ladies' retiring room, with lavatory attached. On the third and upper floors are additional classrooms and chapel-keeper's room. The architect is Mr. James Weir, F.R.I.B.A., 9, Victoria Chambers, Westminster; the builder, Mr. James Holloway, of Lavender-hill; the clerk of works, Mr. Girling. The stonework was supplied by Messrs. Pictor and Son. The ironwork was by Messrs. Steven Bros., of 4, Upper Thames-street, E.C. Hinde-street Chapel, erected in 1810, is one of the oldest Methodist sanctuaries of London. As early as 1761 a little company of believers was found in the neighbourhood of Grosvenor-square, to whom towards the close of that year Mr. Wesley paid a visit.

MANSIONS IN GROSVENOR-SQUARE.

THIS illustration furnishes a general view of the works carried out in rebuilding the corner of Grosvenor-square and Upper Grosvenor-street, from the designs of Mr. W. H. Powell, the architect. Messrs. Patman and Fotheringham built the main structure, and Messrs. Longmire and Burge are finishing a considerable portion of the work. The walls are faced with red bricks, enriched by red rubbers. The clerk of works is Mr. Walter Mitchell. A view of the entrance and loggia to the house in Upper Grosvenor-street was given in our issue of Sept. 16th last.

ST. GILES'S PARISH BUILDINGS, OXFORD.

THE first portion of these buildings, consisting of the large room, has recently been erected in the Woodstock-road, Oxford, closely adjoining St. Giles's Church, to provide a good room for the usual meetings, classes, concerts, &c., associated with church work. It is built of red brick, with freestone dressings and tiled roof, and has a pleasing, picturesque appearance. Messrs. Colston and Plumridge, of Oxford, were the builders, and Mr. H. Wilkinson Moore the architect.

DINING ROOM, DINORBEN COURT.

WE reproduce this week another of our series of drawings hung at the recent Royal Academy Exhibition. This is a perspective sketch of the end of the dining room at Dinorben Court, Hants. The wood framing has been executed in polished chestnut with walnut panels: the contrast thus obtained has a very satisfactory effect. The contractor, Mr. Watson, of Ascot, has carried out the work from designs and under the superintendence of Messrs. Charles Smith and Son, architects, of Reading.

ASYLUM AT HARTWOOD.

MESSRS. CAMPBELL, DOUGLAS, and SELLARS, architects, of 226, St. Vincent-street, Glasgow, are the authors of these drawings, which so far illustrate designs submitted in competition by them for the building.

TOMB OF THE TORRIANI, S. FERMO, VERONA.

THIS tomb is situated in the centre of one of the side chapels on the north side of S. Fermo Maggiore, a large and beautiful church in the west of Verona, celebrated for its excellent brickwork detail. The tomb was built about 1500 by two brothers in memory of their father Girolamo and brother Marco Antonio, both professors of high reputation at the Padua University. It is constructed mainly of white marble, the circular panel shown in the frieze being of verde antique, porphyry, and serpentine, and slightly curved on face. The upper part (not shown in the drawing) is supported by four sphinxes cast in bronze, and is decorated with cast bronze panels, which, however, are only copies, the originals having been carried away by the French to Paris.

CHIPS.

The committee of the Royal Masonic Institution for Girls have adopted plans by Mr. Hunt for the extension of the school buildings at Battersea-rise, estimated to cost £20,000.

A lecture hall, with schoolroom, class-rooms, and vestries beneath, has been added to Newington Presbyterian Church, Belfast, at a cost of £1,000, and were opened last week. Mr. W. J. Gilliland, Lombard-street, Belfast, was the architect, and Mr. Robert Corry, of Donegall Pass, in the same town, the builder.

The local authority of Driffield, Yorks, have decided to invite Mr. Harry Bohn, C.E., of Hull, to visit that town, and inspect and report on the present drainage system.

On Wednesday week the *employés* of Mr. Alderman Miskin, builder, of St. Alban's, presented to Mr. C. W. Miskin a Madalaine marble timepiece, on the occasion of his marriage.

A portrait of the late Dr. C. L. Carson, executed by Sir Thomas Jones, P.R.H.A., was formally presented to the town commissioner of Coleraine on Wednesday week, and has been hung in the large room at the town hall.

The town commissioners of Weston-super-Mare approved, on Friday, of plans, drawings, and estimates, by Mr. Cousins, C.E., for reconstruction of the sewers between Orchard-street and Birkbeck-road, at an estimated cost of £3,299.

The peal of eight bells placed in the tower of Bloxwich Church, in commemoration of the Queen's jubilee, was formally dedicated on Monday by the Bishop of Lichfield. The peal consists of the old tenor bell, and seven new ones founded and hung by Messrs. Mears and Stainbank, of London.

CAPITAL AND COUNTIES BRANCH BANK, LANDPORT.

OUR illustration shows this building, which has recently been completed. To minimise the ill effects of sea air and smoke combined on the structure, non-absorbent materials have been used. The outside is entirely built of buff terracotta and buff and Rockingham glazed bricks in bands, both supplied by Messrs. Joseph Cliff and Sons, of Wortley, near Leeds. The architect is Mr. J. Henry Ball, A.R.I.B.A., of Southsea, and the contractors are Messrs. W. R. and C. Light, of Landport.

NEW PREMISES, ENDERBY, NEAR LEICESTER, FOR THE ENDERBY CO-OPERATIVE SOCIETY (LIMITED).

THE premises consist of two shops, fronting the main road, with entrance to office and public hall. The first floor is utilised for committee, work, and stock rooms, and the upper floor for public hall for members and other meetings. The front is faced with Coalville pressed bricks, and the builders are Messrs. Langton and Sons, of Enderby. Mr. Thomas Hind, of Leicester, is the architect.

COMPETITIONS.

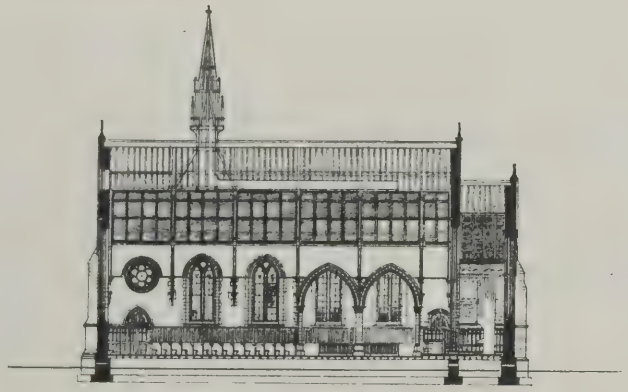
ST. ANNE'S, LANCS.—The local Lifeboat Memorial Committee recently invited designs for a monument to be erected on the Promenade, at St. Anne's, in memory of the crews of the two lifeboats who lost their lives last December while endeavouring to rescue a shipwrecked crew opposite that watering-place. Over forty designs were sent in, and the committee selected that submitted by Mr. William Birnie Rhind, sculptor, Cambridge-street, Edinburgh, who has received the order to proceed with the work. The principal feature of the design, which will be executed in freestone, is a colossal statue of a lifeboat man wearing his life-belt, looking out to sea, as if in the act of watching some vessel where his services may soon be required; his left hand rests on a life-buoy, to indicate the life-saving apparatus. The upper portion of the pedestal on which the figure stands is of rough rock work, and inscriptions will be carved on it. A deeply-splayed base forms the under part of the pedestal, the whole monument rising to a height of 20ft.

SCHOOLS OF ART.

GLASGOW COLLEGE OF SCIENCE AND ARTS.—The annual distribution of prizes and certificates gained by students attending the Glasgow College of Science and Arts, Bath-street, took place on the 27th ult. Mr. David Rowan presided. Reviewing the history of the College, he said that within the past eight years under the science and art and city and guilds examinations the students attending it had gained 2,068 first-class, and 2,742 second-class certificates; 58 first and 87 second honours; six silver and 37 bronze medals; and 17 Whitworth Scholarships. The last mentioned had been gained within the past four years, and amounted in value to £2,300. This last session five Whitworth Scholarships of £150 each, had been gained by John Calder, Nicholas K. Turnbull, Arthur F. Horne, Edward J. Duff, and William Thomson.

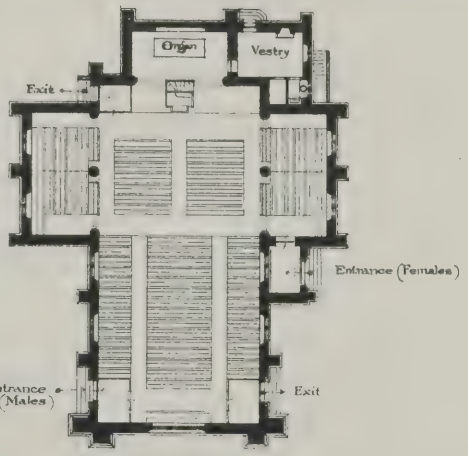
On Thursday in last week a special service was held in St. James's Parish Church, Longton, in dedication of two two-light windows which have been placed in the chancel to the memory of the late Rev. Adam Clarke, rector of the parish. The windows have been supplied by Messrs. Heaton, Butler, and Bayne, of London. The subjects selected illustrate and perpetuate the memory of the life and work of the late Rector. They are as follow:—"Our Lord Instructing Nicodemus," as teaching the ignorant; "Our Lord Comforting Martha and Mary," as comforting the afflicted; "Our Lord Feeding the Five Thousand," as feeding the hungry; and "Our Lord Visiting St. Peter's Mother," as visiting the sick. Their cost has been about £250.

The memorial stone of Bothkennar Parish Church, now in process of enlargement and restoration, was laid on Saturday. The work, which is estimated to cost £1,600, is being executed under the direction of Mr. Sydney Mitchell, architect, Edinburgh.



LONGITUDINAL SECTION.

PLAN.





SIDE ELEVATION.

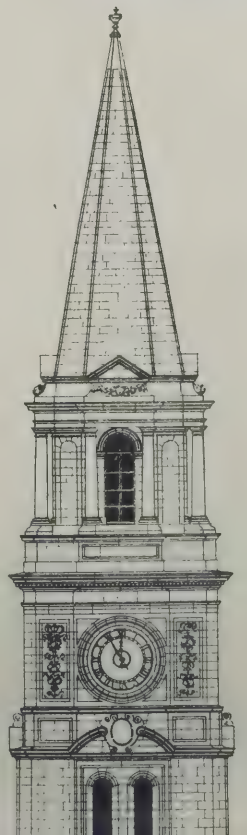
GLASGOW DISTRICT BOARD OF LUNACY.

ASYLUM AT HARTWOOD

MESSRS CAMPBELL · DOUGLAS & SELLARS · ARCHTS



FRONT ELEVATION

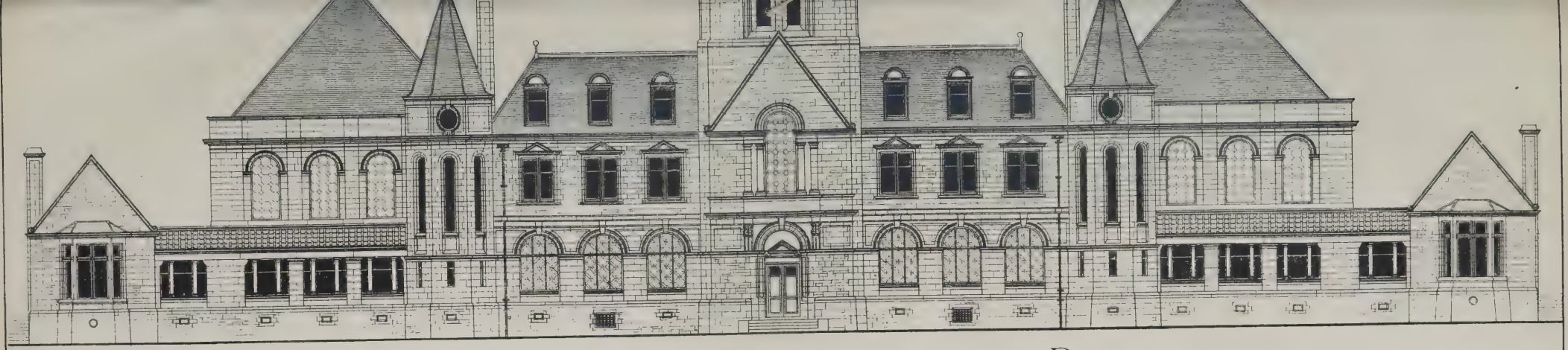




TRANSVERSE SECTION







FRONT ELEVATION OF ADMINISTRATIVE BLOCK.



THE CENTRAL BUILDINGS.

GENERAL PLAN OF THE LAND
SHEWING THE POSITION OF THE
BUILDINGS AND THE APPROACHES.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C



UNIVERSITY OF ILLINOIS

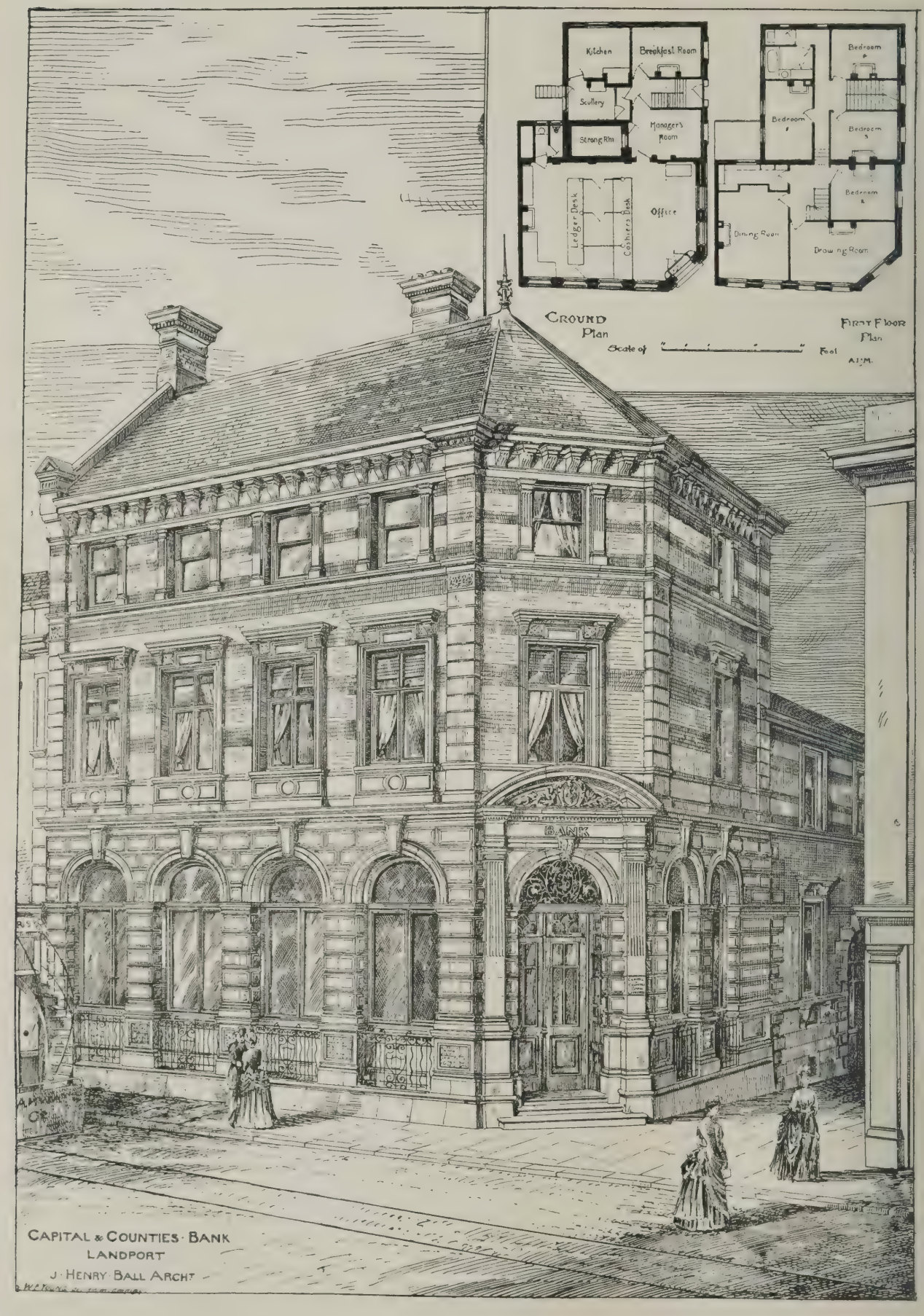
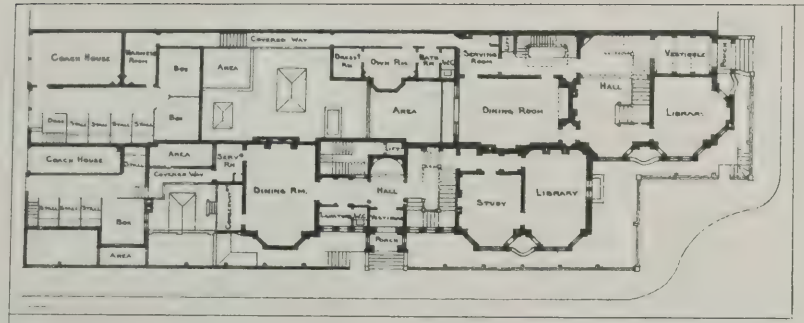

Kitchen
Breakfast Room
Scullery
Strong Rm
Manager's Room
Ledger Desk
Cashiers Desk
Office
Bedroom
Bedroom
Bedroom
Dining Room
Drawing Room
GROUND Plan
FIRST FLOOR Plan
Scale of "
Feet
BANK
CAPITAL & COUNTIES BANK
LANDPORT
J. HENRY BALL ARCHT.



Photo-Lithographed & Printed by Jas. Akerman, 6 Queen Square, W.C.



W. H. Rowell Archt.

"PHOTO-TINT," by James Akerman, 6, Queen Square London, W.C.

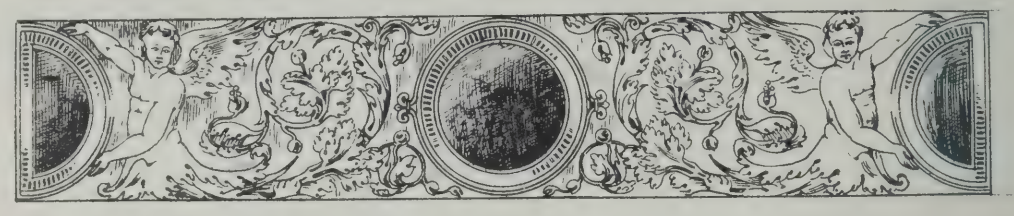
REBUILDING OF Nos 49, UPPER GROSVENOR ST AND 29A GROSVENOR SQUARE

Tomb of the Torriani [lower part]

in a chapel of Ch: of S. Fermo. Verona

Scale Inches 12 9 6 3 0 1 2 3 4 Feet

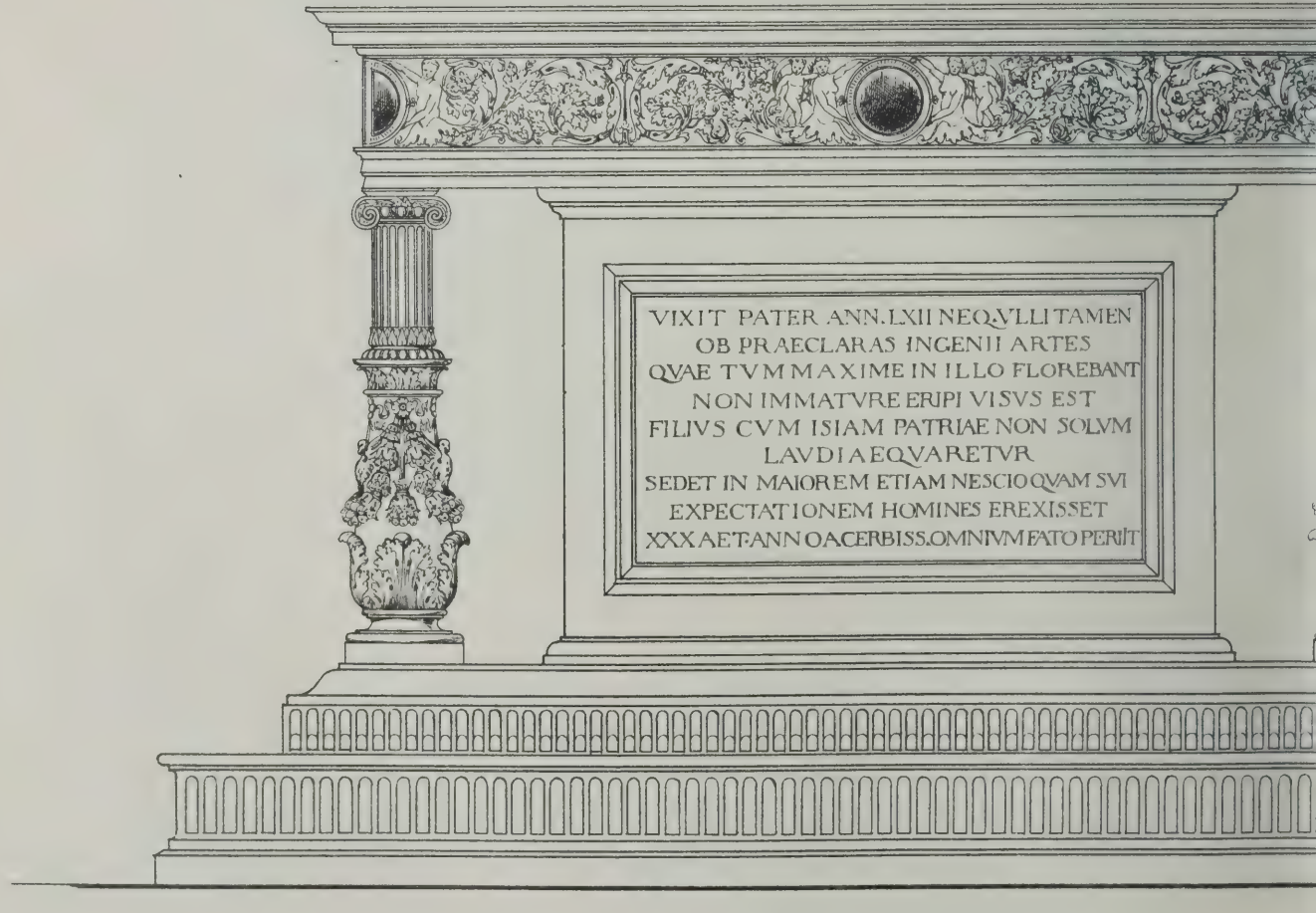
Scale of details 12 9 6 0 1 Foot



Frieze at side of tomb



Frieze at front of tomb



Front Elevation



Panel at side of tomb

Detail of Column

Two diagonally opposite columns have cherubs' heads between swags, the other two have eagles as shown in drawing below

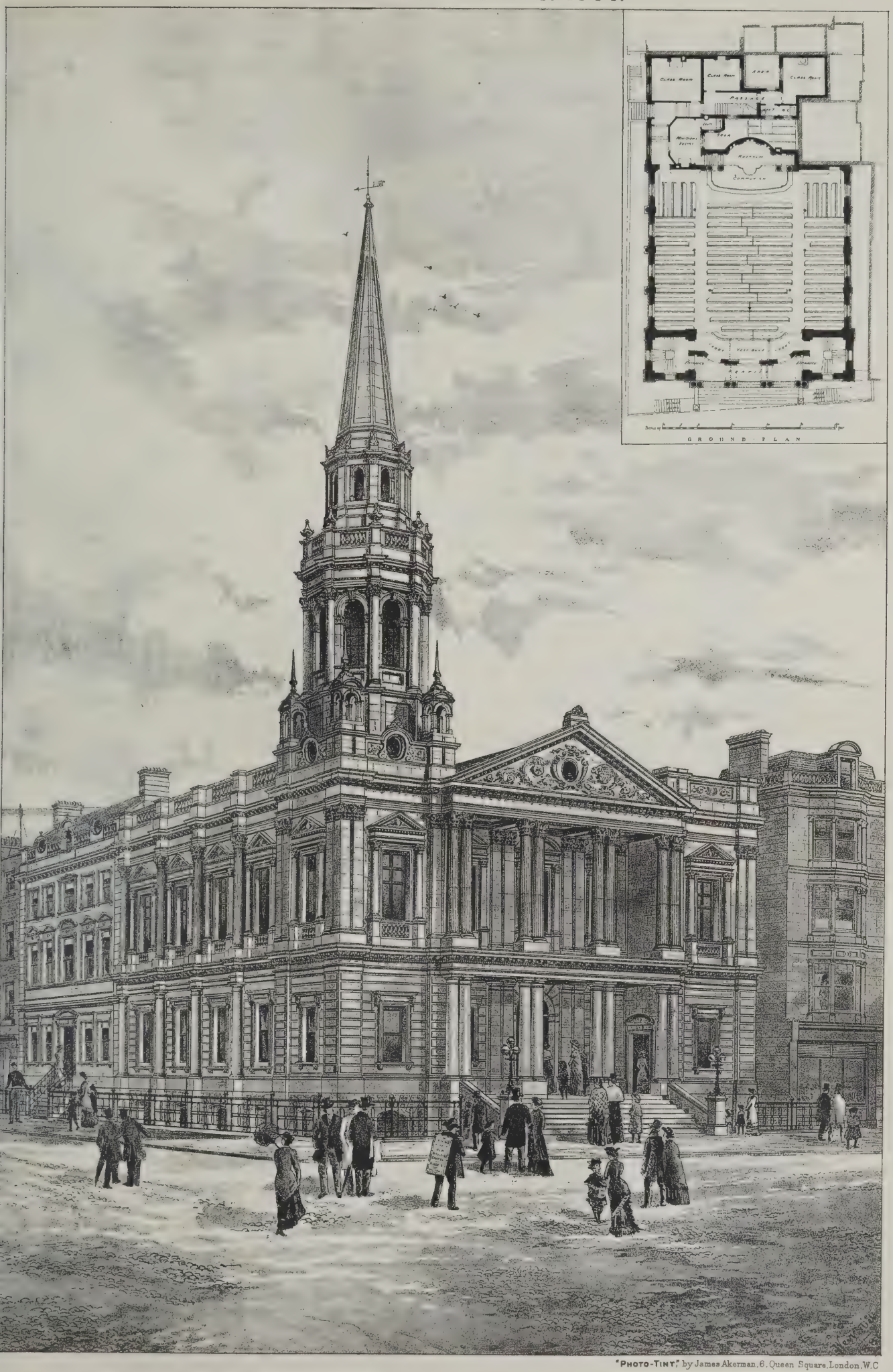




Side Elevation

Geo. J. Oakeshott
Measured July 1885.
Drawn Feb 1887.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

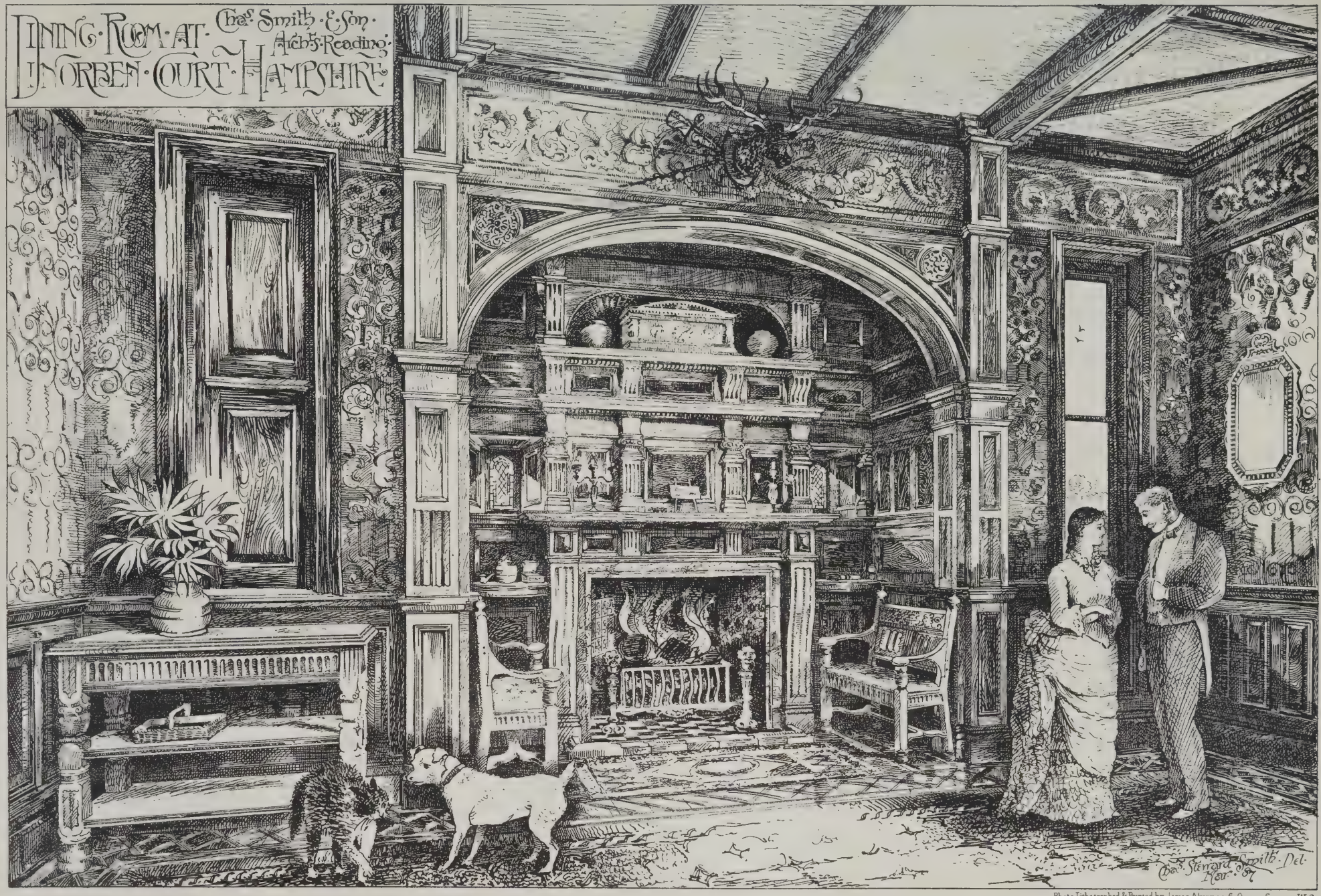


"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C

HINDE · STREET · WESLEYAN · CHAPEL · JAMES · WEIR · ARCHITECT

DINING ROOM AT INORBEN COURT HAMPSHIRE

Chas. Smith & Son Archts. Reading

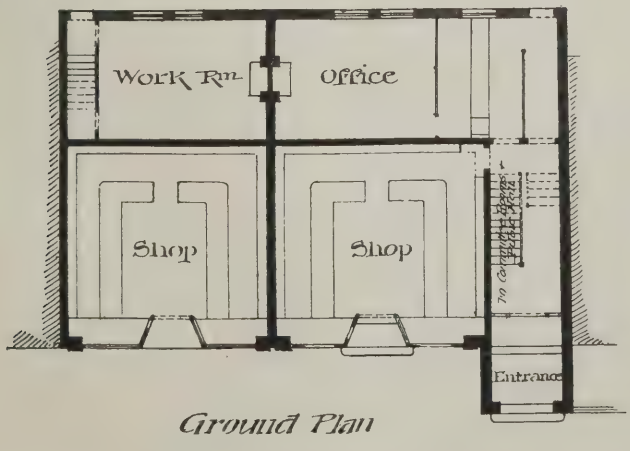


Chas. Stannard Smith. Del.

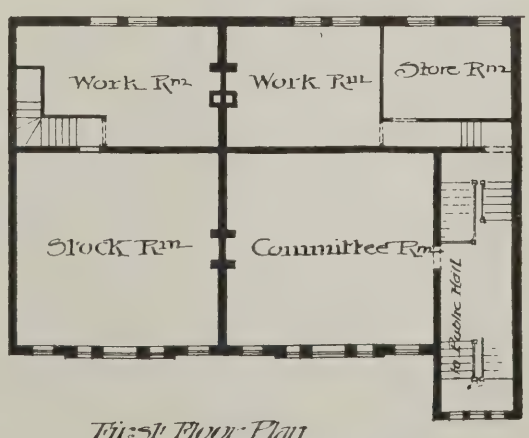
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New Premises · Enderby Co-operative Society Limited. Thomas Hind & Architect.



Ground Plan



First Floor Plan

Public Hall on Second Floor

Scale ... feet

WAYSIDE NOTES.

IT would be a little interesting to the architect to know what percentage of the rabble that now daily gathers and "demonstrates" in the West-end of London is in any way connected with the building trades. But it is difficult to even hazard a guess. Probably there are few *bonâ-fidæ* artisans and labourers in the crowd. One, at any rate, we know there has been who has condescendingly represented the building interests! Did not one of the worthies that lately called at the Mansion House declare that he had worked for speculating builders?

Perhaps he was one of the gentlemen who threw up a job because he "got sick of it." We have the word of a "London builder" that such is a fact. Writing to a daily, he complained that some five men abandoned their work for this reason. Further, one other undesirable type of a building handicraftsman deserted his occupation because "he could not work by himself." Of the two grievances, the latter seems the most worthy of our commiseration. But, Lord (as old Pepys would have said), what a brilliant group of a half-dozen British working-men!

I dare not attempt to go deeply into a question about which so much has lately been written and said. It is far too wide and involved. But I would touch for a moment upon the aspect of the subject as it affects the building interests. And as the reader will possibly anticipate, I would place much of the distress of, and lack of employment for, the building artisan, craftsman, and labourer at the door of the reckless jerry-building system, *alias* Leasehold Tenure. Looking at the question in this light, I can see some slight excuse for the behaviour of the six artisans referred to above—that is to say, if their employer was a speculating builder.

No one can work well, and with that desirable pleasure in his occupation, who is employed by the impecunious speculating builder. What wonder that a man gets heartily sick of always working badly and having no aim but that of producing the cheap and nasty! For such is the labour of the servants of the jerry-builder. Honest and solid workmanship and deft craftsmanship are not required by our friend Mr. Buggins. He prefers rather the man who is a meretricious worker, and whose soul does not revolt against the studiously unworkmanlike manner in which he is compelled to labour. Most likely the case instanced above does not apply here, as in all probability the men were employed by a contractor or true builder. But the fact remains, nevertheless. So much as regards a somewhat narrow view of the labour question.

As touching a wider and more difficult question, if the jerry-builder's object is to produce an erection of brick and mortar, which he calls a house, with as little labour as possible upon its walls and fittings, how great must be the *loss* to the country, in that the necessity for labour is reduced to a minimum! Supposing that every building erected in the land were to be honestly and solidly constructed, how great would be the *gain* to the country, and how everyone connected with the production of the building, from architect to hodsman, would benefit! I merely put forward this position as a suggestion, well knowing the deeply involved nature of the question. Arguing on first principles, it would appear to have some weight, though, it is true, under the present order of things it is not always useful to debate on these data.

Thoughts of Trafalgar-square lead one by easy stages to a relic of the wooden walls of Old England, *yclept* H.M.S. *Victory*. It is sad to reflect on the approaching dissolution of this magnificent example of naval architecture of the early years of this century. I see that the repairs contemplated to the ancient line-of-battle ship include the removal of several of her old timbers that are worm-eaten. Fir is to be substituted. Why *fir?* In addition to this, the whole of the vessel above water-line is to be covered with canvas, which will be painted to resemble wood. After these repairs, "it i expected that the ship will last another century." Fond hope?

Query: Why do not students of naval architecture "measure up" the old *Victory*, and endeavour to press upon the public modern designs for vessels *à la* Late 18th century style?

I am glad to see that the reports received from the fever-stricken village of Burnriggs in Cumberland have been of a satisfactory nature. It is said, however, that there are several villages in the same district which require attention from the sanitary authorities, as "fevers" have lingered among them for many years." The sooner that this attention is paid the better.

In the course of an opening address on "Cremation," to the Medico-Chirurgical Society, at Nottingham, Sir Spencer Wells is reported to have said that "Scarlet fever is just now in London a question of greater urgency; although Dr. Ogle informs me that, notwithstanding the popular alarm, the deaths have in reality 'been considerably below the average for the previous 47 years.'" During the address Sir Spenser gave some remarkable instances of fever having been communicated by germs or spores from bodies buried some 30 years previously! But I cannot go into all the remarkable statements made by Sir Spencer Wells. There has been rather a lot about scarlet fever, and the like, in "Wayside Notes" of late, and I really must draw the line at "Cremation."

In a recent issue of the *Echo* there was an article headed "Smoke *v.* Sermons," which apparently was suggested by the letter of a correspondent of the *Nonconformist*. The latter writer is stated to have said that "up and down our country the worshippers smoke up to the sanctuary doors, and rekindle their pipes and cigars the moment they are outside." I do not mention this to comment on the morality of the proceedings complained of; but because the article forcibly recalled to mind the anecdotes of an old Welsh friend, who loved to enlarge upon the customs of the congregations of certain out-of-the-way village churches of the Principality. In days gone by, everyone desiring an illuminant in the churches in these remote districts had to take his or her own *candle*. For economy's sake, these candles were extinguished or "blown out" when the sermon commenced, and when the homily was concluded they were re-lighted. My friend would draw a vivid picture of the scene at such times; and the *odour!* Faugh! It was described as harrowing to a degree. And when the sermon was ended there was a general strike, strike all over the church, accompanied by a further unsavoury odour of sulphurous matches, as the candles were again brought into requisition by the congregation.

At the commencement of the week there was opened in Jersey a new Roman Catholic church, said to be the finest ecclesiastical edifice in the Channel Islands, and which has cost over £20,000. Now, I remember well meeting at Caen last August a gentleman from Jersey, who enlarged upon the beauties of this edifice. In eulogistic terms spake he of the building.

And I shall have some confidence in his statements, since he was an individual quite *sui generis*. It is not often that we find a modest amateur artist with a preference for drawing architecture pure and simple. Yet I came upon this gentleman after inspecting the *Abbaye aux Dames*, and found him engaged in sketching a "bit" of the abandoned church of St. Gilles, hard by, a building of exquisite loveliness in its decay. Much use I made of him afterwards in inspecting a few old buildings together. For I have ever found that laymen with a little knowledge of, and a genuine liking for, architecture make, at times, most suggestive criticisms upon buildings, and bring home to the architect, who is wrapped up in "architecturalism," many points in design and composition that he would often let go by unheeded. Their little knowledge may be dangerous to themselves, but it will often be found of assistance to the architect, giving him ideas, as the prattle of a child may set the wise man thinking. GOTH.

Building Intelligence.

BALSALL HEATH, BIRMINGHAM.—The premises known as Sherbourne Hotel and Concert Hall, at Balsall Heath, have recently been rearranged and redecorated. The spacious bars of the hotel have been elaborately fitted up in the Renaissance style, and these, together with the smoking and billiard rooms, have been redecorated. In the concert hall a complete transformation has been effected. The work of alteration, which has been proceeding during the past three months, has produced an elegant little hall, in which special attention has been devoted to the convenience of entrances and exits. From the gallery an extra staircase without a turn in it, and emptying itself directly into the street, has been built, and from the floor there are three ample exits, all the doors of which are hung to open outwards. On each side of the stage a fire hydrant has been placed, and in case of fire an immense volume of water in the form of a curtain extending the whole width of the stage can be discharged from above the proscenium. The whole of the seating has been re-upholstered, additional private boxes have been erected, and the hall tastefully decorated, the prevailing colours being sea green and salmon. The bars and billiard room are heated with small bore pipes by Mr. Renton Gibbs, of Liverpool. The general contractors were Messrs. C. Holloway and Son, Coventry-road, Birmingham. The work has been carried out for Messrs. Showells and Sons, Limited, brewers, from designs and under the superintendence of Mr. Franklin Cross, M.S.A., architect, 18, Temple-row, Birmingham.

CHEADLE.—An extensive new wing and other additions have recently been built to St. Wilfrid's College, Cheadle, Stoke-on-Trent, including a refectory, 70ft. by 26ft. and 20ft., recreation rooms, class-rooms, masters' rooms, and dormitory. The college being situated a considerable distance from any fire brigade station, it was desirable to have the building practically fire-proof, and for that purpose the floors are constructed with iron and concrete, and covered with Lowe's wood block paving, the refectory floor being paved with oak, and the girders are protected from fire by plaster upon wire lathing. The stair being also fireproof is designed to serve the older buildings of the college as well as the new wing. The work, costing about £4,000, has been carried out from the drawings and under the supervision of Mr. Peter Shaw, and the general contractor was Mr. John Fielding, of Alton.

GLOUCESTER ROAD.—The new morning chapel, vestries, and parish room, which have recently been added to St. Stephen's Church, Gloucester-road, Queen's-gate, from Mr. H. Roumieu Gough's designs, were opened on Tuesday last, All Saints' Day. Messrs. Chamberlain Bros., of Hammersmith, have carried out the contract for £1,400. Yorkshire parpoints, with Corsham stone dressings, have been used for the external walls, and the new work harmonises well with the existing church. Messrs. Jones and Willis supplied the ironwork of gasfittings, hinges, &c.

HECKINGTON.—The restoration of the chancel of this well-known beautiful Lincolnshire church is now completed, and the reopening services are to be held to-morrow (Saturday). The Bishop of Lincoln will officiate. The roof has been raised to its original pitch; the windows have been reglazed with cathedral glass, and, where necessary, the mullions and tracery have been removed; but in most cases the old tracery was in such a perfect state that very little renewal was found necessary. The floor has been raised 5in., and laid down with Minton's tiles, of varied patterns. The altar-rails have been carried further west, so as to include the sedilia. New carved oak stalls and prayer-desks have been put up. The sacristy, which is a peculiar feature of the building, has been completely restored. It consists of an upper and lower chamber. A groined roof has replaced the lath and plaster ceiling of the lower chamber; and upon this, the new tiled floor of the upper chamber, used as the vestry, rests. All the windows of the two chambers have been completely restored. A doorway has been broken

in the west wall so as to give access to the vestry without passing through the church. Externally, in addition to the new roof, all the finials have been renewed and raised to their original height. The work has been carried out by Messrs. Pattinson, of Ruskington, from plans by Mr. James Fowler, of Louth.

ST. PANCRAS, N.W.—The new goods depot, erected by the Midland Railway Co. on the site of some dilapidated houses on the west side of their passenger station at St. Pancras, was opened on Wednesday. The buildings consist of a goods depot constructed in duplicate. There is a station yard with sidings, platforms, cranes, and all necessary accommodation for working the traffic at the level of the streets, and a similar yard constructed about 24ft. above at a level corresponding with that of the rails of the main line at the north of the passenger station. The upper floor is formed entirely of wrought-iron plates and girders, supported on more than 400 cast-iron columns, and the structure is stated to contain over 20,000 tons of iron. The traffic is carried on by transferring the railway trucks from one floor to the other by hydraulic hoists. Facing Euston-road and Midland-road stores for vegetable traffic have been provided. The whole of the lower yard, covering an area of about 14 acres, is paved with granite up to and between the rails; the upper yard is approached by inclined cartways from Euston-road and Phœnix-street. On this upper floor is the general goods shed, 800ft. long and 150ft. wide, and a warehouse, 300ft. by 100ft., and four stories high. The works have been designed and carried out by Mr. J. A. Macdonald, M.I.C.E., under Mr. John Underwood, the chief constructive engineer to the company. The general contract, which was let to the late Mr. Joseph Firbank, has been carried out by Mr. George Throssel.

Engineering Notes.

INSTITUTION OF CIVIL ENGINEERS.—The opening meeting for the ensuing session will take place on Tuesday next, when an address will be given by Mr. George B. Bruce, President, and the medals, premiums, and prizes awarded during last session will be presented. At the meeting to be held on the following Tuesday, Nov. 15, Sir F. A. Abel will read a paper on "Accidents in Mines." At subsequent meetings the following papers will be read, with a view to discussion:—"Electrical Tramways: the Bessbrook and Newry Tramway," by Dr. Edw. Hopkinson; "The Use and Testing of Open-Hearth Steel for Boiler-Making," contributed by the late Hamilton Goodall; "The 'Jubilee' Bridge over the River Hooghly on the Line of the East Indian Railway," by Sir Bradford Leslie, K.C.I.E.; "Manganese in its Application to Metallurgy," and "Some Novel Properties of Iron and Manganese," by R. A. Hadfield; and "The Alexandra Dock, Hull," by A. C. Hurtzig.

Mr. A. Braxton Hicks held an inquiry on Monday at Wimbledon, as to the death of Mr. Frank Scott Haydon, B.A., aged 64 years, assistant keeper at the Public Record Offices, Chancery-lane, who shot himself with a revolver at his residence, Southey-lodge, Kingston-road, Wimbledon, on Saturday last. A verdict of temporary insanity was returned. The deceased was a son of the late Mr. Benjamin Haydon, the Royal Academician, who was instrumental in bringing the Elgin marbles to this country, and whose death by his own hand, in June 1836, shortly after publishing an autobiography, created a painful sensation in society. Mr. F. S. Haydon had been in the Record Offices for over forty years, and had edited for the series of Record publications the "Malmesbury Chronicle" of 1366 and other works.

An organ, built by Messrs. Young and Sons, of Manchester, was opened on Wednesday week, at the Presbyterian Church, Everton Valley, Liverpool.

The Bishop of London consecrated the new chancel of St. Thomas's Church, Godolphin-road, Shepherd's-bush, on Saturday. The nave of the new church, which has been erected at a total cost of £7,000, was opened by the late Bishop of London Dec. 28, 1882. The second section, the chancel, has been built by Messrs. Dorey, Brentford. The architect is Mr. A. W. Blomfield, and the church has seating accommodation for 700 persons.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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RECEIVED.—E. L. and Son.—S. S. B.—J. C. and Son.—J. W. jun.—C. D. and Co.—H. B. B. Co.—G. and Co.—A. W. K. and Co.—T. L. B.—R. and Co.—J. J. C.

P. J. DAVIES. (Too long; besides, there are some other matters we should like to hear about from you first.)

Correspondence.

ARCHITECTS' ASSISTANTS' PROVIDENT FUND.

To the Editor of the BUILDING NEWS.

SIR,—There have been a few answers—very few, unfortunately—to the letter I wrote to you last week under the *nom de plume* of "Provident." The apathy of the assistants is most deplorable and disheartening. There is very little public spirit amongst them, yet the necessity for such a fund as the above is so great that it is one's duty to do them good in spite of themselves. A meeting will, therefore, be held on Friday, the 18th inst., at 7 p.m., in the meeting-room of the Society of Architects, St. James's Hall, Piccadilly, it being kindly lent for that purpose. A prominent member of the profession will take the chair. Nothing more can be done until that meeting is held. We shall then be able to judge if it is worth while to go on with the movement.

I earnestly appeal to every draughtsman who is anxious to provide for a "rainy day" to attend, and to remember that "God helps those who help themselves."—I am, &c,

W. A. CHAMBERS.

44, Battersea-rise, S.W., Nov. 1.

SIR,—The desirability of such an institution as a Provident Fund for architect's assistants will, we are sure, be felt by the major portion of draughtsmen and those in the profession. We trust, therefore, that it will receive sufficient attention to encourage the proposed meeting being called.—Yours, &c.,

London, Nov. 1. TWO ASSISTANTS.

DRAUGHTSMEN'S PROVIDENT FUND.

SIR,—I am sure that all assistants will agree with me that the proposal of "Provident" is an excellent one, and deserves to prosper. I hope all will support this movement in a hearty manner, and not depend on the efforts of others. Let each assistant act as if the success of the movement depended on his exertions alone; let all work with a will, and together, and come forward and give their support to a public meeting, should one be called, without waiting to find out if So-and-so will come with them. Act independently, and yet together; let them remember "Union is strength"; let them consider what prospects they have of being made comfortable in an independent manner, should they have to go through a prolonged illness. This is worth the consideration of married men and single men also, as I have no doubt some day they may marry. I am sure assistants are much indebted to "Provident" for his suggestion and the trouble he is taking for their welfare, showing that he is actuated only by a warm desire that his brothers (shall I say in affliction?) should improve their circumstances and dispel a dark cloud that has so long hung over their future. Now that he is making exertions for their good, let them one and all within the four seas assist in making his task easy for him, by writing him, intimating that they will give him their support, and make suggestions as he desires. This will encourage him in his good work. I inclose my card, and am—

FORETHOUGHT.

THE FUTURE OF THE ARCHITECT AND "THE ARCHITECT OF THE FUTURE."

SIR,—With reference to Mr. Woodward's letter under the above heading in your last issue, I need only say that if a comparatively unknown general medical practitioner were to address to a well-known London medical specialist, who did not even know him by name, a similar letter to that which Mr. Woodward addressed to me, such letter would meet with the contempt it would deserve: the cases are almost exactly parallel. I have been practising as a sanitary expert for more than 15 years, and am consulted not only by medical men and the public, but also by architects—indeed, I always have on my books large buildings in which the architects are superintending sanitary work carried out to the minutest details under my advice. If, instead of attempting to cast ridicule on "professors of sanitation," he would follow the example of my friend and colleague, Professor Roger Smith, and advise architectural students to attend courses of lectures and practical demonstrations on sanitary subjects, he would be doing the profession and the public a useful service.—I am, &c.,

W. H. CORFIELD, M.A, M.D. (Oxon.), F.R.C.P. London, Professor of Hygiene and Public Health at University College, London, Hon. A.R.I.B.A.

19, Saville-row, London, W., Nov. 1st.

SIR,—I do not suppose that one in a thousand of your readers knows what is the statement I made in the *Times* of the 1st October, which Mr. Wm. Woodward challenges me to prove, and seems to consider the council of the Royal Institute of British Architects should call upon me to confirm or retract. It is this: "*That very many so called architects are utterly ignorant of the most elementary laws of sanitation.*" I am content to repeat this, and leave it to Mr. Woodward to disprove if he can. It is he alone who is bold enough to call in question the veracity of the statement, and the onus of correction rests with him. Has he never met with any buildings, public or private, designed and superintended by architects, in which the drainage and ventilation have afterwards been found to be radically defective? Has he not himself been called in to remedy such? Has he never heard of so-called architects leaving such uninteresting matters entirely to their quantity surveyors, who also often write their specifications for them? It is not by shutting our eyes to such well-known facts as these, or by attempting to conceal them, that we can hope to inspire confidence with a long-suffering and unsuspecting public. The days for such a false policy as this are, happily, gone for ever,

and the public and the profession are alike calling out for protection against the evils of unqualified practitioners in their midst. The Royal Institute has recognised this so far as its own members are concerned, and has determined wisely to admit none to its associateship who fail to pass a qualifying examination; but how about the remaining and vast majority of architects throughout the kingdom? Is nothing to be done to insure that they are properly qualified before they are allowed to impose upon the public and gain their experience at the cost of their clients? I know well that Mr. Woodward and I have many views in common. We are both jealous for the honour of what should be a most noble and learned profession. We both "believe that architects are in need of a strong protective association," and I trust that ere long he will be an earnest worker in the cause which I have so long had at heart, and which I believe to be the only solution of the great question before us—namely, how to protect ourselves and the public from the disastrous results of quack professors of architecture. I mean the compulsory registration of all at present in practice or duly qualified, and a test examination or examinations for all hereafter desiring to enter the profession, not the Institute merely. The latter may eventually become a select club, consisting of the best men of the day, or it may take the position it ought to do, and be to us what the Royal College of Surgeons is to medical practitioners. Time alone will show which of these positions the Institute will occupy. Either is honourable in itself; but if I may venture, as an outsider, to express an opinion, I should say that unless the policy of its council undergoes some considerable change, it will not occupy the more honourable position of the two. No one would more deeply regret this than myself.

The proposition to seek the aid of the Legislature in order to close our profession has met with the cordial support of the public and of some 2,000 practising architects, and a very large number of the Members of both Houses of Parliament are in favour of such a Bill as has been drafted. Medical officers of health throughout the kingdom, who number some thousands, are, I believe, unanimously on my side, as are also, I am fully persuaded, a vast number of the members the Institute, but who yet withhold their support because the movement was not initiated by that body. It may be worthy of remark that the late President of the Institute, when in office, wrote to me saying that any such movement, if taken up at all, should emanate from the junior members of the profession, rather than from those who, like himself, had borne the heat and burden of the day.

I appeal not only to Mr. Woodward, but to all who have the welfare of the profession at heart, to put aside all paltry feelings of jealously as to who originated the movement, and to do their utmost to help it forward. The 180 members of the Institute who signed a memorial in favour of this scheme might do much if they would make their voices heard at Conduit-street.

The "strong protection association" would be found in the General Council, as proposed in the Draft Registration Bill—a body "having power to punish offenders, and to strike their names off the roll, as in the medical and legal professions."

The future of the architect will be perfectly secure when, but not before, "the architect of the future" is known by the public to be as properly trained and qualified to advise as are medical and legal practitioners. Then, and not till then, will the innumerable quacks who bring our noble profession into disrepute sink to that level which they so properly occupy in the medical profession.—I am, &c.,

HUGH ROUMIEU GOUGH.

12, Carlton-chambers, Regent-street, S.W.,
Oct. 31.

SIR,—As Mr. Woodward begins his letter in the last BUILDING NEWS under the above heading by a quotation from Lord Shaftesbury, will you allow me to follow his example in a few remarks on the same subject by quoting a more venerable, but to me unknown, authority: "When the sky falls we shall all catch larks"—for the architect and the sky are very likely to "stand or fall together."

That builders have been, and will probably be, often employed without an architect for small repairs and alterations may be very true; but that it is caused by builders reiterating that architects are not practical is very doubtful, for they are generally too prudent to say it in public, although they may know it to be true in many cases, and they seldom have an opportunity of saying it in private to employers until they are called on without an architect.

The two cases mentioned of a surveyor having taken the place of the late City Architect, and Wormwood Scrubbs Prison being built without an architect, may not be exactly a writing on the wall to foretell the "downfall" of the architect. It is quite possible that the City Fathers know that they have more work for a surveyor than for an architect, and that they prefer to employ one when they require him. Then as to the prison, we must remember that it was Major Jebb who designed Pentonville Prison, the starting point of modern improvement in prison-building, and he was no architect, and there may be quite as competent a man in the Prisons Department as any outsider. It certainly would not tend to prevent an impending downfall if architects were to cry out like employees on the Ordnance Survey against Sappers being employed, as it took the bread out of their mouths.

The "Professor of Sanitation" is, no doubt, almost invariably an unsavoury fungus, one that architects should guard against as carefully as dry-rot, as it is sometimes as injurious to a building. Any intelligent hodsman should know as much as the best of them, and yet even the worst would score more marks than Baron Munchausen in a competitive examination in his speciality. So it is scarcely necessary for Mr. H. R. Gough to imitate the naughty bird on their behalf; but as "there is no rule without an exception," a general condemnation implies that he who condemns "makes the rule." Mr. Gough's assertion at York that architects know nothing of science and engineers of art—is more disparaging to both, and if true, would be more suggestive of the apprehended "downfall" than the builder's reiteration. But, seriously, is there not more reason to fear a downfall from such claims and practices as are referred to in the article on "An Architect's Authority"? for if architect's claim to bind their clients without the client's authority or knowledge, and act on the claim, they will, in nine cases out of ten, bring about a downfall more or less serious. No architect has a right to bind his client to anything without his knowledge and consent, or where he may prudently anticipate consent, like those who rely on a bill of indemnity. What is said about binding an employer as against *third parties* only applies to ordinary matters usually left to the architect; but even then the architect, who is not a *third party*, is accountable to his employer. Surely "making percentages out of tradesmen" is simple robbery, with betrayal of trust superadded. It is not true that the builder would get it if the architect did not, for in many cases both would get it, and the employer should pay it; but when the contractor gets it he allows for it one way or other in pricing. An honourable man would as soon pick a pocket as take a bribe to betray the trust placed in him by a percentage.

There is no valid reason why an architect should not take out quantities for his own work if he does it properly—takes the usual risk for errors, and only charges the usual commission, to be paid by the builder openly from the first instalment to the knowledge of his client, without which nothing should be done, if that downfall is to be put off to St. Tibb's Eve, although some correspondents think clients should not see their builder's accounts! Cannot Mr. Woodward employ his surplus energy on such folk, and treat builders and their little jobs as Lord Melbourne advised Lord John Russell, "With masterly inactivity"?

Oct. 31. M. M.

SEVILLE CATHEDRAL.

SIR,—On looking over the back numbers of the BUILDING NEWS, issued during my absence from England, I notice under the date Sept. 2nd you publish a view of "Seville Cathedral, Gilbert S. Doughty, architect, *delt.*" One might fairly, I take it, assume by this wording that Mr. Doughty had made a drawing in the cathedral, of which your print is a reproduction.

The interior of Seville Cathedral is one of the very noblest creations of Gothic, or indeed of any style of architecture, and you would, I am sure, not wish to represent it to your subscribers in any but the most worthy manner, and we should all of us have valued a *bonâ fide* drawing, and admired the boldness and dexterity of the draughtsman who could accomplish such a subject with even a moderate amount of success.

For my own part, I should have been the first to have offered my congratulations to the artist who had succeeded in obtaining from the clerical authorities the rescinding of their absolute rule against sketching in a building which, as they told me after three days' efforts, was only for worship.

Failing in my efforts, I purchased a photograph by Laurent (of Madrid), which I have before me. Curiously enough (?) it is exactly the same size as your view, taken from the same point of view, and at the very same moment in the day (proved by the shadows) as Mr. Doughty's drawing! Such a coincidence would be most remarkable if it could not be, perhaps, explained in a rather more simple way—viz., that Mr. Doughty has made an *adaptation* (we will not say a *copy*) of Laurent's photograph.

The excessive darkness of the interior is rather unfortunate (for Mr. Doughty), as it rather obscures features and details. For instance, possibly for this reason he has adopted under the upper row of niches of the marvellous retable a somewhat simple form of diaper (!), in place of its actual elaboration of sculpture and ornament, which declined to appear in the photograph, except by such vague indications as just recall it to one who has studied it for hours through the close bronze work of the superb "reja" in front of it (which, moreover, he treats in a rather "severe style!").

Some of the piers of the church, too, are omitted where not quite clear in the photograph, and a dark picture-covered side chapel, with a rich metal screen, is "improved" into a blank wall. Besides these, such comparatively unimportant details as window tracery, mouldings, capitals, &c., &c., are altered boldly to what Mr. Doughty doubtless thinks the architect *ought* to have made them!

In the perspective of his pavement, Mr. Doughty has perhaps better "caught the feeling" of the copy; but he has not been so successful in his texture of the masonry of the walls and piers, having apparently aimed at the effect produced by a model cut in *cork*.

But I need not surely pursue the comparison further between the reality and Mr. Doughty's adaptation of it, and I do not intend to be hypercritical, or to speak hardly of the efforts of young and enterprising draughtsmen, to whom as a rule we are much indebted, so I will only express the hope that we may see in your pages many more illustrations of the noble architecture of Spain worthily represented, either by a reproduction of Laurent's almost perfect photographs, or by sketches and drawings honestly made from the buildings themselves.—I am, &c.,

R. HERBERT CARPENTER.

4, Carlton Chambers, 4, Regent-street, Oct. 29.

P.S.—Perhaps Mr. Doughty has intended it for a *joke*.

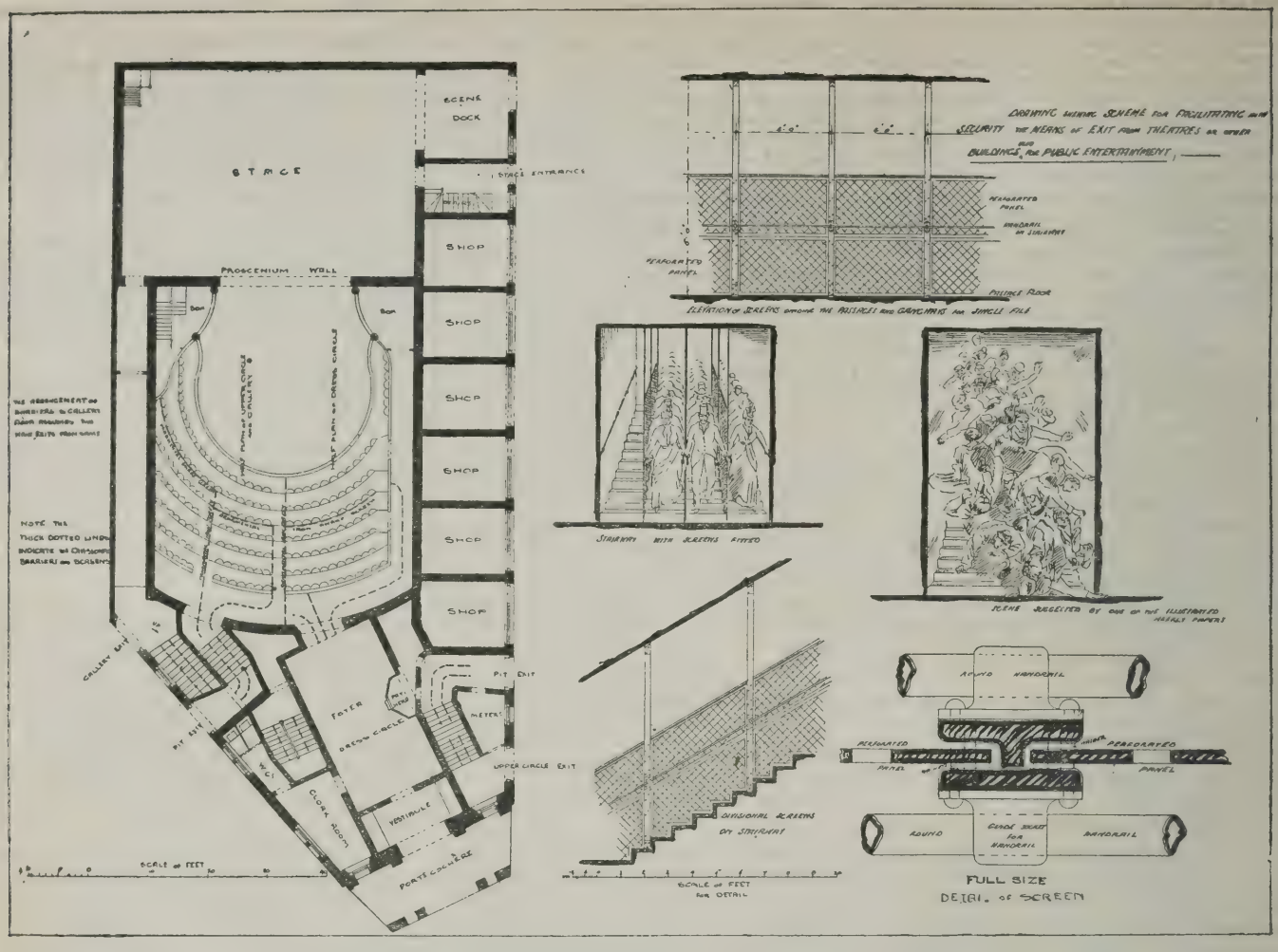
ST. ALBAN'S ABBEY.

SIR,—I have read the letter in your number of the 21st ult. respecting the pranks now being played with the abbey. I was at St. Alban's a few weeks ago, and was much saddened with what I saw had already been done.

I now learn that scaffolding is growing up the north transept, which is in a fair state of repair, apparently with the object of pulling it down and rebuilding it in the so-called Grimthorpean style, which is not remarkable for proportion, meaning, or beauty.

It is nothing short of a scandal that a man should be allowed to make a hobby of a national building so much to its detriment. The south and west gables have already gone, the north transept is in hand, leaving only the eastern gables and the tower to follow.

If the abbey authorities could only be impressed with their responsibility, and before it is altogether too late, of the folly and useless-



THEATRE PLAN: SHOWING MODEL EXIT.

ness of this Grimthorpean rebuilding, it would gladden the hearts of many another besides the writer. Will no one make an effort?—I am, &c.,

E. P. H.

A MODEL EXIT.

SIR,—Although the widespread horror raised by the extraordinary loss of life at the late Exeter Theatre has now in a measure subsided, the material cause of that calamity still exists at the present moment more or less in every theatre of the United Kingdom.

In the course of the last six weeks numerous suggestions have been made—in some instances for reducing the possibility of panics, and in others for preventing the evil consequences of the same.

Now, I think it may safely be said of the various schemes suggested that only a small percentage of them are really practicable; and further, very few of the practical ones are applicable to all our existing places of public entertainment, new and old.

Records of the loss of life in recent years resulting from panics in theatres or other buildings show that the death-roll has been largest where the unfortunate beings had to pass through long passages and down staircases before reaching the street. In these cases the majority of the victims were killed by being hurled down the stairs through their inability to resist the enormous pressure of the struggling mass behind them. And the escape of the others was effectually stopped by the piles of suffocated beings blocking the way.

A moment's consideration of the elements that bring about these dreadful affairs must disclose the cause of disaster; and in turn, the cause should suggest the remedy.

The pressure that one man, considered individually, can exert by mere pushing is insignificant; but give a man the opportunity in a crowd of using his shoulders as a lever and his neighbour's person as a fulcrum (which is the principle at work in a struggling crowd), the one-man pressure has become appreciable. Multiply this by 50 or a 100 men doing the same thing, the compound accumulation has become enormous, until the front and middle portions of the mass are carried off their legs, hurled along at the mercy of those behind only to find a terrible death if a stairway should come in the line of flight.

The remedy, then, that is to counteract this I think is obvious. In the case of a theatre or public place of entertainment, the body of the audience must be so divided on leaving the auditorium that the minimum amount of pressure is exerted, however eager persons may be to go forward. And if accessories can be introduced to check even the minimised pressure so much the better. In the drawing accompanying this letter I have endeavoured to incorporate a scheme that will not only give great facility in leaving a theatre, but combine with it the utmost security. The simple principle of the expedient is the insertion of divisional screens and barriers in the exits of a building, as shown by the drawing.

The divisional screens in the passageways and on the stairs are formed by placing wrought-iron standards from floor to ceiling of T-section, 3in. by 1in. by ½in., 4ft. apart, fixed at top and bottom. To those are screwed wrought-iron bars, 3in. by ½in., of same height, and fixed after ¼in. wrought-iron perforated panels have been placed in position, the standards being then of I-section.

At a convenient height from floor, a round bar handrail would be run on each side of the screens, and also to the walls flanking the side gangways, thus placing two handrails for each file of persons; single file being the manner in which the audience must necessarily leave the building, as the passageways formed by the screens would be 2ft. 3in. wide, made a little more or less as the dimensions of the passageways and staircases of existing theatres would necessitate. The height of the panelled portion of screens should be about 5ft. from floor to insure complete isolation of each gangway, Openings would be left in the screens—say on landings—to avoid the possibility of two people meeting face to face in one gangway.

Under this principle, it will be seen that the only pressure, if there is any at all, which a person has to contend against is the pressure of the single line of persons behind him or her; while in addition, the assistance of two handrails to each individual descending at stairway, for instance, would reduce the possibility of disaster to absolute zero.

A simple system of dwarf screens or barriers would be devised for the auditorium, so that the house is divided into sections of some 40 or 50 people, each section under the arrangement being compelled to leave the building by its apportioned gangway. The accompanying drawing shows the scheme for a particular case. The plan is that of the late Exeter Theatre, enlarged from the one published in the *Daily Telegraph* the day following the news of the disaster. The design of the barriers in the several parts of the auditorium would be in harmony with the composition of their surroundings of less severe character than their brethren in the exit passages, and of course constructed to avoid interference with the view of the stage.

I must mention, in conclusion, that the main idea of this scheme was suggested to me by Mr. E. S. Gunn, of the Metropolitan School of Shorthand, Chancery-lane, who wished to see his idea put into a practical shape. I venture to think this simple plan meets in a thorough manner the great danger accruing from the evolutions of a mass of panic-stricken individuals frantically struggling for life in a passageway or staircase. Dangerous panics will occur at periods in theatres in spite of the preventitive and palliative effects of iron curtains, electric light, and printed directions to "keep cool in case of fire!" And if the appalling loss of life witnessed at Exeter, and a year or so back at Sunderland, is to be minimised, if not entirely avoided, the means of exit from public places of entertainment must undoubtedly be made more rapid and secure by some such means as I have here described.—I am, &c.,

32, Walbrook, E.C. SYDNEY B. BEALE.

DRAIN TRAPS.

SIR,—I should be glad if "Clerk of Works" would communicate with me, giving his name and address, and I will then send him full particulars of my traps, and he can examine the question for himself.—I am, &c.,

W. BROWN, Architect.

Clifford-street, York, Oct. 29.

Intercommunication.

QUESTIONS.

[9445.]—**Carpenters who have Become Great.**—Can any one mention the names of some men of mark in this century who began life as carpenters?—CURIOUS.

[9446.]—**An Old Saw.**—I possess in my collection an old saw, bearing the date A.D. 1592, and the initials "W. B." and "R. V." The date is assuredly genuine. Does anyone know of an older one? It was, no doubt, used continuously in Exeter until a few years ago. I put this query in this column some time ago, but without result. I asked the same question in *Notes and Queries* a while ago, and some foolish writer quoted a still older saw in the Bath Museum. Inquiry, however, led to the discovery that the Editor had been shamefully hoaxed, and that no old saw existed there.—HARRY HEMS.

[9447.]—**Buenos Ayres.**—Can any reader of the "B. N." who has had experience in Buenos Ayres or the Argentine Republic generally, kindly say whether there is a good opening for an architect and surveyor in that country?—K.

[9448.]—**Blue Staffordshire Bricks.**—Some makers mould these from plastic clay, whilst others press them from dry powdered clay. I am told that the latter will not stand the weather. Would any of your readers who understand the difference kindly give some information as to the advantages and disadvantages of each kind of brick?—S.

[9449.]—**Letting Contracts.**—A. and B. are invited to give a contract for some ironwork for a warehouse, no specification or quantities supplied, and nothing stated as to the lowest or any tender being accepted. B. lost the job, although B.'s tender was considerably less in amount than A.'s. Has B. any remedy, or can B. claim any compensation? Both A. and B. were fully qualified to execute the work.—L.

[9450.]—**Masonry and Stone Cutting.**—Referring to Mr. Lawrence Harvey's first lesson on the above subject, p. 642, is the following really true, or is it a slip of the pen or a misprint?—"In that case (in architraves) the stone offers a much greater resistance when its quarry beds are placed *vertically*, as was practised by the Greek, Roman, and Mediæval masons." The italics are my own. Would a wood lintel also be stronger if the grain ran vertically instead of horizontally? It appears to me that the statement requires further elucidation to warrant its acceptance by your readers.—A. HANSON.

[9451.]—**Roof Boarding.**—I have heard lately that in several instances architects have omitted the usual varnishing from the underside of deal roof-boarding in the open roofs of churches, chapels, and large halls. The effect is, I am told, not particularly pleasant at first, on account of the lightness of the colour of the wood; but that this tones down in a few years, when it looks better than if it had been originally varnished. I should be glad if your readers would favour me with advice in the matter. On the ground of cleanliness, is it not unadvisable to adopt this course? If varnish be omitted, should the wood be lightly stained with a transparent stain, and sized to stop the pores, and so prevent shrinkage?—W.

[9452.]—**Norman.**—I should like to know the correct dates of the choir and nave of Durham and the choir and transepts of Norwich. Those given by the guidebooks and treatises on the style are not to be depended on, as the accounts vary. The names of any churches which retain apses of the period will be gladly received.—W. H.

[9453.]—**Load on Beams.**—If four baulks of pine, 18in. square, are laid across two walls, making 20ft. span, 3ft. 6in. apart, what weight would they sustain, having the load distributed over 14ft., 1ft. 6in. from one wall, and 4ft. 6in. from the other? A reply from some practical reader will oblige.—G. B. N.

[9454.]—**Lime in Skins.**—May I venture to ask some of your readers who have some acquaintance with chemistry to kindly inform me, through your pages, how lime may be washed out of skins that it will leave no trace, and that strength of skins may not be impaired—that is, skins that have been unhaired by lime? The lime may be dissolved so that it will wash out, so that the skin may dry transparent; or, please refer me to some work wherein I can obtain the information.—J.

[9455.]—**Technical Education.**—Will some reader kindly say if he knows of a good work on this subject, and whether any regulations are in existence with reference to laboratories, &c.?—CONSTANT READER.

REPLIES.

[9426.]—**Arch in Lincoln Cathedral.**—The sketch published last week seems to suggest that the S.W. tower has shown an indication to lean towards its neighbour, particularly if there is a set-off as shown in section.—J. P.

[9432.]—**Black Stains in Varnished Stained Deal.**—On reference to the specification and the work, I find it was pine used for the dado as "Tekton" suggests. I should feel glad of any suggestion to remedy the same in case of it spreading all over. The stains are not generally deep, and can be scraped off in most cases.—H. H.

[9434.]—**Refusal to Proceed.**—A tender submitted by a builder, and the acceptance by employer, make a contract, and the parties in law are bound. The only case I know is Lewis v. Brass, 1877. If the acceptance was made in writing, B. has a better chance to compel the performance.—G. H. G.

[9439.]—**Science for Engineers.**—It would certainly be to the advantage of a young man who has served his term of pupilage to take a three years' course of study at South Kensington. "Science" had better apply for particulars to the department, when he will receive a syllabus of lectures, list of textbooks required, &c.—G. H. G.

[9440.]—**Roof.**—Couples 18in. from centre to centre must mean 18ft.; if so, the distance is at least 6ft. too great. In the construction there seems to be no trussing, and the rafters would be inclined to sag. The collars would only prevent spreading, but would not assist to give strength to the rafters. I do not understand the "3 by 2in. piece running the length of roof and spiked to the backs of the upper and lower collars." No purlins are mentioned, and 4 × 2in. rafters without purlins would be weak.—G. H. G.

[9441.]—**Early English Foliage.**—Mr. Colling, in his "English Mediæval Foliage" (p. 37), says: "The Early English triple leaves are supposed to have been taken from the water avens anciently called the "Herba Benedicta," or Holy Herb, the leaves of which consist of three slightly serrated round lobes. They are divided in the older examples quite down to the central stem, and each leaflet is again subdivided into three."—HARRY HEMS.

[9442.]—**Mortar.**—I find the best way for securing any prescribed proportions in making mortars is, for instance, to put down three more loads of clinkers and cinders and roughly flatten the heap, then tip a load of unslaked lime and spread that evenly over same, finishing with a top layer of two or three more loads of ashes, making the proportions as desired. Have this pile turned over once, and pug from it as desired. If on a big job, increase the quantities. One uniform mortar is certain.—G. B. N.

[9443.]—**Perpendicular Style.**—Consult Fergusson's "Handbook," Gwilt's "Encyclopædia of Architecture," where, I believe, a list of architects will be found. Not many old examples of Perpendicular are to be found in London. I may mention the following:—St. John's Gate, Clerkenwell; the Guildhall; Crosby Hall and Westminster Hall; and notably Henry VII.'s Chapel, Westminster Abbey.—G. H. G.

[9444.]—**Cavendish Memorial Tomb.**—The memorial in question has been placed in Cartmel Priory Church.—GEO. F. ALLENDER.

CHIPS.

A dinner was given on Monday week at the Exchange Tavern, Lombard-street, E.C., to the employés of Messrs. Colls and Son, of Moorgate, to celebrate the completion of Messrs. Lloyd, Barnet and Bosanquet's new bank in Lombard-street. Mr. Brooks, representing Messrs. Colls and Sons, took the chair, and Mr. Bamford, clerk of works, the vice-chair. The health of the architect, Mr. J. A. Chatwin, of Birmingham, was proposed by Mr. Hutchinson, foreman of works, and was received with enthusiasm.

The central lights and tracery of the large window of the library of Sion College on the embankment have been filled in with stained glass, the gift of Mr. W. H. Willis. In the principal lights are figures of Chaucer and Caxton, on a diapered groundwork, and surrounded by a foliage border. In the tracery are shields with the arms of the See and City of London, the city of Bristol, the donor of the glass, and the founders of the college and library. The window is the design and work of Messrs. Joseph Bell and Sons, College Green, Bristol.

A stained glass window, which has been placed in the eastern wall of the workhouse chapel of the City of London Union, Lower Clapton, was unveiled on Friday last. It is a reproduction of Holman Hunt's picture, "The Good Shepherd," and has been executed by Messrs. Pitman and Son, of Newgate-street, E.C.

The foundation of a new Congregational church was laid last week in Dyer-street, Cirencester. It will be Italian in style, and will seat 424 persons, at a cost for erection of £2,800. Mr. W. Gilbee Scott, of Bedford-row, London, is the architect; Mr. T. H. Kingerlee, of Oxford, the builder; and Mr. J. Lancefield the clerk of works.

The new church of St. Lawrence, situated at Catford Bridge, Lewisham, is one of three churches intended to be erected by the Lewisham Church Extension Association. Mr. H. Roumieu Gough, of Carlton-chambers, Regent-street, is the architect, and the building is rapidly approaching completion, and will be consecrated by the Bishop of Rochester on the 19th inst. Accommodation is provided for about 1,000 worshippers, and the church, which is moderate in cost—namely, about £7,500, is admirably adapted to the excellent site it occupies. Mr. John Lister, of Aston, near Rotherham, is the contractor.

On the evening of Thursday week, the students and friends of the Salisbury School of Science and Art commemorated its 21st anniversary by a most successful *soirée*, held at the school. During the evening a presentation of valuable plate was made to the head master, Mr. Joseph Harris, who has successfully taught the school for the past sixteen years.

LEGAL INTELLIGENCE.

IN RE J. G. STIDDER.—(London Bankruptcy Court, Nov. 1, before Mr. Registrar Linklater.)—The bankrupt, who had carried on the business of a sanitary engineer at 50, Southwark-bridge-road, under the style of J. G. Stidder and Co., filed his petition in May last, and now applied for his discharge. The liabilities amounted to £10,625, in addition to £27,172 not expected to rank; assets, £2,927.—The Official Receiver reported that the bankrupt commenced business in 1870 with a capital of £1,400, and had been financed throughout by a person who, in consideration of the advances made, was to receive interest thereon and a percentage of profits.—The Registrar suspended the bankrupt's discharge for six months.

IN RE CHARLES CHURCHILL.—A first meeting of creditors was held on Wednesday before the Official Receiver. The debtor was an importer of American machinery, carrying on business at Cross-street, Finsbury. His accounts showed liabilities to the amount of £15,213, and assets £3,972.—Mr. Van Praagh, for the debtor, had no proposal to make, and the proceedings accordingly resulted in bankruptcy, a trustee and committee of inspection being appointed.

IN RE GUY AND BEVAN.—An adjourned sitting for public examination was held under this failure on Wednesday. The bankrupts, Messrs. Richard George Guy and Lambton L. L. Bevan, were timber merchants, carrying on business in Fenchurch-street as George Guy and Co., and at St. John, New Brunswick, as Guy, Bevan, and Co. Their statement of affairs showed liabilities £179,286, of which £105,229 were expected to rank, with assets £25,323. Both bankrupts gave evidence and passed their examination.

WATER SUPPLY AND SANITARY MATTERS.

DENNY AND DUNIPACE, N.B.—A report has been received by the Commissioners of the burgh of Denny and Dunipace upon a proposed water scheme for the district, drawn up by Messrs. Kyle, Dennison, and Frew, civil engineers, Glasgow. The engineers have, as a source of supply, the Garvald Burn, which flows into the river Carron, 1½ miles to the west of the town. Allowing 30 gallons of water a head per day, the quantity of water required for the burgh is 122,400 gallons per day. The Garvald Burn area district is estimated as capable of discharging water at the rate of 141,000 gallons per day, and the Overton Burn, which could also be utilised, has a drainage area yielding 163,000 gallons per day. They, however, consider the Garvald Burn as sufficient for the demands at the present time. It is practicable to construct reservoirs at this place to contain a quantity of upwards of 12,500,000 gallons of water, equal to a full supply for the burgh for 102 days. The elevation of the clear water tank would be 220ft. above the highest point in the burgh. The total cost of the Garvald Burn scheme would not exceed £5,700, which includes 10 per cent. for contingencies, but exclusive of cost of land or wayleave or pipes within the burgh.

MUNICIPAL SURVEYORS AT LUTON.—A district meeting of the Association of Municipal and Sanitary Engineers and Surveyors was held at Luton on Saturday, chiefly for the purpose of inspecting the new sewage works lately completed by the corporation at a cost of £20,000. Among those present were the president (Mr. J. Gordon, of Leicester) in the chair; Mr. Lewis Angell, of West Ham; Mr. E. B. Ellice Clark, of Westminster; Major L. Flower, engineer to the Lea Conservancy Board; Mr. C. Jones, of Ealing, &c. A paper upon "The Sewage of Luton, Past and Present," was read by Mr. W. H. Leete, borough surveyor, under whose supervision the works have been carried out. In this it was stated that Luton has a population of about 35,500, and its municipal area comprises 2,600 acres. It is situated at the head of the Lea watershed, and above the intakes of the London Water Companies, by whom its treatment of its sewage has always been jealously watched. The sewage of Luton is distinctly of an exceptional character, being deeply coloured by the dyes, both vegetable and aniline, used in dyeing the straw plait, and it is not possible to disintegrate its component parts unless by very costly treatment. The town council last year purchased 70 acres of land about one mile from the town, which they have converted into a sewage farm. This land, the greater part of which lies on a hillside, is about 200ft. above the level of the town, and the sewage is forced up to it by a powerful horizontal double-action engine and pump combined, worked by boilers of 130H.P. The sewage falls into a series of tanks from which it is led over the farms by means of an arrangement of sluices and carriers. The land is of a chalk formation with a covering of staple soil. The greater part of the farm is laid down in rye grass. The cost of working is very

low, and the result of the scheme has proved satisfactory to the corporation. In the discussion which followed the reading of the paper, Major Flower said he had come to the conclusion that land was the only absolute purifier of sewage, although there were cases where some chemical processes answered well. The Lea Conservancy Board were exceedingly pleased with the thorough way in which the Corporation of Luton had met the case. Some discussion followed. The members of the association afterwards drove over the sewage works and visited the water company's works, after which they were entertained at luncheon by the mayor at the town hall.

THE SEWER OUTFALL WORKS AT BARKING.—On Saturday the members of the Metropolitan Board of Works went down the river by steamboat to inspect the works in progress at the main outfall of the northern sewerage system near Barking Creek. The operations, which are about half complete, are being carried out by Messrs. Mowlem and Co., under a contract for £406,000, and were commenced in February, under a bond to deliver them over in July next, subject to penalties of £300 per week in default. Thirteen precipitating tanks on the land-side of the existing reservoir will receive the sewage, which will remain for two hours in a quiescent state for the deposition of the sludge. The effluent water will then be run off into the river, and the sludge into other tanks, where it will settle for ten hours longer to remove more of the liquid, which will be used for mixing with lime to form a precipitating agent. The settled solids, still containing 90 per cent. of moisture, will be passed through pipes and loaded into ships, in which, unless it prove of commercial value, it will be carried away to sea. The works executed up to the present time amount to £135,000, and 2,000 men are engaged upon them.

CHIPS.

Mr. Henry Henshaw Hadfield, of Manchester, a well-known drawing master and painter in that city, died on Friday last, aged 78 years. He was a pupil of the late Michael Calvert, and was afterwards for many years honorary secretary of the Manchester Academy of Fine Arts. About 30 years ago he published a work on "Perspective," which had a wide sale at the time. Among Mr. Henshaw's pupils were his cousin, Mr. T. Oldham Barlow, R.A., and Mr. John Brett, Mr. Ward Heys, and Mr. R. B. Wallace.

A memorial window, the work of Messrs. Saville and Young, of London, was unveiled in Shebbear parish church, Devon, last week. The subject is the Ascension.

The names of the following builders appear among the adjudications in bankruptcy in Tuesday's *Gazette*:—William Martin, of Willesden-green; William Adams, jun., Maindee, Mon.; and Thomas Potterton, Cavendish-road and Railway-approach, Balham.

Miss Sophie d'Ouseley, who presented a picture of Westminster Abbey to the Queen, has been commissioned, the *World* says, by the ladies of Cornwall to paint the picture of the interior of Truro Cathedral, which is to be given to Mrs. Benson, the wife of the Archbishop of Canterbury.

In the Manchester Chancery Court, on Monday, on the petition of Messrs. Littlewood, architects, an order was made to wind up the Palace Hotel Hydropathic and Spa Company (Limited), Birkdale.

The highest award of merit at the Adelaide Exhibition has been awarded to Messrs. Edward Smith and Co., of Coalville, Leicestershire, for their ornamental floor and wall tiles.

The Hertfordshire Michaelmas Court of Quarter Sessions on the 20th Oct. decided to increase the salary of the county surveyor, Mr. Urban Smith, C.E., of Westminster, from £400 to £500.

A girls' club room and school of cookery have lately been built in connection with St. Clement's Schools, City-road. Messrs. Wallace Bros. are the builders employed, Mr. Hugh Roumieu Gough, F.R.I.B.A., being the architect.

A new post-office for the rapidly-rising watering-place of Cromer, Norfolk, is shortly to be erected from the designs of Mr. H. Roumieu Gough, who is also about to build himself a seaside residence there, having many other important works intrusted to him, besides the management of a large estate.

Walter Hind, aged 40, builder, was committed for trial by the Worship-street police magistrate on Tuesday on two charges of forgery, and having knowingly uttered forged cheques.

Mr. E. Pritchard, of 2, Storey's-gate, Westminster, and 347, Waterloo-street, Birmingham, who failed in Chester 24 years ago as a contractor, and paid a composition of 2s. 4d. in the pound, has this week paid all his creditors the remaining 17s. 8d. in the pound.

Our Office Table.

MESSRS. C. E. HALLE and J. COMYNS CARR announce that they have resigned their positions on the direction of the Grosvenor Gallery, which they have held since its establishment in 1877, on the ground that in placing the virtual control of the Gallery in the hands of a man utterly unconnected with Art, and wholly ignorant of its aims and requirements, Sir Coutts Lindsay has removed every guarantee that its future conduct shall be consistent with the high and worthy purpose with which it was originally established. Mr. Alma-Tadema and Mr. Burne-Jones have written to Messrs. Hallé and Carr in terms of approval of this secession. Mr. Tadema thinks it more than doubtful whether he should be justified in continuing to exhibit at the Gallery; while Mr. Burne-Jones goes further, and positively affirms that his connection with the gallery is over. Sir Coutts Lindsay writes that he proposes to make no change in the management of the gallery. Sir Coutts seems also to show that the quarrel is but a private one of no public interest; but as Mr. Fredk. Wedmore says, in an able letter in which he reviews the history of the Grosvenor Gallery, no small share of its policy has been initiated by the assistant directors. Although no man, and indeed no picture gallery, is really necessary, the split in the Grosvenor directorate can scarcely fail to have a marked and possibly serious effect on the fortunes as well as the character of the Grosvenor exhibitions.

THE recent encounters in Trafalgar-square between the police and the ill-employed have suggested to several correspondents of the daily press that that open space might be rendered far more agreeable and ornamental with any other treatment than the present method of paving the whole area. "J. M." proposes that the square should be inclosed by a strong and high ornamental iron railing surmounted by sharp spikes and provided with four gates. Mr. William Woodward replies that this would be a step in the wrong direction, for the tendency in the parks and ornamental inclosures of London is to get rid of all prison-like railings, and to substitute low rails and curbs. His own proposal is that Trafalgar-square should be laid out as an ornamental inclosure designed by a landscape gardener. The base of the Nelson monument should be, he thinks, also inclosed by a low curb or cordon of old-fashioned wood posts and chains, planted with shrubs and laid with green turf. Thus two objects would be secured—(1) the beautifying of one of our finest open spaces by green grass and evergreens; (2) the closing of the square as a Mob Forum.

MR. JAMES LEES, of Goole, who was terribly injured by an explosion of fireworks on Jubilee day, is pronounced to be hopelessly blind. He cannot, therefore, retain his position as manager for the gas and water company. He is 48, and has a wife and two daughters. A fund is being raised locally, and contributions are being sent in by building and engineering firms, and by persons connected with gas and water undertakings. Mr. Lees was formerly an iron founder in Carlisle, and was afterwards on the staff of the Pimlico foundry of Messrs. Young and Co. The secretary to the Lees fund is Mr. G. W. Cutts, solicitor, Goole. The contributors include—Mr. Geo. Livesey, South Metropolitan Gas Company (£25); Messrs. Dempster, Manchester (£20); Messrs. Spence and Co., Manchester; Messrs. Guest and Chrimes, Rotherham; Messrs. Bray, Leeds; Messrs. Dixon and Sons, Leeds; and others in all parts of the country.

PROFESSOR BALDWIN BROWN, in opening the Fine Art Class in the Edinburgh University for the winter session, took for the subject of his introductory address the Epic Poem of Babylonia, recently deciphered in part from clay tablets found in that country. It was still very fragmentary; but they had enough to form some idea of it, and to compare it with some of the earliest Greek poetry. The indebtedness of Greece to the East was now universally acknowledged, especially in mythology and the arts. It was now seen that Greece borrowed much more largely from Babylonia than from Egypt. Like the "Iliad," the Babylonian Epic grew out of collection of separate lays of great antiquity. These lays were evidently put into something like a continuous whole 1,000 years before the days of Homer. The Babylonian Epic was made up of twelve cantos, and contained about 3,000 lines. It was divided into several episodes, one of which, entitled the Chaldæan account of the Flood, resembled in a very remarkable manner the story they had in the book of Genesis of the Flood. Another gave an account of the descent of the great goddess Ista to Hades. These were both parts of a continuous poem which had reference to the adventure of an ancient hero—a Babylonian Herakles—whose name was Isdubar, King of Erech, whom some identified with the Biblical Nimrod, who reigned over a city of the same name. The poem contained passages of true poetry. It introduced us to the Babylonian Pantheon in a very vivid and striking manner, and it afforded much insight into the derivation of Greek myths and legendary personages, giving some curious parallels to what we found in Homer. We have in this epic, so far as we can make it out, a powerful and interesting work, containing forcible situations and a good deal of powerful poetry. It is still incomplete, but we are getting fresh light thrown upon it every day, and as fresh tablets are being discovered he hoped soon to have the poem in its entirety.

M. HIPPOLYTE LAZERGES, the distinguished French artist, has just died at the age of 70 years. Since 1841 he had been a regular contributor to the Salon exhibitions, his chief works being sacred subjects. His "Death of the Virgin," painted for the Chapel of the Tuilleries, and exhibited in 1867, was widely noted. The most important of M. Lazerges' later works are the following:—"Ecce Homo," 1885; "Susannah at the Bath," 1857; "Jesus Embracing the Cross," 1859; "The Dance of Assouans," 1861; "Christ Praying for His Persecutors," 1864; "Mary Magdalene first beholding the Lord," 1867; "The Way to Calvary," 1870; "Eve," 1872; "Christ in the Nineteenth Century," 1873; "Stabat Mater," 1874; "Louis XVI. and Marie Antoinette at Versailles," 1875; and "The Caravan of Kabyles," 1876. The "Foyer of the Odéon Theatre on a First Night" contained portraits of the most celebrated Frenchmen of the day.

CHIPS.

The Bishop of London will consecrate St. Cuthbert's Church, Philbeach-gardens, Kensington, which is thought by many to be one of Mr. Gough's most masterly and original designs, on the 14th inst. We shall give a full description of the church on a future occasion.

Messrs. Hayward Tyler and Co.'s steam pumps have been awarded the First Order of Merit, being the highest award at the Adelaide Jubilee Exhibition.

Mr. John Evans, who has been for many years the chief working manager of Lord Penrhyn's extensive slate quarries at Bethesda, has severed his connection with these quarries.

The Manchester corporation have purchased from their autumn exhibition, for the permanent collection at the Royal Institution, the following pictures:—"A Thorn amidst the Roses," James Sant, R.A., £636; and "Across the Forest," £105, Eyre Walker, R.W.S.

St. Peter's Church, Cornhill, is being restored from plans by Mr. E. Flint. Messrs. Phillips and Bisiker, of Leadenhall-street, are the contractors.

The committee who are arranging for a memorial to the late Rt. Hon. W. E. Forster, have intrusted the execution of both the monument in Westminster Abbey (which will be placed within the space occupied by the monument to Mr. Forster's uncle, the late Sir T. F. Buxton), and the statue to Mr. H. Richard Pinker. Mr. Pinker is now engaged in preparing sketches for the statue, which will be of bronze, and the site for which in London will shortly be determined.

St. David's Church, Glasgow, locally known as the "Ram's Horn Church," was reopened after restoration on Sunday, when the Lord Provost, city magistrates, and council attended officially. The side galleries have been removed, and the lancet lights throughout the building have been filled with stained glass.

The Bishop of Rochester unveiled, on Monday, a stained-glass window, typical of "Scenes in the Life of Our Saviour," which has been erected at the west end of St. Paul's Church, Lorrimore-square, Walworth, in memory of the Rev. Evelyn F. Alexander, late vicar of that parish, who died in February last.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW). — Association of Public Sanitary Inspectors. Annual Address by Hugh Alexander, Chairman of Council, Westminster Town Hall. 6 p.m.

MONDAY.—Royal Institute of British Architects. Opening meeting. Address by the President, E. I'Anson. 8 p.m.
Society of Engineers. "Primary Batteries for Illuminating Purposes," by Perry F. Nursey. 7.30 p.m.

TUESDAY.—Institution of Civil Engineers. Address by the President, G. B. Bruce. 8 p.m.

CHIPS.

The committee charged with the erection of a technical college at Dewsbury have decided to take steps for the erection of a building to cost £6,000, exclusive of site, and to be capable of further extension.

The movement for the registration of plumbers is assuming practical form in Manchester. Mr. John Holden, F.R.I.B.A., of that city has been appointed chairman of the local council, with Mr. M. Ingram as deputy-chairman, Mr. W. Jaffrey as treasurer, and Mr. Fred Scott as secretary and registrar. A sub-committee on which both masters and operatives are elected is at present engaged in the task of collecting information and drafting rules.

On the occasion of the dedication of the new reredos and the completion of the east end of the Cathedral Church of St. Nicholas, Newcastle-on-Tyne, festival services are to be held. There will be a week of services, beginning on Sunday, Nov. 13th, and ending on Sunday, Nov. 20th, in which the Archbishop of York and the Bishops of Durham, Newcastle, Carlisle, Southwell, Liverpool, and Sodor and Man will take part. The works were described in our issue of the 21st ult., p. 607, and we shall illustrate the choir, showing the new stalls and bishop's throne, next week. Mr. R. J. Johnson, F.S.A., of Newcastle, is the architect; and Mr. J. Sherwood Westmacott the sculptor.

The Prince of Wales laid, on Wednesday, the foundation-stone of the church of All Saints, at Falmouth. It is being built on a site given by the Earl of Kimberley, situated on high ground at the top of Killigrew-road. It is arranged to accommodate about 700 persons, and will cost about £6,000. Mr. John D. Sedding, of London, is the architect.

The second section of the Roman Catholic Church of the Sacred Heart in Norton-road, Hove, Brighton, has just been opened. The church is 14th-century Gothic in character, and, as completed, seats 450 persons. Mr. Joseph S. Hansom, of Palace Gardens-terrace, Kensington, is the architect; Messrs. R. and E. Evans, of Peckham, S.E., are the builders; the clerk of works was Mr. J. W. W. Randle, and the foreman was Mr. C. Cole. The carving of the church, with the exception of that of the altar and pulpit, has been done by Messrs. Bolton, of Cheltenham, and the grills, brass gates, and gas fittings have been supplied by Messrs. Starkie, Gardner and Co. of London.

The parish church of Doddinghurst, near Brentwood, which has been completely restored at a cost of £2,500, was reopened on Tuesday.

Major-General Carey, R.E., one of the inspectors to the Local Government Board, has opened an inquiry at Clifden, near Manchester, into the application of the Barton Rural Sanitary Authority, to borrow £750 for the sewering of Back Manchester-road, Berry-street, with other streets in that township. The authority have just completed a system of main drainage for the township of Clifton, and they now seek powers to divert the street drains into the main sewer. The plans prepared of the proposed work were submitted by Mr. C. C. Hooley, C.E., surveyor to the authority. The inspector after proceeded to Urmston, where a second inquiry was held into a proposal of the same authority to borrow £550 for the sewering and forming Lily-street, Urmston.

At the invitation of Mr. Bridgman (Chairman of the Law and City Courts Committee), the Lord Chancellor has consented to lay the foundation stone of the New City of London Court on Wednesday, the 23rd inst.

Mr. Ernest George is exhibiting at the rooms of the Fine Art Society a collection of some three hundred of his admirable water-colour drawings.

A correspondent signing himself "G." says in the last edition of Rickman's "Gothic Architecture," p. 259, the illustrations of bays of Canterbury and Winchester Cathedrals have been wrongly transposed. The first one represents a bay of Canterbury, and the second a bay of the nave of Winchester. It may be of interest to call attention to the error, so that it may be corrected by Messrs. Parker in the next edition.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

ARMLEY.—For eight houses (in two blocks), for Mr. C. Stott, at Armley. Mr. F. W. Rhodes, architect:—

Brick and mason (labour only):—			
Barrass, W., New Wortley	£160	0	0
Joiner:—			
Blackburn, J., Armley	290	0	0
Plumber:—			
Crowther, C., Leeds	98	0	0
Slater:—			
Atkinson, J., and Son, Leeds ...	42	18	0
Painter:—			
Green, G. H., Leeds	13	0	0
Plasterer:—			
Haddock, W. J., Armley	75	18	0

ARMLEY.—For six houses, Armley, Leeds, for Mr. J. Blackburn. Mr. F. W. Rhodes, architect:—

Brickwork (labour only):—			
Haddon and Hutton, Leeds	£78	0	0
Plumber:—			
Crowther, C., Leeds	72	0	0
Plasterer:—			
Pearson, J., Leeds	54	10	0
Slater:—			
Pickles Bros., Leeds	28	12	0

ARMLEY.—For eight houses at Armley, for Mr. J. W. Waker. Mr. F. W. Rhodes, architect:—

Richardson, S., Leeds	£420	0	0

BIRMINGHAM.—For forming, sewering, kerbing, guttering, and paving New-street, from Bracebridge-street to Aston Brook-street. Mr. A. H. Hamblin, Temple-street, architect and surveyor:—
Currall and Lewis (accepted).

BICESTER.—For the erection of new Salvation Army Barracks, for General Booth. Mr. E. J. Sherwood, 101 Queen Victoria-street, E.C., architect:—

Grimsley and Son, Bicester	£500	0	0
Coxhead, Leytonstone	444	0	0

CANTERBURY.—For covering in the Shambles, for the city council:—

	A.	B.	C.
Hodgson, Canterbury—	£391 0 0	£426 10 0	—
Martin, Ramsgate—	375 0 0	—	£335 0 0
Jukes, Coulson, and Co., Bromley-by-Bow—	356 0 0	386 0 0	—
Wiltshire, G., Canterbury (accepted)—	360 0 0	395 0 0	—

A.—Ordinary glazing. B.—Rendle's system.
C.—Helliwell's system.

CEFN, NORTH WALES.—For the erection of new Salvation Army Barracks, for General Booth. Mr. E. J. Sherwood, 101, Queen Victoria-street, E.C., architect:—

Weale and Co., Ludlow	£458	0	0

CLAPTON.—For the erection of a temporary exhibition building, for General Booth. Mr. E. J. Sherwood, 101, Queen Victoria-street, E.C., architect:—

Willesdon Paper Co. (accepted) ...	£151	0	0

CLEVEDON, SOMERSET.—For alterations and additions to premises known as Glendale, for the Rev. J. S. Newmann. Messrs. Barker and Cross, architects:—

Elston, Clevedon	£538	18	0
Hardwidge and Tanner, Clevedon ...	483	10	0
Dowland, Easton	485	0	0
Hill, Clevedon (accepted)	444	11	11

COLNBROOK.—For the erection of new Salvation Army Barracks at Colnbrook, for General Booth:—
Young, Slough (accepted).

EAST GRINSTEAD.—For board room, offices, and surveyor's residence, for the East Grinstead Local Board. Mr. W. N. Martin, Wimbledon, architect. Quantities by the architect:—

Longley, J., Crowley	£911	0	0
Cardos, J.	888	0	0
Foster, A.	852	15	6
Pink, R., Godalming	847	0	0
Criswell and Chitty	837	17	0
Pledge, W.	789	14	4
Beard, J....	757	0	0
Morris, J.	740	0	0
Charlwood Bros. (accepted)	685	0	0

Rest of East Grinstead.

EASTBOURNE.—For the erection of an inn at Ocklynge, for Mr. H. C. Hurst. Messrs. Fuller and Oakden, architects. Quantities supplied:—

Martin, J.	£1,790	0	0
Deadman, S.	1,798	16	0
Martin, M.	1,770	0	0
Russell, J.	1,765	0	0
Miller and Selmes	1,747	0	0
Wood, J.	1,695	0	0
Dore and Son...	1,617	0	0
Cornwell and Son	1,595	0	0
Parker	1,575	0	0
Wren, C.	1,565	0	0
Newman and Hart (accepted) ...	1,519	0	0
Huggett and Pattenden	1,545	0	0
Bishop and Thorpe	1,479	12	0
Starbridge and Tupper	1,473	0	0
Hookham, J.	1,395	0	0
Coster, J.	1,208	0	0

All of Eastbourne.

FOLKESTONE.—For alterations to the Bradstone Hall, for General Booth. Mr. E. J. Sherwood, 101, Queen Victoria-street, E.C., architect:—

Alderton and Wheeler, Cambridge	£315	0	0
Coxhead, Leytonstone (accepted) ...	200	0	0

HALIFAX.—For the construction of the Halifax High Level Railway, from King's Cross (Halifax) to Holmfield:
Baker, C., and Sons, Bradford (accepted).

HEATHCOTE, WARWICKSHIRE.—For the erection of an infectious diseases hospital, for the Warwick Joint Hospital Board:—

Webb, W. J., Birmingham... ...	£7,990	0	0
Haywood, C., Jun.	7,930	0	0
Smith, G. F., Leamington	7,766	15	0
Houghton, T., Leamington ...	7,658	18	10
Tallis, E., Warwick	7,345	0	0
Jones, T. H., Leamington	7,272	0	0
Brodney and Co., Wolverhampton	7,137	0	0
Jarvis, E., Banbury	6,950	0	0
Heatherley, J., Bros., Coventry ...	6,870	0	0
Mallin, J., West Bromwich* ...	6,721	9	6
Panter, D., Pershore	6,641	11	0

* Accepted.

HITCHIN.—For the erection of new Salvation Army Barracks, for General Booth. Mr. E. J. Sherwood, 101, Queen Victoria-street, E.C., architect:—

Foster, Hitchin	£702	0	0

HORNSEY, N.—For erecting a new school for 1,000 children, to take the place of the present Hornsey-road School, for the London School Board. Mr. T. J. Bailey architect:—

Tyerman, J....	£14,526	0	0
Dabbs, W. M.	12,417	0	0
Simpson and Co.	11,280	0	0
Johnson, W....	11,243	0	0
Wall, C., Lots-road, Chelsea* ...	10,790	0	0

* Accepted.

[(*a*) Cost of school buildings and closets £8,984; (*b*) ar pavement and playground, £400; (*c*) boundary walls and gates, £282; (*d*) playground on top of school, £499; (*e*) teachers' rooms, £300; (*f*) extra depth of foundations, £325; total, £10,790. Cost per head of (*a*), £8 19s. 8d.; total cost per head, £10 15s. 9d.]

LEICESTER.—For the supply and erection of four independent rotative Woolf compound beam pumping engines, together with eight Lancashire steel boilers, and other machinery and plant in connection therewith, for the new sewage pumping station, according to designs, plans, and specifications of Mr. J. Gordon, M.Inst.C.E., borough surveyor :—

	A.	B.
Daglish, R., and Co., St. Helen's, Lancs.—		
—	...	£36,625 0 0
Simpson, J., and Co., Ltd., London—		
—	...	36,398 14 5
Do.—For three compound high-duty Worthington engines—		
—	£31,477 13 3 ...	—
Fawcett, Preston, and Co., direct-acting, vertical, compound, intermediate receiver and surface condensing engines—		
—	33,000 0 0 ...	—
Wareham, T., Burton-on-Trent—		
—	...	32,500 0 0
Hathorn and Davey, Leeds—		
—	...	28,685 0 0
Do.—Improved, differential compound surface-condensing engines—		
—	21,685 0 0 ...	—
Bever and Dorling, Dewsbury—		
—	...	28,417 10 0
Lilleshall Iron Co., Oakengates—		
—	...	27,800 0 0
Stewart, D., and Co., Glasgow—		
—	...	26,422 2 0
Watt, J., and Co., London—		
—	...	24,250 0 0
Easton and Anderson, London—		
—	...	23,794 0 0
Wood Bros., Sowerby Bridge—		
—	...	22,852 0 0
Gimson and Co., Leicester (accepted)—		
—	...	22,629 6 0
Kirk, G., and Co., Stoke-on-Trent—		
—	...	21,168 0 0
Silvester, F., and Co., Newcastle, Staffs.—		
—	...	18,947 0 0

A.—Engine builder's design. B.—Borough surveyor's design and specification.

LIVERPOOL.—For the borings required in connection with the crossing of the river Weaver by the Vyrnwy Aqueduct, for the city council :—
Timmins, E., Runcorn (accepted).

LIVERPOOL.—For additions and alterations to the west wing of the City Hospital, Netherfield-road, for the city council :—
Morrison and Sons (accepted) ... £2 937 0 0

LIVERPOOL.—For the erection and completion of the new wholesale fish market and the first section of the retail fish market, for the city council :—
Morrison and Sons (accepted) ... £18,145 0 0

LAMBETH.—For the erection of a new library, for the Lambeth Libraries Commissioners, in the South Lambeth-road, and presented to them by Mr. H. Tate, J.P. Mr. S. R. J. Smith, A.R.I.B.A., 15, York Buildings, Adelphi, W.C., architect :—

	Portland Stone Dressings.	Doulton Stone Dressings.	Fittings.
Candler—			
	£5,050 0 0 ...	£4,900 0 0 ...	£500 0 0
Bowyer—			
	4,927 0 0 ...	4,794 0 0 ...	366 0 0
Smith, W.—			
	4,855 0 0 ...	4,805 0 0 ...	498 0 0
Holliday and Greenwood—			
	4,747 0 0 ...	4,707 0 0 ...	397 0 0
Hall, Bedall—			
	4,680 0 0 ...	4,615 0 0 ...	505 0 0
Higgs, F. and H. F.—			
	4,640 0 0 ...	4,465 0 0 ...	390 0 0
Mills, J.—			
	4,600 0 0 ...	4,550 0 0 ...	450 0 0
Higgs and Hill—			
	4,330 0 0 ...	4,294 0 0 ...	374 0 0
Nightingale (accepted)—			
	4,270 0 0 ...	4,225 0 0 ...	390 0 0

LONDON.—For carrying out the following works, for the London School Board :—

Chelsea (Beethoven-street).—For forming additional windows :—

Pardoe and Son	£39 0 0
Cowley and Drake	29 10 0
Oldrey, W., and Co.	25 0 0

West Lambeth (Eltringham-street).—For erecting kindergarten gallery :—

Walkley, H.	49 10 0
Dowling, T.	48 0 0
Lascelles, W. H., and Co.	45 0 0
Hammer, G. M., and Co.	43 10 0
Cruwys, T.	39 0 0

West Lambeth (Walnut Tree-walk).—For erecting sliding glass partitions in boys' and girls' departments :—

Mallett, H.	82 10 0
Lathey Bros.	82 10 0
Holloway Bros.	71 10 0
Nightingale, B. E.	63 10 0

Marylebone (Haverstock Hill).—For providing stepped flooring :—

Davis Bros.	42 0 0
Sarjeant, E. H.	39 0 0
Vincent, H. and F.	34 0 0
Pratt, W.	28 9 6
Cruwys, T.	27 18 6

Board Offices.—For new boiler :—

Crane, R.	156 10 0
Cannon, W. G.	144 10 0
Heathman, J. H., and Co.	143 0 0
Longden and Co.	103 12 6
Russell, B.	96 0 0
Rosser and Russell	93 10 0
Fraser and Fraser	88 10 0

(Lowest tender accepted in each case.)

LONDON, S.W.—For alterations and additions to the Rising Sun, Bridge-road, Battersea, S.W., for Mr. G. Sansom. Mr. H. I. Newton, 17, Queen Anne's-gate, Westminster, S.W., architect :—

Gill	£927 0 0
Godden, S.	875 0 0
Lamble, S. R.	860 0 0
Burman and Son	835 0 0
Fincher	815 0 0
Walker, J., Poplar (accepted) ...	760 0 0

Pewterer, &c :—

Kemble, R.	120 0 0
Davidson, J.	112 5 0
Saunders and Son	107 14 0
Heath, Goswell-road (accepted) ...	103 0 0

LONDON.—For rebuilding Nos. 43 and 45, Great Titchfield-street, and Nos. 1 and 1a, Little Titchfield-street, W., for Mr. W. M. Verney. Mr. W. J. Miller, architect. Quantities by Messrs. J. and A. E. Bull :—

Perkins...	£3,967 0 0
Oldrey and Co.	3,958 0 0
Simpson and Son	3,926 0 0
Colls and Son	3,795 0 0
Bywaters	3,576 0 0
Patman and Fotheringham ...	3,473 0 0

MAIDSTONE.—For taking down and rebuilding warehouse, at Bridge Wharf, Undercliffe, Maidstone, for Mr. W. Taylor. Messrs. Ruck, Son, and Smith, architects. Quantities supplied :—

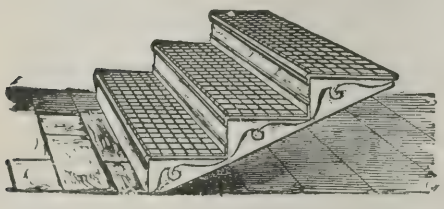
Cox Bros.	£1,249 0 0
Vaughan, E.	1,222 0 0
Pryer, A. N., and Co.	1,192 10 0
Elmore, T.	1,177 17 6
Wilkins, E., Losse	1,164 10 0
Wallis and Clements (accepted) ...	1,099 0 0
Rest of Maidstone.	

PUTNEY.—For altering Nos. 6 and 7, Salisbury-pavement, High-street, Putney, for the London and County Banking Co., new branch bank. Messrs. T. and W. Stone, 2, Great Winchester-street, E.C., architects :—

	Corncockle Stone.	Portland Cement.
Gregar, W.—		
	£1,820 0 0 ...	£1,695 0 0
Adamson—		
	1,445 0 0 ...	1,390 0 0
Dabbs—		
	1,450 0 0 ...	1,300 0 0
Higgs—		
	1,280 0 0 ...	1,160 0 0
Turtle and Appleton—		
	1,288 0 0 ...	1,128 0 0
Parsons—		
	1,225 0 0 ...	1,090 0 0
Avis and Co. (accepted)—		
	1,099 0 0 ...	989 0 0

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Bedminster
Bescot Junction
Birmingham
Bishopsgate
Blackfriars
Blackfriars Bridge
Blake Street, Sutton Coldfield
Blaydon-on-Tyne
Bletchley
Bolton
Bolts Bridge
Bombay, India
Bow
Bowdon Central
Brick Lane
Bristol
Broadfield
Broad Street
Broadstone, Dublin
Burdett Road
Burscough Junction
Burton
Bury
Borough Road, Mersey Tunnel
Canonbury
Camden Road
Chalk Farm
Charing Cross
Cheddington
Cheetham Hill Junction
Chequerbent
Clayton
Clifton
Clitheroe
Crewe
Crooked Billet Level Crossing
Cross Lane
Crumpsall
Cullercoates
Cannon Street
Dalston
Daubhill
Daybrook
Denholme
Derby
Droylesden
Drighlington
Dudley
Dudley Port
Dundee
Ealing Common
Ealing Terminus
Earl's Court
Edgware Road
Failsworth
Farringdon Street
Farrington
Fenchurch Street
Finchley Road
Firsby
Forest Gate
Forest Road Level Crossing
Fulham
Geedley
Gloucester Road
Gower Street
Grantham
Greenwich
Hackney
Haggerston
Hammersmith
Heaton Park
Hereford, Barr's Court
Highbury
Highdrau Road, Wallsend
Hollinwood
Holyhead
Homerton
Horley
Hounslow
Hounslow Barracks
Keighley
Kemble Junction
Kenilworth
Kensal Green
Kentish Town
Kilburn
Kilsby
King's Cross
King William Street
Langley Green
Latimer Road
Lea Bridge
Leamington
Leman Street
Leyland
Leyton
Leytonstone
Lichfield
Limehouse
Lincoln
Little Ealing
Liverpool Road, Manchester
Liverpool Street
Llandudno
Long Buckby
London Road
Ludgate Hill
Mark Lane
Maidstone
Manchester
Manchester, Exchange
Manchester Road
Mansion House
Mildmay Park
Millhill
Milverton
Monkwearmouth
Moorgate-street
Monument
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Sheffield
Shoreditch
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Slough
Soho
South Bromley
South Kensington
Southport
Speke
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Stechford
Stepney
Stoke
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Sutton
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Tring
Tynemouth
Upton Park
Victoria
Victoria Park
Walham Green
Wallsend
Walsall
Waterloo, Liverpool
Weaste
Werneth, Oldham
Westbourne Park
West End Lane
Westminster
Whitchurch
Whitechapel
Whitefield
Whitley
Widnes
Willenhall Bridge
Willesden
Wood Green
Wormwood Scrubbs
Worsley
Wolverhampton
Wolverton

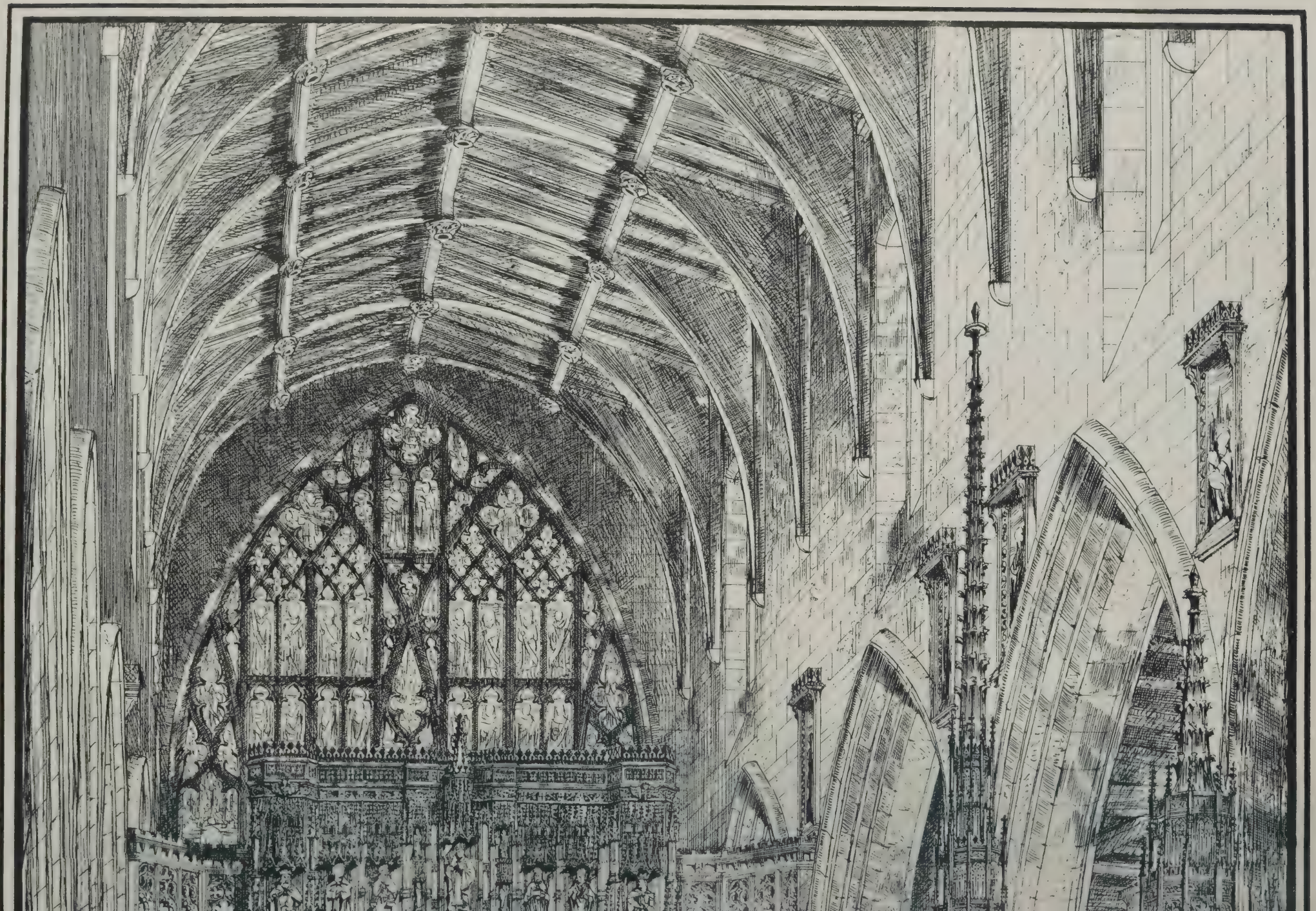
Barracks.
Aldershot
Ashton-under-Lyne
Barnet
Belfast
Budbrook
Burnley
Caterham
Chatham
Chester
Coventry
Curragh Camp
Dublin, Beggar's Bush
Dublin, Island Bridge
Dublin, Ship Street
Dublin Royal Barracks
Dundalk
Dublin Castle Police Barracks
Eastney
Fleetwood
Fulwood
Halifax
Hamilton, Glasgow
Hulme
Knightsbridge
Leicester, Glen Parva
Manchester
Newbridge
Newcastle-on-Tyne
Normanton
Northampton
Norwich
Portsea
Portsmouth
Preston
Regent's Park
Salford
Shorncliffe
Trim
Warley
Winchester
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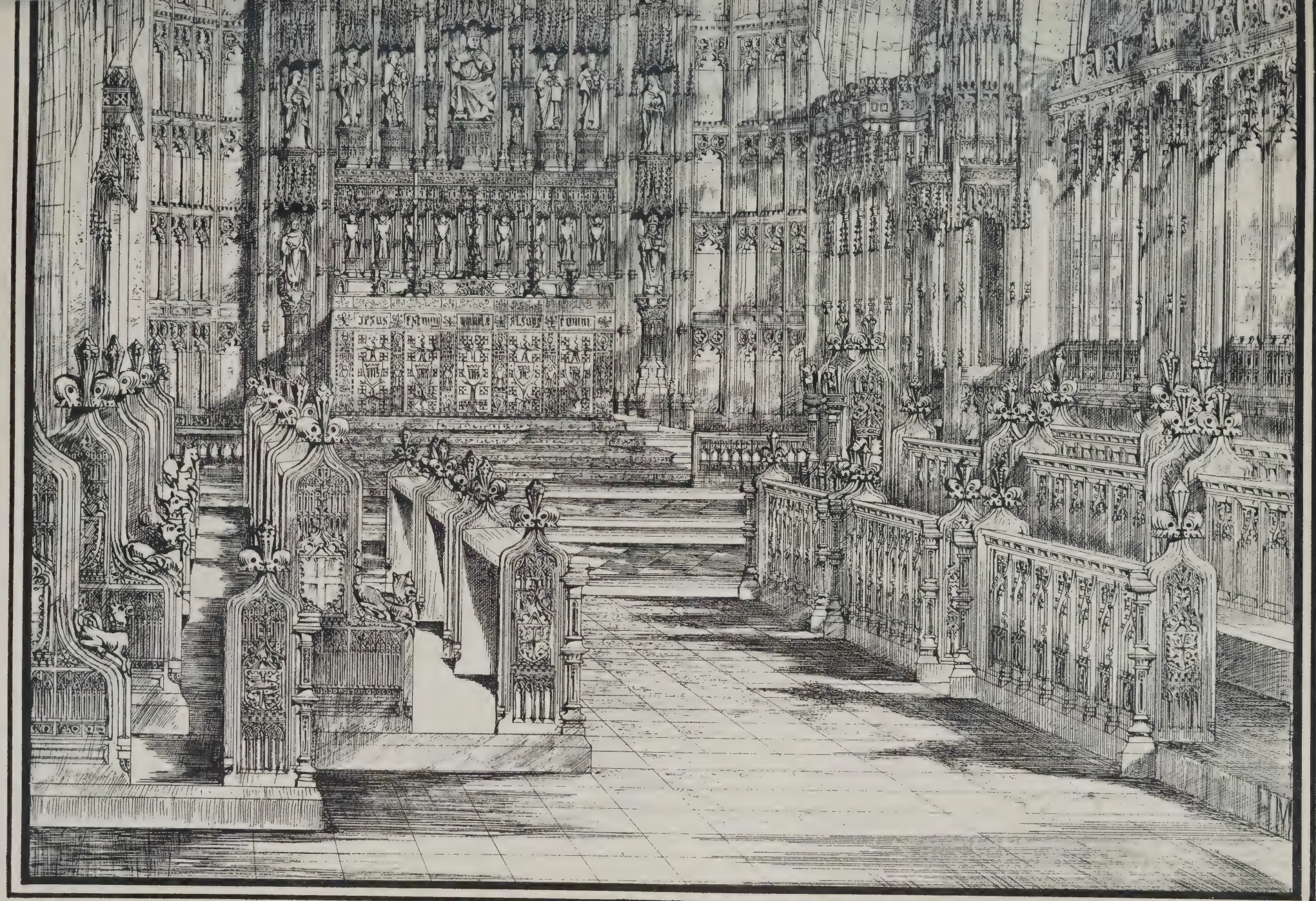
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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
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FRIDAY, NOVEMBER 11, 1887.

OPTICAL REFINEMENTS IN ARCHITECTURE.

MANY architects look upon all refinements of line and curve as so much waste time, and would as soon think of referring to the original Latin of Vitruvius for rules in proportioning their rooms, as to consult and apply the corrections of the Parthenon to their buildings. In sketching out his design to a small scale on a sheet of Whatman's drawing paper, the architect does so without any further thought than to produce a convenient plan, or a well-grouped elevation. Any infinitesimal correction to the straight line, or entasis would be inappreciable to the naked eye on the surface of paper, the inequalities of which would render it worthless; nor does he take much trouble in the proportions of his rooms so long as they look right and fit well. If such refinements are to be made, they should be shown in large drawings, or set out to the full size on the works by proper rules and other instruments. The task is laborious and troublesome, and contract prices are little in sympathy with such niceties of adjustment. Even of the more practicable mode of adopting certain ratios and proportions, the architect does not avail himself very much, and he takes heart in his carelessness about such things by the opinions of leading architects who have found, as the late Mr. Sydney Smirke, R.A., once observed, that there are pleasing effects producible by the adoption of such widely different proportions that he was incredulous of all these theories. That able and learned architect pointed out once in a paper that rooms of admitted beauty are to be found of almost every geometrical shape—even the circular doomed interior of the Roman Pantheon, and the octagon tribune which contains the Venus di Medici, of Florence, are both considered beautiful interiors. Even square rooms were shown to be beautiful sometimes, and a triple cube, like the Sistine Chapel, has as much to recommend it as a room of the Vitruvian double cube. Beauty in form cannot be reduced to a formula founded upon geometry or musical affinities. If it were, architecture would be reduced to a mathematical art which everybody could apply. Without any doubt beauty resides in a variety of forms, which are appropriate and fitted for their purpose; a square cubical room or an octagon apartment would be monstrous and ugly as a sitting-room; for a vestibule or ante-room, having a centre fountain or statue, either form may be beautiful. Optical refinements may be carried too far in these practical days; but we do not believe an architect is fully competent in his art who ignores them on every occasion, and will not admit that a long, horizontal line, such as a girder or beam in a ceiling, has a weak, sagging appearance, especially when there are any contrasting lines near it, as a slightly cambered or segmental ceiling. Anyone who will deny that he sees any weakness in a curved roof or ceiling with a straight tie-beam, or assert that the angles formed by the walls of a room, and a rigidly straight ceiling, look exactly what they—as right angles, must possess a natural defect in his vision, and is, so to say, "form-blind." We do not say that every horizontal beam—such as an entablature supported by columns at intervals—ought to be "corrected" by the application of a parabolic curve, or that every stringcourse and cornice should be arranged to curve or bend upwards; but we contend that these refinements ought to be made in interiors wherever the lines are long, and contrasting lines and surfaces occur in juxtaposition; that they are, in truth, applying precisely the same principle of correction as the colourist or decorator would apply when he takes care to juxtapose two colours or shades which shall be complementary to or harmonise with each other.

It is painful to witness in modern buildings a perfect ignoring of these principles of design. We go into a public hall or concert-room, and take our seat; the flat coffered ceiling appears to be literally bending or falling upon our heads. To make the impression still more apparent, the architect has introduced a circular or flatly-curved arch over the orchestral recess. If the ceiling is a flat curve, as it often is, the trusses are, perhaps, brought down below and encased, their lower edges being made perfectly horizontal, the two lines serving to increase the difference between them; in other words, to make the trusses look as if they were deflecting. Take another example: We enter a church that has a lofty nave, with side aisles, and spanned by a chancel arch. Lower down, at its sides, abut flat, segmental-pointed arches opening into chancel aisles. The lofty piers against which these three arches abut invariably look thrown back or distorted at the springing of the chancel arch; the vertical lines of the piers appear crooked. The cause of the optical illusion can be easily explained. The large arch curves contrast at the springing with the vertical pier lines and cause them to appear pushed out of the perpendicular, and this is intensified, the flatter and more sudden the springing curves are—the angle made looks sharper; the aisle arches, on the same principle, cause the piers to bend inwards at the junction and a distorted effect is produced. The high walls of the nave also appear to be thrust out by a flat, curved, or straight roof. It is only by opposite contrasts that the vertical lines of pillars retain their apparent straightness as in the abutting arches of the arcade.

These and other effects of contrasted lines have been fully discussed in some articles upon "Optical Correction in Design" in the BUILDING NEWS, which appeared in Vol. XVII. for 1869 (pages 123, 302, &c.), in which the author has called attention to several distinct kinds of illusion. To these articles we refer the reader. It is strange that so few works have been written on the subject. Mr. Penrose's learned work on the "Optical Refinements of Greek Architecture" dealt chiefly with the corrections formed in the Greek Temples, and notably those of the Parthenon; Mr. Pennethorne's work on "Ancient Geometry" ought also to be noticed in this connection. The modern architect may be too busy and practical-minded to care to examine minutely the investigated horizontal curved lines discovered in the Parthenon; but he should, if necessary, be ready to apply a similar method of curvature to any long, straight, horizontal lines with which he has to deal. There are other kinds of refinement which are equally important, and can be as readily applied. Mr. Pennethorne some years ago showed that the masses of the temples of Athens and Rome were designed on perspective principles — that is to say, the masses and many of the details were designed as they were intended to be viewed. The point of sight was always before the architect—that is to say, he studied the effect of his entablatures, abaci, and other masses of details from points of view that were likely to be frequented. It is well known that the various sections through the Doric capitals, the mouldings, and other parts of Athenian buildings, were composed of different arcs of the conic sections. Mr. Pennethorne says that the Greek entablature is perspectively proportioned and arranged to suit the given points of sight thus: The apparent height of entablature is measured in seconds upon the arc of a great circle. "Then, dividing this whole apparent height into some given number of aliquot parts, measured also in seconds, the apparent height of the architrave, of the freize and cornice will, in each case, be a multiple of this given modulus. Again, by dividing the first modulus into a given number of apparent aliquot parts, a second modulus is obtained, by which the apparent heights of all the details of the cornice of architrave and frieze will be regulated, and the true lineal heights are then all determined by trigonometrical calculations." In short, all the visible heights of features are, upon this principle, regulated from a given point, the real elevational height of each part being afterwards found. This system of proportion would probably entail too much labour upon the architect to work out with any accuracy, and may be looked upon as chimerical. But we see instances every day of positive ignorance of these principles, especially in the designing of mouldings, projecting features, and towers. If the architect is too impatient to make nice corrections in the manner we have pointed out, he ought at least to take the trouble necessary to regulate his heights and masses before inking-in his elevations. Sketching-in perspective is a valuable auxiliary in designing roughly the masses of a building; but some more accurate method is required in perspectively setting out the heights of stories, entablatures, parapets, towers, and other features. This can only be done by adjusting all heights from a given point of sight, or upon the arc of a circle described from the said point. An elevation is misleading, as every architect knows who has suffered disappointment after the building is finished; it only gives vertical heights, which may be very much curtailed or foreshortened in the actual view of the building from the opposite side of the street, for example. It will be said that the result of this system is to ignore actual heights of stories, and to give to upper features and towers or roofs, especially those at a distance from the façade, a fictitious elevation when the point of view is near. Not necessarily. The system can be applied only to those features that belong to the façade, or be made to include other planes more or less distant. If a dome in a quadrangular planned building is to be made a feature in the view, its tambour should be raised; other features would be stilted; whereas, if designed on the principle of the elevation, as if the eye were on the level of every sucessive stage in the height, we know how purposeless these features become. Wren, in his design of St. Paul's Cathedral, it is very obvious, studied the contracted area of the site and its surrounding streets in raising his dome to the height it now is. Were it to have been proportioned in height from the elevation, the dome would have almost disappeared from view in the streets surrounding. In many other of our cathedrals we find the same regard for increased height of tower; in others, as at Winchester and Peterborough, the tower is lost sight of behind the advancing western arm of the church. Both the distant and near view have to be consulted, and a compromise made that shall satisfy the eye. In the same class of optical correction may be mentioned several other defects. A very common instance of the want of perspective designing is to be met with in buildings whose cornices cut off a large portion of the blocking course and parapet from near points of view. In some buildings we find they are practically lost to view—a good reason for curtailing the projection of cornices in narrow streets. So also with the design of capitals and windows. The stilting of the arches is desirable to correct the effect where the pillars are high. In the design of mouldings above the eye architects often err

in not studying the effect of the members, or how some of them may be entirely lost when viewed from the ground level. Many towers and spires have been spoilt by designing them in elevation instead of at the angle. In broach spires we find a want of care in one particular above others. The broach is designed on the level; the hips of the broach are made to look gentle in elevation; but when raised above the eye 60 or 100ft. they become so depressed as to give a very ungraceful and abrupt springing to the spire. The mistake committed in this instance is the taking of the hip line of each angle broach from the elevation instead of diagonally—in short, taking one side of a square instead of the diagonal. The mistake is intensified when the angle of the hip is seen considerably below, and therefore foreshortened by perspective. The same defect occurs when the angles of hips of a pyramidal roof to a tower are designed as seen opposite a face instead of anglewise; and in designing square towers the diagonal view, as well as the side, should be attended to. It is needless to multiply instances which every practical architect must have experienced in the course of his work. One more example. We may instance the want of entasis to spires and columns. Everyone who has a critical sense of vision must have observed the apparent weakness there is in a spire that has perfectly straight sides, when compared with one which has been entasised, and the same with all columns; here also the method to insure the correction can be easily applied. The more important of these refinements are capable of being made at the initial stage of design, without recourse to decimals of two or three removes from the decimal point, or to mathematical calculations.

DUDLEY GALLERY IMPERIAL ART SOCIETY.

THE winter exhibition of oil pictures in the Dudley Gallery, Egyptian Hall, Piccadilly, appears under more favourable circumstances; as in another instance, the committee have reduced the number of pictures, placing them in more favourable positions for inspection, and setting them off by draping the upper part of the gallery. There is even now a great deal that is commonplace on the walls. Among the better pictures, the hunting scene, "Perfect Bliss," by Edgar Giberne, is truthful in natural colour and handling. The Hon. Stephen Coleridge's "The Avon at Stratford" is fresh and clear, and the studies by C. H. H. Macartney, "Wet Sands" (10), and his fine coast scene near Tintagel (109), are full of sunlight and atmosphere. The breaking waves, as they roll upon the sands, and the warm sandstone rock, lashed by the blue sea in the second picture, are painted with much feeling. A nice piece of impressionism is to be found in Edith Œ. Somerville's "Late in the Gloaming" (11)—very simple and truthful in colour. Another lady artist, Fanny Moody (13), sends an amusing row of pups, "We are Seven." Alfred de Bréanski is at home in Welsh scenery; his "Llyn Tregennen" is irradiant with the gleam of sunshine. There is also careful handling in his view of "The Pool, Burnham Beeches"—an effective study of woodland. Gustave de Bréanski (15), in his "Fishing-boats Seeking Harbour," shows a masterly knowledge of the sea; the atmosphere and colouring are excellent. "A Cornish Pilchard Fleet" (25) is equally truthful, and redolent of the waves. "Near Matley Wood, New Forest" (18), by F. Golden Short, and Kenneth Mackenzie's "From Surrey's Heights" (19)—a wide expanse of wooded country from a sandy ridge of hills—are both landscapes of merit. T. K. Pelham, a new member, has shown his capabilities in two works. "A Gift for the Convent" is a pleasing figure study, in which there is some feeling. Lucien Doucet, a member of the Paris Salon, exhibits "Une Parisienne" (27), a dark face in a black hat, full of expression in the eyes. We may speak commendably of "The Sphinx at Sunrise" (32), by William Logsdail; "Cosy Quarters," by Valentine Garland, a new member; H. H. Couldery's study, kitten and strawberries (39); and Egerton B. Coghill's "An Impression"—a feelingly-painted bit of sea with pierhead, the sunlight reflection and dark piles making a study of contrast. A. Helcké has also a freshly-painted piece of moorland (43), and Sir Joscelyn Coghill, Bart., sends sketches of Castle Townshend (45 and 48); but his study of an old naval officer—"A Maritime Authority"—with his glass; and the large picture, "The Compact"—an incident from Goethe in "Faust" (118)—are not without character and dramatic interest.

"Plutarch's Lives" (104), by J. Henry Smith, is a large figure composition in which there is some power, and good drawing, and colour in the figures. Beneath is a delicate piece of finished execution by Jessica Hayllar (101) in her daintiest style. Another of the figure subjects is Lucien Davis's "The End of the Race"—a party of young, hilarious girls playing at hoop racing. Two of them are near the winning post, the one who is in first smilingly turning to her competitor in the race. With the exception of the rather waxy-looking dog, the figures are well painted, and the painter has succeeded in giving the idea of movement and merriment. Edith Œ. Somerville's "Retrospect" is in contrast—an aged woman of the peasant class before her toilet table, almost French in style, though somewhat hard. In the centre of the room hangs a masterly picture of a woodland glade through which a brook runs—"Belgian Beech Woods"—(65), by W. Rupert Stevens. The wood is thick with foliage, through which the light gleams. There is depth of tone and feeling in the work. Sydney S. Morrish has also a charming view on the South Devon coast, in which the effect of mist and sunlight is cleverly rendered. "She's all my Fancy painted Her," by Regniald Barker, is certainly an ideal—if we may call it—angelic face, but the shoulders and neck are faulty. A small picture, a group of figures (92), entitled, "Primrose Day on the South Coast," by Chas. E. Tucker, is more pleasing as a composition and a study of bright, sunny colour, such as one might see at Hastings than as a finished work of *genre*. The artist has evidently ignored conventional rules, and has given us an impression. A large effective seascape, "White Horses," by Walter J. Shaw, hangs in a prominent place. The wave motion, colour, and sunlit effect are ably rendered. "A moonlight Coast Scene," by Christopher Rummelhoff (99), in its greyness of tone and nice colour is one of the few clever impressions of light and shade. Jessica Hayllar has a finished *bon bouche* (101); the "Roses," by Herbert Dalziel, are nice, though the black ground is disagreeable. "Hedge Roses," by Emily A. Cook (107), is another flower study delicately handled. A few small pieces, "Evening," "Toilers," and "Wanderers," by V. De Ville (116, 120, 121)"; a charming little bit of woodland, a poem of colour, by James G. Grace, are redeeming works on this wall. De Ville is a new member, and his pictures, especially the gipsies on the side of track on a lonely heath or common (121), and the "Toilers" are full of nice sentiment, and are promising studies. A. Helcké's atmosphere (in 127) and E. Blount Smith's "End of September" are also studies of merit. Oliver Baker's "An Old Inn Yard" wants depth of shadow to make an interesting picture; his "Mill Pond" (125) shows some good work. Blanche Macarthur's "No Rose Without a Thorn" is delicately handled in parts; and a large, solidly-painted landscape (139), "Now Fades the Glimmering Landscape on the Sight," by Byron Cooper, may be mentioned before leaving the exhibition.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE opening meeting of the 53rd session of the Institute was held on Monday evening, the President, Mr. Edward I'Anson, in the chair.

The SECRETARY mentioned that among other donations to the library was a portfolio containing fifty sketches by the late Mr. George Devey, presented by his executors.

Mr. RALPH NEVILL, F.S.A., called attention to the wretched lighting of the library by argand gas burners, a form of light which he characterised as combining the maximum consumption of gas for a given light with the greatest amount of heat and deleterious products; it rendered the atmosphere stifling and unwholesome, and besides making study irksome to readers, had an injurious effect on the bindings. He supposed an electric light installation was out of the question; but the Welsbach gas light was beautifully white, threw out little heat, had no deleterious productions, and it was inexpensive, a single light being fitted for 15s., and against this outlay was the reduced consumption of gas.

The PRESIDENT replied that if Mr. Nevill would write to the Council, his suggestions should receive consideration.

The following 24 gentlemen were elected to membership:—As Fellows: Joseph Clarkson Maddison, Hereford-street, Christchurch, Canterbury, N.Z.; William Henry Powell, Associate, 6, Southampton-street, Bloomsbury, W.C.; James Jerman, Associate, 33, Paul-street, Exeter; Thomas Meakin Lockwood, 80, Foregate-street, Chester; and Arthur Hill, Associate, 22, Georges-street, Cork. As Associates: Henry Thomas Gradon, 40, Sadler-street, Durham; Richard Matthew Dudley Fell, 53, Bernard-street, Russell-square, W.C.; Henry Hoyne Fox, H.M. Indian P.W.D., Burmah; George Cade Smith, 24, Ivy-road, Gosforth, Newcastle; Charles John Marshall, 115, Ebury-street, S.W.; Edgar Harry Selby, 26, Craven-street, Charing Cross, W.C.; William Henry White, 11, Lawford-road, Camden-road, N.W.; Robert Williams, Holly Bank, Haslemere; Edmund John Bennett, 5, Harmer-street, Gravesend; James William Brooker, 13, Railway-approach, London Bridge, S.E.; Herbert Richard Lloyd, Dresden Villa, Moseley, Birmingham; Frederick William Marks, 21, Harrington-gardens, S. Kensington; James William Stonhold, 65, Stanhope-street, Regent's Park; Hubert Alfred Gregg, 1A, St. Helen's-place, E.C.; Francis Eldred Lodge Harris, 11, Lawford-road, Camden-road, N.W.; Arthur Henry Worsley, 65, Stanhope-street, Regent's Park; Theodore Moore, Whip's Cross, Walthamstow; and Henry Paterson, 77, Wilberforce-road, Finsbury Park. As Hon. Associate: Sir John Coode, K.C.M.G, 5, Westminster Chambers, S.W.

THE OPENING ADDRESS

was then delivered by the PRESIDENT, who, in his introductory remarks, referred with satisfaction to the fact that the Imperial Institute competition had been won by one of their Fellows, Mr. Collcutt, but pointed out that, possibly because their body had sent no subscription to the funds, architecture was unrepresented upon the Executive Council of the Imperial Institute, unless it were considered that the President of the Royal Academy represented architecture as well as painting and sculpture. A fitting work for the Imperial Institute would, he might suggest, be the production of a thorough and complete record—perfect in all its details—of the more important architectural monuments contained in India, and the many historical sites and ruined cities to be found within the various dependencies of Great Britain and Ireland. There was no complete or national work of the kind; and he hoped that there might soon be found means, by the agency of the Imperial Institute, to furnish at least a catalogue of the historical monuments extant within the confines of the British Empire. Having referred to the death of Mr. Beresford-Hope, the second and last non-professional President of the Institute,

Mr. I'Anson passed on to consider the new privileges conferred on the Institute by the Supplemental Charter. The Institute had obtained the right to hold examinations not only within the United Kingdom, but also in any colony or dependency thereof and in' India. They had obtained the right to use distinguishing affixes ; and also power to declare, in the year 1892, that every person desiring to be admitted a Fellow must have passed an examination. (Applause.) Moreover, the examination test which they ventured, in 1882, to impose upon all candidates for the Associateship was now a right which they were empowered to exercise. These, in his opinion, were powers and privileges the possession of which entailed responsibility of a very high character towards the public and towards themselves, and they formed a basis upon which all minor professional questions must rest if any superstructure was to rise out of them. At the triennial conference held in May, one meeting was occupied in considering the subject of professional education, and in the result a series of resolutions was adopted by the meeting, embodying a practical scheme for organising a complete system of progressive examinations. The preliminary examination would test the general knowledge and lead schoolmasters to systematise the studies of the pupil, and to direct his attention in particular to those essential branches of knowledge which the examination would indicate. The intermediate would be for the probationer, a stage at which he would test his elementary architectural knowledge, and in the preparation of which he would lay a solid foundation for his future studies. The final would give him a standard for the development of his studies so as to place him in a position to enter on the active practice of his profession, ready to apply the principles and details he had acquired, and to further pursue his work until fully prepared to enter on that ultimate examination which in a few years might be established as a preliminary qualification for the class of Fellowship. He hoped that when the scheme was matured it might lead to their intrusting the preliminary examinations to local societies, as indicated by Mr. Lawrence Booth. Meanwhile, in the spring of 1888, an examination will be held under the auspices of the Manchester Architectural Society. It had been sought, moreover, to direct the attention of young architects in practice to the obligatory examination which now formed the only entrance to the degree of Associate of the Institute. The number of such architects who would be worthy members of that body, but who had not yet joined its ranks, would, he was convinced, continue to increase, and it could not be too widely known that this examination was framed so as to have regard to the position of architects in actual practice. Indeed, the examiners were in the habit of giving the fullest consideration to the professional status of such candidates. To another of the meetings of the Conference the Council referred the report of the Special Federation Committee, in order to elicit an opinion as to the feasibility or desirability of carrying into effect any or all of the proposals made in that report. The meeting was a thoroughly representative one, and the report was returned, after a few slight modifications, with a request that it might be taken into consideration. This, continued the President, has been partly done, and the matter is now in the hands of a special committee, engaged in the preparation of draft by-laws according to the terms of the Supplemental Charter granted to the Institute in the spring of the current year, and I believe before many weeks are over it will be possible to convene a special general meeting for the purpose of considering the same. Meanwhile, without pledging myself to agree with all the provisions of the report, I may perhaps be allowed to express satisfaction with their general tenour. The Conference of 1887 has resolved that the centre of any federation of the members of the profession within the Empire is and shall be the Royal Institute of British Architects, and the expressed object in view is to establish a closer connection than now exists between British architects generally, so as to promote the advancement of our art, harmony of practice, and intercommunication. For this purpose, roughly speaking, the Institute is to organise periodical conferences in the provinces, as well as in London ; the local societies, which are to retain their identity and name, and the management of their internal affairs, are to adopt the "Schedule of Professional Practice and Charges," sanctioned by the Institute, with a proviso that, so far as may not be inconsistent with the spirit of such schedule, they may arrange terms for the guidance of their own members in circumstances not covered by the schedule ; they are also to afford every practicable assistance to students in preparing for the examination in architecture ; and further, local examinations are to be held, by a society or group of societies, of persons desirous of qualifying for candidature as Associates of the Institute. In return, the Institute is to hand over to the local societies a proportion of the amount received by the Institute in annual subscriptions from their members. These are the main points of the report of our Special Federation Committee, and they seemed to me, as they seemed to the conference meeting which discussed them, quite feasible—indeed, eminently desirable. There are, of course, details, especially of professional practice, which will require care and time to work out and assimilate ; but I trust that both in London and in the provinces the leading men will exercise mutual forbearance while completing the minor arrangements of a scheme likely to benefit the whole profession, and to the success of which I wish a hearty God speed. The consideration of a very important subject —the proposed "Registration" of architects— also took place at the Conference, when, after a lengthy discussion, it was resolved to recommend this question to the careful consideration of your Council. The matter is now before a special committee, who are fairly representative of both town and country. Mr. Connon, of Leeds, has accepted the post of hon. secretary to the committee ; and those who know the energy and ability of this gentleman will not fail to conclude that the work will not be allowed to flag. Gentlemen, this is a very important question. It has been strongly pressed upon us from without. It is also clear that many amongst us think it a right step to take. But the critics will ask—Is it for the good of the public ? Is this movement a disinterested one, or is it not ? Is it to make a trades-union of the profession—(No, no)—to exclude all those who have not been admitted within the inner circle from sharing in the emoluments of those who are within ? Will it really protect and guard the public from incompetent men ? (Hear, hear.) For my part, before venturing upon any conclusion as to the desirability or the reverse of "Registration,"—whatever that term may imply—I think that we may ask ourselves two very apt and pertinent questions : First, as to the form in which the registration of architects may be effected ; and, secondly, whether the fact of having passed those examinations for admission to the Institute, now sanctioned by Royal Charter, and to which I have just referred, will not accomplish—to all intents and purposes, and sufficient for the present time—the main object of registration as contemplated by the Conference of May last. (Applause.) The President then referred to the losses sustained by the deaths of members of the Institute during the past session, including among the Fellows George Devey, George Vulliamy, George Bell, of Glasgow, Thomas Henry Sapsford, of Sydney, Sir Horace Jones, Ambrose Poynter, Robert Parris, George Barnes Williams ; among the Associates, George Goldie, Oswald Adshead, Thomas Farrer, Harry Saxon Snell, Robert A. Frazer, Andrew Edwards, Vincent Wing, and Arthur Harland ; among the Hon. Associates, Major-General Moody ; and from the hon. corresponding members, Ruprich-Robert, Oliver Rayet, and Professor von Neureuther, of Munich. He also alluded to the election of Mr. Blashill to the post of Superintending Architect to the Metropolitan Board of Works, and to the decision of the City Corporation to rescind their recent vote and again include among their officials a City Architect, and to the award of the Royal Gold Medal to Mr. Ewan Christian. Having observed that the exhibition of the students' work, held in the Conduit-street Galleries last January, was one of the best, if not the best, ever hung, Mr. I'Anson announced that the committee of the new British School at Athens had just made a proposal of some importance and interest. They were prepared to contribute £50 towards the expenses of any duly qualified architectural student whom the Council might select to send out to Athens during the session now opened. The conditions attached to the grant were—(1) That the said student should reside at least four months in Greece ; (2) that he should hold himself at the disposal of the director of the school to assist in excavations if required. (Laughter.) Nothing that had transpired during the year had induced a belief that the Institute might be brought more closely into relationship with the Royal Academy. Although, in the early part of the year, it was stated that proposals involving serious modifications in the constitution of that body were being considered by its members, no communication on the subject had been received, and any action that might have been taken by the Academy had been without results as regarded the Institute. On the other hand, an arrangement of some significance had been made between the Architectural Association and the Institute, whereby, during this session, the meeting room would be occupied once a fortnight by the Association, and with the entire concurrence of the members of both bodies. It was a source of extreme gratification to him to know that the mutual assistance long rendered was thus appreciated by both societies in a manner so cordial, and, as the excellent President of the Architectural Association showed in his recent address, so sincere. The aims of both were identical ; they existed for a like purpose. In the Supplemental Charter and its examination clauses, the objects for which both were working had been defined. The Institute, while urging the members of the younger society to maintain their absolute independence, would further the interests of the profession by endeavouring to enlarge the capacities of the Architectural Association as an educational body. Some important questions would come before the members of the Institute this session —namely, the settling of the by-laws to be made under the Supplemental Charter ; the development of the scheme of Federation ; and the consideration of Registration. On another very difficult and vexed question—that of "Light and Air"—a mass of evidence had been collected by a special committee of the Institute, the work of which had been transferred to the Standing Committee for Science, with a view to the framing of some practical suggestions. In conclusion, the President said : A great deal has been written and said of late about the progress of the last fifty years. To many of you I have no doubt that such a period seems a long time, but, believe me, it is barely anything at all in the life of a corporation ; and to everyone, whether he be an old man or a young man, I would say—Do not be in a hurry. It was only last year that the London Colleges of Physicians and of Surgeons combined for educational purposes, and for the furtherance of professional education ; yet the College of Physicians was founded early in the 16th century, and the Surgeons can trace their existence back to the rejgn of Edward II., and even earlier. In 1844, only forty-three years ago, a Charter granted to the surgeons constituted a new order of Fellows—a grade higher than members—who were to qualify for the distinction by strict examination, or by selection from among deserving members. It is unnecessary to tell you the results of that great step ; you will draw your own inferences from the parallel I have ventured to place before you. No class of men have been reviled, even for centuries, with more bitterness, and with more wit, than the physicians and surgeons. They have been assailed with clamour inside and outside their ranks ; they have met with every kind of opposition. Such things, however, do no harm, for, when the cause is good, opposition to it creates no new enemies ; on the contrary, it consolidates old friendships, brings back waverers, and strengthens the ties of interest and duty which unite the members of a sound and flourishing society like that to which you, gentlemen, and I have the advantage to belong.

Mr. A. W. Blomfield, F.S.A., moved that a letter of condolence be sent to the family of the late Mr. Beresford Hope. This was seconded by Mr. Ewan Christian, and unanimously adopted.

Mr. Blomfield afterwards moved a vote of thanks to the President for his very interesting and exhaustive address.

Mr. JOHN SLATER, as representing the Architectural Association, seconded the vote of thanks, and, referring to the recognition of that Association by the Institute, said that anything which made the institution the recognised centre of the life and work of architecture, whether as regarded the Metropolis or the provinces, must be an undoubted good. He quite approved of the introduction of examinations, and, if properly conducted, they would prove, he believed, invaluable in fostering and improving architectural education. They would, he considered, commit a fatal mistake if they attempted to rush through any scheme of Federation or Registration.

PROFESSOR KERR supported the proposition, and referred to the death of Mr. Beresford, Hope, who, he said, was identified with a movement for the advancement of the profession, and with the Renaissance of English Mediæval art.

The vote was unanimously accorded, and briefly acknowledged by the President.

ARCHITECTURAL ASSOCIATION.

THE second ordinary meeting for the present session of the Association was held in the R.I.B.A. meeting room on Friday evening, the President, Mr. John Slater, B.A., in the chair. Mr. T. E. Pryce, secretary, announced that the order of lectures had been changed from that recently published in the syllabus, and that at the next meeting, to be held on the 18th inst., instead of Mr. Baggallay's paper, one would be read by Mr. Herbert D. Appleton, entitled "Suggestions for our Sketching Club." The following seventy gentlemen were elected as members:—G. S. Fleetwood, A. C. Williams, A. H. Knott, P. D. Smith, J. R. Clunis, A. H. Moore, P. A. Grinstead, E. R. Sequira, E. D. Webb, A. C. Walker, J. Peter, G. H. Fox, T. P. Simpson, J. Gethin, F. A. Huntley, A. Corderoy, W. H. Brooks, E. Carless, A. T. Pope, R. Scarfe, P. L. Waterhouse, E. G. Angel, E. Oertel, Ernest H. Selby, J. E. Jefferson, B. C. Bailey, E. Carter, C. E. Gray, A. P. Cocks, C. H. Strange, W. H. Winder, W. M. Paton, E. Archer, A. Gladding, H. G. Robins, F. J. Waller, A. C. Henderson, J. F. Parker, H. Rice, F. H. Greenaway, H. N. Smith, C. N. Johnson, E. W. Wonnacott, F. T. White, H. B. Young, J. T. Masters, J. G. Whyte, G. L. Orme, H. W. R. Ormefield, C. H. Cheston, A. Field, A. J. Jackson, F. T. Davys, C. W. Riches, T. P. Clarkson, A. T. Griffith, S. F. Bartleet, A. E. Habershon, M. A. Green, P. G. Eade, W. G. Ingram, C. A. B. Smith, W. J. Roome, A. M. Wakley, J. Angold, D. Gibson, F. E. Hollinworth, E. H. Hill, R. B. Lindsey, and A. T. Walmsley. Eighteen nominations for membership were also read. The next business was the election of a member of committee in the place of Mr. E. Guy Dawber, resigned. The committee, acting on the principle hitherto adopted of appointing the highest unsuccessful candidate at the annual election, had nominated Mr. P. J. Marvin; but certain members of the general body considered that Mr. Marvin was already eligible to act on the committee under Rule 22 as the representative of a class, and Mr. W. J. Leverton was therefore nominated by Messrs. A. O. Colland and Max Clarke. The President, having been appealed to, said Rule 22 was ambiguously worded; but the intention and practice was not to make representatives of all the classes *ex officio* members of committee, as they would swamp the elected members. On the vote being taken, Mr. Marvin was elected by 54 to 43 votes.

ARCHITECTURAL MODELLING.

Mr. J. C. L. SPARKES read the following paper on this subject:—

My topic is not usually regarded as one of the first importance in the education of the young architect; but is, nevertheless, of the deepest interest to him and his future clients. It is the light and shade of his building; and in assuming that the practice or the art of modelling can help forward this important section of the great art, it enters into the consideration that should be given to every touch on a building that involves light and shade, which is no less than every particle of relief that is used as ornamentation of the structure. Now, the modelled decoration of a single abstract is simple enough, and we see in many competitions that are annually held that it is a question that deals with the systematic, orderly, and pleasant distribution of various details, natural or conventional, in high or low or flattest possible relief; but who can say more than that, in itself, the panel, as such, is a pleasant object, not offensive by any disproportion of form, light, and shade, or half tone? But the problem is a very different thing when a panel has to be made to take its place among an already distributed arrangement of mouldings or other projections; whether these are the proper attributes of any particular style, or the accidental results of peculiar lighting. Then the panel has to fit its prescribed place, and the prescription of colour that surrounds it must be thoughtfully consulted and studied, that the designer may forward the harmony of the whole mass. This involves a very subtle question—namely, that of the *colour* of a building. I do not mean anything that relates to pigment; but the general tone that the light and shade of the plastic mass produces on the artistic observer. Equally the *colour* of a statue is, of course, not any pigment with which it may have been tinted, but the value in grey that it presents, and a capable sculptor uses his colour with all the taste with which he is gifted to convey his sense of breadth or complexity, light or dark, whichever quality may best explain his meaning. The colour of the hair of a sitter may be represented approximately, the depth of the colour of the eye, or the over-balance of some too heavy shadow may be made right by the proper understanding of this vital principle. Now, colour in a building is much the same as colour in a statue—it requires a large experience; and in architecture as in painting and sculpture demands a refined taste to express a breadth that shall be perfectly harmonious and never bald. Take as an illustration the diametrically different treatment that a panel designed to be exposed on the south façade of a building in full daylight or sunlight should receive, from what must be applied to the same panel if its mission is to decorate a staircase with a narrow top light. So consider the different treatment visible in the Venus of Milo, formed to be seen in the broad light of southern daylight in harmony with the large breadths of simple Classic wall surfaces, and the draped figure of a saint from its position in the overarching porch of a Gothic cathedral. The colour in the two is absolutely opposite; first in the building, and, of necessity, in the details that decorate it. Or take a façade of Bramante and one of a Romanesque building, and the difference is as light to dark—breadth of light to its opposite. The conditions governing every portion of the decoration of these opposite and contrasting works of art are so obvious that no one will take exception to the proposition that follows on—viz., that every detail must be modelled to contribute to the general tone, whether this be in the direction of breadth and light or fretted dark; or, further, that this will demand of the architect a knowledge of effect and a mastery of detail that can only be attained by dealing with each moulding and each relief decoration as a part of a whole, plastic and amenable to each wish or fancy of its author. Light and shade enter into the ultimate treatment of each angle, cornice, surface, and plain, large or small; therefore, all combine to give "colour" to a building. If we accept the truth of this statement, how necessary, then, is it that the young architect should *model*. Colour, then, can consist of the aggregate values of light and shade in its largest significance, and must be studied down to its smallest details. And this involves the consideration of how it is to be done. The historic method—that is, a progressive course of graduated form from Early to Late in any particular style—seems at first sight the most reasonable and satisfactory, so far as mere modelling goes, and is indeed so, if we aim merely to give a clear idea of form, surface treatment, and light and shade of particular parts of any building; and with this in view the student should commence with some rather simple panel, and learn the use of his material from the free imitation of the chosen object, never losing sight of the fact that many beautiful objects, such as those carved in hard stone, wherein the greatest fineness of line is possible and is expressed, are clearly not suitable for copying in clay. In such a case a translation may be made. Or, again, a rough piece of wood-carving, partly sawwork and mainly gauge-work, is not to be imitated in clay; here the careful and capable guidance of a good teacher is necessary. But enough remains for the architect to copy accurately and even servilely. The genius of the material deserves some study. Clay is plastic; it is added piece by piece, layer on layer, until the desired contours are reached. This is the very opposite of a carving, when out of a block the desired contour and figure are cut; and it is sometimes difficult for a student to realise that he must not scrape and carve down a lump of clay to some smaller form. For these reasons the example should be wisely chosen in consonance with the genius of the material. With this in view the architectural student should model not only architectural details, but also the human figure, for in this section of study *colour* will become one of the qualities he will learn to appreciate; and if he should be able to obtain any great power in figure modelling, the question of colour in his work will be constantly before him, and in that case he will not fail to admit its very great importance. As to where this study can be carried on, I call your attention to the isolation that surrounds the average Government Art School. The manufacturer does not, to the full of his requirements or opportunities, use the art school. In many cases the manufacturer is absolutely indifferent, and a condition of isolation undoubtedly often exists between the school of art and the manufacturer. The connecting link is to be found in the secondary, or technical, or advanced, schools of art, where the classes shall be few, with masters who shall be specialists, the best men in their calling, and where the work shall be essentially practical and technical, and carried on to the farthest possible point. The art school has prepared the ground, the technical school sows the particular crop it is desired to raise, and the manufacturer and employer of art labour see their interests are advanced by the excellent teaching their apprentices may obtain in these secondary schools. An important instance of such an extension of art-school work is seen in the Technical Art School at Kennington, which has grown out of the Lambeth School of Art, an institution that, unaided, has done its share of work in helping the local manufactures to a name and an importance that has generally been admitted they have attained. I invite the attention of all interested in this work to this school, where instruction is given by a modeller and sculptor, capable in all the varied sections of architectural decoration, and in figure no less. The entire district is deeply indebted to Mr. William Silver Frith for the work he is doing in the South of London. The clearsightedness of the City and Guilds of London Institute has allowed this absolutely necessary work to be done; and their liberality fully supports one of the most interesting and useful art schools in this city.

Mr. LAWRENCE HARVEY, in proposing a vote of thanks to Mr. Sparkes for his paper, strongly supported his views as to the value of modelling as a training for architects, remarking that in the architectural school at Zurich it was recognised as highly important, and would probably ere long be made an obligatory subject. Unless an architect could say whether a model was correct or not he was a slave to his sculptor and carver. The same design was not equally suitable for execution in marble and in Bath stone; the sharp or blunted arrises characterising the several materials must be taken into account. Mr. Sparkes had emphasised the necessity for a knowledge of "colour" in sculpture, and this simply meant an artistic realisation of the value of light and shade, of plain and roughened surfaces, and of the subtle refinements of the art. In wood carving great technical difficulty was experienced in treating the background surface; but by a recent invention this had been overcome. The device consisted in fixing to the surface of the wood whatever raised ornament was required, as in the mouldings and stiles of a door, for example, and other pieces of wood; these might be of various colours, and then, when the whole was set, the carver could cut, as in cameo work, partly through the several layers of red, yellow, or white wood, and so produce great variety of treatment.

Mr. LEONARD STOKES, in seconding the vote

of thanks, said the value of a knowledge of modelling was very great to the architect, for a model would enable him to realise his building not as a series of elevations built upon a plan, but as a solid mass; it would help the designer to see round the corner of his work in a way that a perspective did not. He did not think that Mr. Harvey's cameo-like process of wood-working was one that recommended itself to architects.

Mr. H. D. APPLETON trusted that modelling would not be added to the accomplishments the well-trained architect was expected to have a thorough mastery of. The argument that it would enable him to correct the carver's work would apply equally to every branch of building, and if they regarded modelling as essential, he ought certainly to practically understand the bricklayers', carpenters', and plumbers' crafts. Professional education was in danger of being made so technical, and in so many directions, that the architect's life would not be worth living. Had Mr. Sparkes any architectural pupils in his modelling classes, and, if so, what were the limits of age?

Mr. FRANK JONES asked if Mr. Sparkes recommended to architects modelling in preference to setting up perspectives of their buildings, or as an accessory or means of realising the effect, or did he intend to restrict it to details.

Mr. E. SWINFEN HARRIS remarked that one reason why the late Mr. George Devey's buildings had always so excellent an effect in execution was because they were all erected from models prepared in wood to a reliable scale. Where clients would consent to this nothing could be more satisfactory, as any errors could be corrected before it was too late.

Mr. W. HAMPDEN PRATT hoped Mr. Sparkes would on a future evening develop his views more fully. He feared one result of the larger use of models for details would be that architects would be tempted to employ ornament too freely, to the destruction of that very reticence in design for which Mr. Sparkes had contended. He should have liked Mr. Sparkes or Mr. Harvey to have definitely explained how they would modify a design for execution severally in plaster, Bath stone, and marble; further, if designs for each material needed to be differently treated, it was not clear how actual modelling in clay or plaster could educate an architect for preparing designs for execution in harder materials. There was a danger, too, that if the architect took all the responsibility of his carved detail, the sculptor would be degraded from an artist who interpreted the design into a mere copyist.

The PRESIDENT, in putting the vote of thanks, which was carried by acclamation, observed that nothing could be of greater educational value to the architectural student than trying to model his buildings, and if the pupil would endeavour to construct his roofs, say, in thin sections of soap, he would fully realise the nature of the problem. The plan of modelling a building to scale in wood was excellent; but most clients would object to the cost, and few architects were so fortunate in their clients as the late Mr. Devey. He hardly thought that different coloured woods should be used as a cameo or sgraffito work, as Mr. Harvey had suggested.

Mr. SPARKES, in acknowledging the vote of thanks, said he had not suggested that the architect ought to make a full model of every building, nor did he anticipate that the average architect would arrive at a great pitch of fame as an original modeller. He thought, however, that that practice in the art of modelling instruction would stimulate their sense of light and shade and colour in sculpture and carved ornament. An archæological or historical knowledge of various details was one thing, but to be able to practically apply them in a building was, all would concede, another. Mr. H. Herkomer's new house at Bushey was an interesting example of an amateur's design worked out by amateurs. It was an artist's, not an architect's, design, but promised when completed to be one of the most picturesque and, perhaps, incongruous buildings yet erected, and one in which the qualities of light and shade would be well worked out. Mr. Herkomer was building from the inside outwards—the furniture was being made before the outer frame of the house was put up. The furniture and walls were being covered with a profusion of 16th century detail, executed by ingenious machinery on the premises, and this he thought to be a weak feature, for the ornament, although faultlessly executed, lacked the genius of handiwork, and was too precise and uniform. In reply to Mr. Appleton, he did not think he ever had an architect's pupil in his modelling classes, and that was, perhaps, one reason why he was addressing them that evening. One result of these classes had been that many of their best workmen had given up carving, for the new light they gained there made them determined to prepare designs for others rather than execute those supplied to them. Although this was not their aim in the school, it evidently tended to send out men with well-developed minds. It had been suggested that a model would be more useful to an architect than making a perspective drawing; but in schools of art it was supposed that an architectural perspective possessed that quality of seeing further round a corner than usual, which had been claimed for the model. If invited he should be pleased to explain his views as to the colour, light and shade which could be given to a building at a greater length on another occasion.

THE INCANDESCENT GAS-LIGHT COMPANY.

AN improvement in gas illumination that is likely to become a serious rival to the electric light has been lately brought into notice by the application of the principle of incandescence to the ordinary gas-burner. The new gas-light, the invention of Dr. Von Welsbach, of Vienna, is being very successfully introduced by the Incandescent Gas-Lighting Company, of 15, Leadenhall-street, who have completed large premises in Palmer-street, Westminster, from the designs and under the superintendence of Mr. W. Macie Leir Seaman, architect, of Albert Gate Mansions. The system of lighting may be described as follows:—Round the flame of a Bunsen gas-burner a tubular wick or hood of carbonised cotton net about 3in. high is placed, the effect of which is to greatly intensify the light by rendering the net incandescent. The process is simple. The "mantle" of net, as it is called, is steeped in a chemical solution containing oxides of the elements of zirconium, lanthanum, and other substances, the secret of which belongs to the Company's patent. The mantle is then ignited till the cotton is burned away, leaving a residuary skeleton of incombustible oxides. The light emitted by this incandescent gauze is perfectly white and steady, and has all the brilliancy of the incandescent electric light. A large percentage of gas is saved, and, what is more important, the illuminating power is doubled, while smoke is entirely consumed in the perfect combustion of the gas. In this respect, indeed, the incandescent light is a boon that all consumers of gas will readily admit after seeing or trying the Welsbach light. The atmosphere is not vitiated, the heat is lessened, and the sooty deposit on ceilings, books, and paper avoided. The burner is extremely simple, cheap, and can be applied to any of the existing gas-fittings. There are two sizes of lamp made, which are very reasonable in price, and are fitted with shades of various patterns. That this gas lamp must ultimately take the place of the common gas-burner we have not the slightest doubt. The Welsbach lamp, compared with an Argand burner, has the advantage of giving a light of 20 candles to one of 16 candles, the consumption of gas per hour being just half of the latter. Compared with the ordinary nipple burners, the saving of gas for the same illuminating power is, at least, 60 to 70 per cent.

The manufacture of the refractory mantles of cotton is quite an art, and is carried on in the new premises of the Incandescent Gas-Light Company in Palmer-street, Westminster. A large number of female hands are employed here, and the labour is light and comparatively easy, as the making and manipulation require considerable delicacy. The processes which the mantles for producing the incandescent light undergo are several. First, we see the knitted fabric or hose made on a kind of stocking machine worked by hand, and resembling in its operation a sewing machine. In another part of the factory the hose so woven is cut into lengths, and the top ends gathered in and threaded with fine wire, this operation forming the mantle; after this the mantles are steeped in a chemical solution, the secret of the patent of the inventor. They are then dried. A room fitted with racks, having glass bars over heating coils and raised to a temperature of 95°, is provided for this purpose. A number of young women are here seen who are engaged in turning round the mantles hung on the glass bars, so as to insure equal drying all round. The saturation and drying of the mantles are twice repeated, the rooms being connected by openings through which the saturated mantles can be passed to the drying room and returned. A further operation is the fitting of the mantles on their stands of wire, and subjecting them to burning in gas jets. The cotton is burned away and the coating remains, which forms the fragile skeleton which produces the incandescence. In another large room is a row of tables and stands of gas jets, upon which the mantles are burned for 2½ hours, at the end of which time the process of incineration is completed, and a residual skeleton of the impregnating solution alone remains. On the ground floor of the factory the burners are packed in boxes for transport, a large store in connection therewith being used for finally disposing of the goods. The building, of three stories, in which these operations are carried on has been fitted up with every convenience. On the upper floor are lavatories and closets, in which Jennings's flush-out closets and lavatory basins are provided. The staircases are of iron, well ventilated and lighted, and over each of the tables where the operations of chemically heating, drying, and burning-off are conducted, are large funnel-shaped tubes for carrying off the fumes and products of combustion. The floors are provided with lifts in connection with the storeroom. Each floor is well-lighted and ventilated by windows, the walls coloured grey, and the whole of the factory presents an appearance of cleanliness and activity. We may add that the new light has been introduced into the General Post Office, the Bank of England, London and Westminster Bank, Royal College of Physicians, several of the large hotels and clubhouses, and some of the leading theatres in London, in addition to the chief newspaper offices, banks, and insurance offices. For offices and domestic dwellings the Incandescent Gas Light Co. are taking large orders, and we are informed are about enlarging their premises to meet the demand upon them.

DRAWINGS BY MR. ERNEST GEORGE.

ALMOST interesting collection of sketches in watercolour is now to be seen at the Fine Art Society's Exhibition, 148, New Bond-street. The present display of drawings by Mr. Ernest George illustrates Rome, Venice, Rouen, Amiens, Bruges, Rotterdam, and many other Continental cities besides London. The sketches are charmingly simple and unlaboured; through the washes of tint the pencil lines are still visible, which give an architectural zest to them. The colouring is wonderfully transparent and rich in tone. Take, for example, the lovely sketches from Amiens, or St. Jacques' apsidal chapels, Dieppe, with their pierced parapets and high roof, or the staircase in sacristy—a fine piece of architectural sketching; or, again, the stone staircase in Rouen Cathedral with its pierced balustrade of rich tracery, bright and stony in effect. Mr. George loves to saunter through the narrow streets and by-ways of Mediæval cities and sleepy villages, picking up here and there some long-forgotten ruin or dwelling. He does not give us the conventional views of the engraver and painter, but takes up subjects which perhaps have never been sketched before, and herein lies the interest of the collection. There is a true poetical feeling in the brilliant views from Venice and the Italian Lakes, such for instance as the Campanile di San Giorgio Maggiore; the Rialto Bridge; a Street in Verona with Campanile. A brick Campanile, Milan, with what looks like the circular baptistery near, in simple washes of grey and red; a fine drawing of the Duomo of Milan showing the pulpit round pier; and several sketches from Como, San Remo, and other places will be admired for their truthfulness. The English drawings include Old Houses at Exeter, Lyme

Regis, and Whitby; some charming views from Cambridge of Clare Bridge and St. John's, with the red brick Elizabethan buildings and bridge over the Cam; Shops, Banbury; a "Row," Yarmouth. The London series, many of which are known to our readers, include the old row of wooden houses in the Strand; Cock and Pye, Drury-lane; St. Bartholomew's, Smithfield; views of St. James's Palace, Lambeth Palace, Battersea Bridge, Holywell-street, Staple's Inn, and many other bits of Old London with which Mr. George's facile pencil has made the public familiar. These picturesque fragments of old-world architecture, yearly disappearing, have a conscientious record in these sketches, which will long survive the originals. As pure watercolour sketches, these drawings deserve a visit, even apart from their archæological interest and picturesque charm.

FIREPROOF CURTAINS FOR THEATRES.

MR. JOHN STONES, of Ure Mills, Ulverston, whose iron revolving shutters are so well known to architects, has introduced a new fireproof curtain, which appears to possess all the necessary qualities for resisting the spread of fire in theatres and public buildings. The old iron curtain has not answered the expectations of theatre proprietors and architects. The curtains of Mr. Stones are made in a variety of ways to meet different requirements. The curtain can be made in one sheet, balanced above the opening by weights and chains, or the curtain can be made in two parts, one part to ascend and the other to descend, and so connected as to draw together automatically, and close the opening when liberated. The framework of the curtain is constructed of light L or T-iron, with diagonal stays to preserve the form. One side the frame is covered with thin corrugated steel sheets, lined with silicate cotton or mineral wool, which is pressed into the corrugations, and covered over with a network of steel; the two sheets of steel are connected by bolts. The curtain, in fact, combines the rigidity of iron plates in a corrugated form, with the fireproof qualities of silicate cotton. The asbestos cloth curtain has the serious defect of showing the glow of fire; but in Mr. Stones' curtain the outer sheet is protected by the backing or filling of the silicate cotton, and therefore no sign of a fire on the stage-side could be rendered visible—a very important point in preventing panic, in addition to which the sound-proof property of the cotton will deaden any noise or confusion that otherwise would be heard by the audience. Stones' new folding curtains for closing very wide openings in one continuous sheet is another useful invention for shutting off the proscenium in case of fire. The curtains are composed of a series of curvilinear iron plates hinged together, and made to fall upon one another in a zigzag form by means of lifting chains or wire ropes. We strongly recommend these curtains to the notice of theatrical managers and architects.

ENCAUSTIC TILE AND MOSAIC PAVEMENTS.

WE have received a new illustrated catalogue and price list from the firm of Josiah Wedgwood and Sons, Etruria, Stoke-on-Trent, whose great reputation as potters extends for more than a century back. Messrs. Wedgwood and Sons are now making, in addition to wall tiles, plain, encaustic, and porcelain floor tiles of very superior quality. These tiles are not the vitreous-faced kinds so often met with, but are vitrified throughout the substance. The chromo-litho illustrations represent in their true colours the several patterns that are manufactured to a scale of ¾in. to a foot, so that architects in their plans can select any design and introduce it in the space. The floor tiles in red, buff, light and dark drab, chocolate, and black are made in several patterns, the prices ranging from 5s. to 25s. per square yard. A large assortment of arrangements in the above colours, and also in blue and dark-green, celedon sea-green, buff, and pink are to be seen in the plates, some very simple and effective, suitable for vestibules, halls, and landings, others being of elaborate design, and in a nice harmony of colours. The patterns are based on the square and diagonal arrangements, the tiles being made in squares of several different sizes, in oblongs, triangles, hexagons, octagons, and half-hexagons and octagons. By the aid of the key diagram giving these shapes and the sizes, any designer can produce any arrangement. Very artistic and quiet in colour are the designs on plates 41 and 42, in which a drab ground with white star-like patterns are introduced. Plates 45 and 46 show some very rich patterns in which drabs, blues, greens, and reds are introduced. The last is suitable for a square lobby, the centre being two intersecting squares of rich colours upon a sea-green ground with bordering. The glazed dado and wall tiles comprise many tasteful combinations. We especially notice an ivory wall tiling with very delicate-patterned tiles in the dado, and two or three more of exceeding delicacy in shades, well adapted for laboratories. A large number of chaste patterns of printed tiles suitable for a variety of decoration will be found, also embossed and incised enamel glazed tiles suitable for dadoes, friezes, and furniture panels, representing decorative devices, classical figure subjects. We cordially recommend the new patterns and price-list to the notice of the profession.

BUILDERS' BENEVOLENT INSTITUTION.

THE fortieth anniversary dinner in aid of the funds of this Institution took place on the 3rd inst. at Carpenters' Hall, London-wall. Mr. Herbert H. Bartlett, president of the Institution, occupied the chair.

The chairman, in proposing "Success to the Builders' Benevolent Institution," said that this honourable charity had since its foundation granted relief to no less than 234 pensioners. During the past year, ten deaths had occurred, and nine persons who had been waiting had been elected, the total number on the fund being 32 men and 33 women. The annual expenditure was large, and the committee were anxious to obtain new subscribers, as many who had given regularly had been removed by death. The income of the past year had been insufficient to meet the expenditure, and the balance on the reserve fund had been withdrawn. The expenses of administration were as low as they could possibly be, and there was no expensive machinery. The building trade gave employment to more people than any other single trade in this country, but it was subject to untoward events, any one of which was sufficient to plunge a man from a respectable position into a condition of need. It was important, therefore, that those who were able should endeavour to mitigate such a sudden fall. Good as donations were, annual subscriptions were much more valuable, and he hoped that his hearers would each get at least two new subscribers, which would give the committee greater confidence in administering the funds of the Institution.

PAINTING ON CEMENT.

ACCORDING to the *Bulletin de la Céramique*, it is known that the caustic lime which is not in a state of combination in cement saponifies the oil used in painting. Consequently, painting on cement is only practicable when, under the influence of the air, carbonic acid has united with the caustic lime to form carbonate of lime. When it is desired to paint cement without delay, attempts are sometimes made to neutralise the lime by acids; but the above named journal recommends in preference the use of carbonate of ammonia, the acid of which combines with the lime while the acid is liberated. The effect produced is, however, only superficial. Various other expedients are referred to, but the solution of the problem would seem to consist in the use of caseine. Fresh white cheese and slaked fat lime are added to the colour. This mixture hardens rapidly, assumes the consistency of stone, and is insoluble in water, a formation of albuminate of lime taking place. It is according to this system that the mural paintings at the Berlin War Museum were executed.

To make the composition, three parts of cheese and one of slaked fat lime are stirred, the quantity of colour to be added being regulated by practice. Only earth colours or oxides of iron would be used for light red to dark brown shades; for blue, ultramarine or cobalt blue would be used; for white, oxide of zinc or sulphate of baryta; and for black, animal black. Inorganic colours, such as those of aniline, would not be used, nor would Prussian blue, vermilion, blue ochre, and white lead be employed, on account of the injurious effects of the sulphur present in the cheese in combination with these substances.

If the painting surface is too dry it can easily be damped. The caseous lime should be prepared daily, and the brushes should be cleaned after the application of each coat of paint. The process thus described is recommended for its economy, the walls of a house being painted as fast as the scaffolding is removed. The caseous paint does not easily take fire, and is therefore considered particularly suitable for the decoration of theatres, and for application to stage carpenter's work generally.

CHIPS.

The monument over the grave of the late Archdeacon Harrison, in Thannington churchyard, has just been completed by Mr. H. C. Sutton, of Canterbury, in accordance with designs prepared by Mr. Richmond, R.A., a friend of the deceased prebend. The cross is of Sicilian marble, mounted on a Calvary of three blocks of marble, which, in turn, stand upon a base of Aberdeen grey granite.

Mr. William Wilds, architect and surveyor, of Hertford, was accidentally burned to death on Monday. He celebrated his 86th birthday on Saturday.

Major General Hutchinson made an official inspection on behalf of the Board of Trade on Monday of the first section of the Oxted and Groombridge new line of the London, Brighton, and South Coast Railway, from Oxted to Edenbridge. The works have been carried out under the supervision of Mr. George Lopes, under the direction of Mr. Banister, resident engineer. The contractors, Messrs. Firbank, were represented by Mr. Stennett. This section of the new line will be opened for traffic on the 1st January.

At a general meeting of the Royal Institute of Painters in Water Colours, held on Monday evening, Mr. W. T. Blackmore was elected secretary.

Notices were posted at Lord Penrhyn's Carnarvonshire slate quarries on Monday announcing that full time would be immediately started. The quarries, which employ about three thousand hands, have for nearly a year been working only four days a week.

The report by the Board of Trade of their proceedings under the Tramways Act, 1870, and the Gas and Water Works Facilities Act, 1870, during the session of 1887, has just been issued. The tramway orders confirmed by Parliament were 12 against 13 in 1886, and the gas and water orders confirmed were 13 against 20.

A new memorial pulpit has just been placed in the church of St. John the Divine at Knotty Ash, near Liverpool. It has been designed by Messrs. Aldridge and Deacon, of Liverpool, and executed by Mr. Harry Hems, of Exeter. The base is composed of moulded and veined Devonshire marble. The body of the pulpit is of oak and of octagonal plan. It stands against the north wall, and on the five sides or cants facing the congregation are recessed and groined niches, occupied by statues of St. John the Baptist, St. Peter, St. Paul, St. Chrysostom, and Savonarola.

The Free Church at West Grangemouth, N.B., built in 1837, was reopened on Sunday after internal restoration, carried out by Messrs. J. and D. Meikle, of Ayr, joiners, and by Messrs. Bennett and Co., of Glasgow, decorators.

A new mansion is to be built at Stoke Park, Northamptonshire, from the designs of Mr. Richard Whitbread, M.S.A., Carlton, Nottingham, to replace the one designed by Inigo Jones, which was destroyed by fire about two years ago. The same architect is also designing the new Church and Convent of the Sacred Heart for the Little Company of Mary, to be built in Adrianna-row, Rome.

The foundation stone of a mission church was laid at Glencreban, near Oban, on Monday week. The architect is Mr. David Mackintosh, of Oban, and the contractors Messrs. MacColl and Graham, of the same town.

Dr. Edward Walford has been appointed medical officer of health for the Cardiff urban and port sanitary districts, at £400 per annum.

St. James's Church, Ashted, was reopened by the Bishop of Worcester on Sunday after restoration at a cost of £1,000. Messrs. Osborn and Reading, of Birmingham, were the architects, and Messrs. Jeffrey and Sons the builders.

The Bishop of Gloucester and Bristol recently consecrated the new chancel, vestry, and organ chamber which have been added to Redbrook Church within the past few months. Over the vestry is a little spire built of Bath freestone. The work was intrusted to Mr. A. Heath, of Coleford, the architect being Mr. J. P. Seddon, of London.

The new church of St. James, Gunnersbury, built from the designs of Messrs. Chatfeild Clarke and Son, was consecrated on Tuesday.

WAYSIDE NOTES.

WITH the opening meeting of the R.I.B.A. we enter upon a period of the year of greater interest to the architect, as, after Tuesday next, we shall have all the London architectural societies in full swing, with their attendant meetings, paper-readings, and discussions. The presidential address at the Institute last Monday did not foreshadow any great future undertakings on the part of the big Conduit-street body. Mr. I'Anson, however, evidently alluded with satisfaction to the time when Associates would be compelled to pass an examination if they are desirous of arriving at the full dignity of Fellows.

It would appear to me that this new measure of the Supplemental Charter, which is to come into force in the year 1892, is certainly wholesome and just. It will give the Fellow a better standing, in the same way that the Associateship is now of greater value by reason of the existence of the present obligatory examination, and will thus tend to raise the status of the body generally. It is to be hoped that the new examination will be pretty extensive. But it should be *chiefly* practical, and deal almost exclusively with that knowledge which is to be gained by experience in everyday business occupations, as few men have the time or opportunity for systematic book studies when they are engaged in the uphill work of making a business. And very many do struggle for years after they have become Associates in an endeavour to get a living by independent practice in the profession.

Mr. I'Anson commended to the attention of those present at Conduit-street the other evening the project of federation and the scheme of registration. It is cheering to hear the President of the R.I.B.A. speak of the latter subject as "important." Let us hope that those thus advised will really give some consideration to the matter.

Until the registration scheme is complete, we must acknowledge that there is some excuse for the public pleading a want of confidence in the architect. But, touching "the future of the architect," is there not an old aphorism which says that "every man is the architect of his own fortune"? This must certainly be the case with regard to the architect. He has, doubtless, at times a great struggle in his younger days; but there are few businesses more likely to repay well-directed energy and that abundant self-denial which all who are in earnest will carefully study. Despondency, at any rate, will help none, and is generally taken as a confession of individual weakness.

I do not think that the architect has cause to fear the builder (this for the encouragement of the halting and faint-hearted, though the very idea makes one smile) — that is to say, the *true* builder, who is confessedly the subordinate of the architect, and who, when he has confidence in the architect, there is none who reverence him so much and look up to him on all occasions. It is pleasant, I would remark in passing, to hear a genuine, good-hearted builder speak with pride of the architect he is working under. It does one good to hear such persons spoken of with evident enthusiasm.

"He is such a gentleman," and "It is a pleasure to do anything for him." "Everyone is glad to oblige Mr. ——." On the other hand, no one has a greater contempt for the charlatan and the bully as our honest, horny-handed builder. Many will call to mind how he delights in showing up the fraud, or in dwelling upon the shortcomings of the overbearing tyrant.

But it is quite another thing in respect to Mr. Buggins. He, indeed, is the enemy of the architect, though even he is only as the advance guard of the leasehold system that wars so successfully against our interests. But we need not fear that the speculating builder will supersede the architect!

By the bye, the rumour that the good people of Truro are likely to employ a jobbing builder to complete the design and works at their new cathedral in the place of Mr. Pearson is totally without foundation, so that no undue alarm need be felt by those who despair as to the future of the architect (!).

There will be a new field for the operation of the speculating builder soon. Last Monday an official inspection was made of the first section of the Oxted and Groombridge new line of the London, Brighton, and South Coast Railway from Oxted to Edenbridge. I believe that this section of the line will be ready for traffic at the beginning of the New Year. New estates will doubtless be opened in the district it traverses, and "desirable villas" spring up like mushrooms.

Last Saturday there commenced to run special express trains to and special steamers from Dover, in connection with the "Train de Luxe" to the Riviera, thus affording those persons who may have been charmed by the exhibition in Bond-street —the "Sunny South" —a chance of visiting, in comfort, this fair corner of the earth. I spent a very enjoyable hour or so in examining Mr. Talbot's drawings. There is not much architecture about them, but what there is is singularly interesting. The sketches in Algiers, for instance, give us little peeps of the architecture of that far-off town that it does not fall to the lot of all to visit. From all the pictures of Algiers that one sees it seems charmingly curious —a bright, sunny place with white houses and quaint scenes of Arab life and strange architecture in its streets. One may quite reasonably expect to someday see Algiers a fashionable health resort, if only better and more regular communication could be effected with it.

The Riviera sketches are very pretty indeed, and give those of us who have never been there an idea of the nature of this portion of the Sunny South, with the deep blue sea and sky, and great mountains that run right down to the water's edge. Some of the old towns, too, are represented. I understand that there is a rich hunting-ground amongst these old half-deserted villages of the mountains above the Riviera that is to say, for the architect who is fond of novelty rather than intrinsic beauty in buildings. Recently, I was examining some fine photographs of the Riviera and neighbourhood, and among them one of the little, almost deserted village of Ege. It seemed a fascinatingly interesting place, weird in its situation at the summit of a mountain covered with olive-trees; and far below, the great mountain-spurs jutting boldly out into the Mediterranean.

In a room adjoining Mr. Talbot's sketches is a collection of drawings by Mr. Ernest George that should receive a visit from the architect. Many of the most picturesque corners of Europe (as regards architecture) are there represented. Charming sketches of the old brick gables and turrets of Bruges and the Low Countries generally; beautiful studies in Normandy, in Northern Italy, and in Rome are there to be seen. Our own dear old English architecture is not forgotten, and many a quaint piece of brickwork has been represented in freely-flowing water-colour. I quite admit that a great mistake has been made in hanging the pictures so monotonously; but ample compensation will be found in the fact that each and every one has the name and whereabouts of the subject clearly inscribed upon it. This is really an inestimable boon to those examining a collection of drawings, as nothing is so annoying as to have to keep constantly bobbing one's head from picture to catalogue, and from catalogue to picture, in one's efforts to determine to what quarter of the globe a given subject belongs.

GOTH.

New board schools recently erected in Albany-road, Cardiff, were formally opened on Wednesday week. The work has been carried out, under the supervision of Mr. A. Llewellyn Batchelor, by Messrs. Stephens and Bastow, of Bristol. The buildings afford accommodation, in the aggregate, for 1,235. Excluding the cost of the site (£3,168), the schools have entailed an outlay of £9,000. In addition to the usual classrooms, there is a marching school, 30ft. by 20ft.

Mr. C. Meaby, the newly-appointed surveyor of St. Luke's, E.C., has just been presented with a silver tea and coffee service by the inhabitants of Chelsea, as recognition of his services as assistant-surveyor of that parish.

ARCHÆOLOGICAL.

THE RUTHWELL CROSS.—The parish church of Ruthwell, Dumfries-shire, was reopened on Monday after enlargement for the reception of the widely-known Runic cross. The cross, which is of freestone, is supposed to date from about the close of the 7th century. Its broad faces are enriched with sculptured representations of Scripture subjects, accompanying each of which is an appropriate quotation in Latin; but the Runic characters carved on the narrow sides give to the stone its unique value. These form a border surrounding a running scroll of vine, with birds and beasts lodged in the branches. Mr. J. M. Kemble found, about half a century since, that the language was Anglo-Saxon, of the type current in Northumberland in the 7th and 8th centuries, and produced a copy of the inscription in verse. This was afterwards ascertained to be a portion of Cædmon's "Dream of the Holy Rood," of which a perfect manuscript copy was discovered in the convent at Vercelli. The name of Cædmon himself appears on the top stone of the monument. At the Reformation the stone was broken, and the pieces lay neglected in the interior of the church until the late Rev. Dr. Henry Duncan had it restored and erected within the manse grounds in 1823. The restoration included the supplying of new transverse arms, the original pieces having been lost. The embellishment of the cross, which conveys a very favourable impression of early Christian art, was suffering visibly from exposure to the weather, hence the Rev. J. Macfarlan, the present incumbent, decided to have it placed under cover. A grant of £40 has been made from the national funds towards the cost incurred in the protection of the cross. This amounted to £300, the balance being defrayed by subscription. The plan adopted was to build a recessed chamber on the south-west side of the church. This chamber is not screened off and accommodates the minister's reading desk and the precentor's seat, as well as the cross, which is placed at the back. The full height of the monument, 17ft. 8in., is now exposed. A wooden railing encloses the cross, and to it is attached a brass plate bearing the inscription:—"The Ruthwell Cross dates from the Anglo-Saxon times. Destroyed during the conflicts which followed the Reformation; lay on the earthen floor of this church from 1642 to 1790; erected in the manse garden in 1823; sheltered here and declared a mouument under the Ancient Monuments Act in 1887."

CHIPS.

A bust of the Queen has just been fixed in the town hall, Macclesfield. The bust is of white marble and is mounted on a pedestal of *brèche sanguine* African marble. An alcove has been prepared for its reception on the main staircase of the town hall. The sculptor is Mr. R. L. Boulton, of Cheltenham, who also executed the two life-size statues in niches on either side of the bust.

Mr. S. J. Smith, C.E., held an inquiry on Monday into an application by the Bangor City Council to the Local Government Board for sanction to borrow £1,600 for the extension of the water intake; £500 for the purchase of the lease of the Siliwen Baths; and £160 for private improvements. Evidence was tendered by Mr. Gill, the city engineer.

It is expected that next spring the Queen will unveil the colossal bronze statue of General Gordon, which is to be erected at Aberdeen in front of the Art Gallery. This statue was subscribed for by members of the Gordon clan, and it has been executed by Mr. Burnett, A.R.S.A., of Edinburgh.

At Farm-street Church on Sunday week the Chapel of Our Lady of Lourdes was solemnly opened. The altar is of alabaster and serpentine marble, and the reredos of Caen stone with Devonshire marble columns, and contains a statue of Our Lady, executed at Leghorn, in white marble. The architect is Mr. Purdie, of Brook Green, and most of the carving has been executed by Mr. Anstey.

New premises have just been erected for the Liverpool Exchange Club, from plans by Messrs. Grayson and Ould, of that city. The formal opening took place on Friday.

A monument of Cluny stone has been erected over the grave of the late Robert Bryson, of Edinburgh, in Warriston Cemetery. It is of Greek design, with moulded base and pediment, and a medallion portrait in the centre. The medallion was executed by Mr. Stuart Burnett, A.R.S.A., who also designed the monument.

CONTENTS.

Optical Refinements in Architecture 711
Dudley Gallery Imperial Art Society 712
Royal Institute of British Architects 712
Architectural Association 714
The Incandescent Gas-Light Company 715
Drawings by Mr. Ernest George 715
Fireproof Curtains for Theatres 716
Encaustic Tile and Mosaic Pavements 716
Builders' Benevolent Institution 716
Painting on Cement 716
Wayside Notes 717
Archæological... 717
Our Lithographic Illustrations 718
St. John's Church and Vicarage, Stamford-hill, N. ... 719
Proposed House at Mottingham 719
Engineering Notes... 719
Competitions 719
Building Intelligence 738
Architectural and Archæological Societies 739
Correspondence 740
Intercommunication 744
Legal Intelligence... 744
Our Office Table 745
Meetings for the Ensuing Week 745
Tenders 746

ILLUSTRATIONS.

CATHEDRAL CHURCH OF ST. NICHOLAS, NEWCASTLE-ON-TYNE.—VIEW IN NEWCASTLE-ON-TYNE.—THE BRIDGE LODGE, NETHERCROFT.—SPANDREL FIGURES AT THE NATIONAL ART MUSEUM, VIENNA.—LUNATIC ASYLUM FOR THE BOROUGH OF NOTTINGHAM.—ST. JOHN'S CHURCH AND VICARAGE, STAMFORD HILL, N.—HOUSE AT MOTTINGHAM.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEWCASTLE CATHEDRAL.

UPON the formation of the Diocese of Newcastle, it was settled that the great parish church of St. Nicholas, which has an area of over 20,000sq.ft., should become the cathedral. The fabric was thoroughly repaired some time ago under the direction of the late Sir Gilbert Scott; but the choir was left with very temporary fittings. In the new conditions it became necessary to complete the work in a manner suited to the circumstances of the case, and hence the works shown in the illustration. Mr. Robert J. Johnson, F.S.A., of Newcastle, was appointed as architect, and, aided by a very handsome donation for the special object, the reredos, with the sedilia and side screens, which for the moment form the principal feature in the work, were very soon taken in hand. This work, with the completion of the bishop's throne, the choir paving, and other matters, is to be dedicated on the 13th inst. The choir stalls, with their screens and canopies, and the remainder of the works, are in progress, and it is expected that everything will be completed by the end of 1888; the reredos is about 20ft. high from the foot pace of the altar, and with its splayed wings extends all across the choir. It is made of very fine Uttoxeter alabaster, and, as will be seen, its general idea is taken from Winchester and St. Albans. Immediately above the altar a range of nine niches holds as many figures of angels, bearing shields with the emblems of the Passion. Above is a seated figure of Our Lord, crowned and enthroned, the right hand raised in benediction and the left bearing an orb. The four niches immediately adjoining have the four Evangelists, each with his attendant emblem, and the two outer niches on this range hold figures of St. Mary and St. Gabriel, indicating the doctrine of the Incarnation. The upper row of figures comprise St. Cuthbert in the centre, with the head of St. Oswald, St. Nicholas, St. Oswald, Ven. Bede, St. Aidan, St. Benedict Biscop, and St. Edwin, all, excepting St. Nicholas, being Northumbrian Saints. Below, on either side of the altar, are St. Wilfrid and St. Paulinus, and the ten small niches on each side of the central figures have small statuettes of Virtues. All these figures have been very beautifully modelled and carved in the purest white English alabaster by Mr. J. Sherwood Westmacott, of Pimlico. The sedilia and side screens of the sanctuary are worked in Caen stone in a very rich manner. There are many special gifts, including an altar of oak and cedar with a marble slab in the top, that has been used for an unknown period in the church for a similar purpose. There are also frontals for the seasons, the white one being specially handsome, and representing the Tree of Life, with angels on the orphreys playing on instruments of music. The silver gilt cross, the candlesticks, and the flower vases are also gifts, and all the individual gifts have been specially designed by the architect. The bishop's throne (the lower part of it made for the enthronement of the bishop in 1882), has now been raised on several steps of marble, and completed by the addition of stages of canopy work and a crocketed spire, according to the original design. The space between the back of the reredos and the east end of the church has been adapted as a chapel. The floor has been sunk to the original level of this part of the church, and oak screens have been put up in the aisles to mark off the limits of the chapel. The second altar is placed immediately under the east window, on a marble pavement. It has a reredos and panelling of oak, the reredos being a triptych richly painted and gilded. This is to have paintings of the Nativity, the Annunciation, and the Visitation, with figures of the prophets on the doors. These pictures will, it is hoped, be ready by Christmas. All the alabaster and marble work, except the figures, has been done very well by Mr. R. Beall, of Newcastle, and his brother, and the oak work by Mr. R. Hedley, of Newcastle, under the personal direction of the architect.

A VIEW IN NEWCASTLE-ON-TYNE.

ANTICIPATING the opening ceremony in the Cathedral at Newcastle next Sunday, we have reproduced to-day a line drawing by the celebrated architectural draughtsman, T. M. Richardson, sen., showing the unique tower of St. Nicholas, as represented in his fine picture, which now belongs to Mr. John Waller. Richardson has done more for the old city of Newcastle than even its historians. Everything in it that was quaint, or interesting, or beautiful he has in some way recorded, either with his pencil, his etching needle, or his brush. The view which we have photo-lithographed is from one of his best studies, full of incident, bright with sunlight, and crowded with figures, yet skilfully subordinated to its real subject —the adequate illustration of the great church spire and belfry. Of the artist himself it may be said briefly that he was born in 1784 at Newcastle-on-Tyne, and in due course was apprenticed to a cabinet-maker, by whom report says he was very badly treated. On the death of his father in 1804, he filled the post of master of St. Andrew's school at a salary of £30 a year. At this time he obtained a little leisure for persuing his artistic studies. Sickness obliged him soon to take a voyage to London for change of air, and during his stay he is said to have accidentally seen some of David Cox's works, which so influenced his aims and opened out his powers of appreciation for the beautiful that he resolved to resign his post as schoolmaster and devote his whole energies to painting. He was, however, neither encouraged nor appreciated by his contemporaries or fellow-townsmen. In 1816 he commenced a series of aqua-tints in illustration of Newcastle and the neighbourhood; following these publications with a set of mezzotint engravings of castles of the English and Scottish Borders. Subscribers were scarce, however, and the cost of publishing was great, so that both enterprises were financially unquestionable failures. Richardson, notwithstanding, was bent on improving art knowledge and in furthering its interest, so that we find him in 1822 working hand in hand with Thomas and Robert Bewick to inaugurate the first Fine Art Exhibition in the North of England. He contributed fourteen pictures on this occasion, and for many years was the chief promoter of several similar exhibitions held in the town. "The Old Fish Market, Newcastle," was exhibited by Richardson at the Royal Academy in 1814 as his first appearance in the great Metropolitan show. His most important works are "Newcastle from Gateshead Fell," "View of the Side, with the Annual Procession of the High Sheriff of Northumberland to meet the Judges," "Scene on the Thames at Greenwich," and "Stirling Castle." A contemporary writer says of the first two named here that "they might hang side with any similar subjects by Turner, or any other painter of the English school, without losing by comparison." The first mentioned picture is said to have been Richardson's finest oil painting, though the Corporation of Newcastle only gave £50 for it when they completed its purchase for the town in 1833. The artist died in 1847 at the age of 63, after a life of patient industry devoted to his art, and distinguished by perseverance against almost insurmountable difficulties. His son, Mr. T. M. Richardson, is well-known in London as a water-colour artist. We are indebted to Mr. Andrew Reid, of Newcastle, for the loan of the original, from which our plate is taken, and it may be of interest to remark that this gentleman has recently published a chromo-lithograph of the same picture, which measures 3ft. by 4ft., to the reduced size of 28in. by 40in. (double elephant), and he proposes to give others of our English cathedrals by other painters, the next of the series being a view of "Durham Cathedral," from a picture by Mr. Robert Jopling.

THE BRIDGE LODGE, NETHERCOURT.

THE illustration shows one of the lodges to Nethercourt (which we illustrated some time back). As the road here crosses the Dollis brook, a feature has been obtained by uniting the lodge and bridge. The materials are the same as the house—*i.e.*, red brick, Stoke Ground dressings, and tiled roof. The architect is Mr. Percy G. Stone.

SPANDREL FIGURES, HISTORICAL ART MUSEUM, VIENNA.

THE subjects of these sculptured figures by Professor Rud Weyer are selected from Old Testament and pagan history. In the upper row in the centre is the head of Hiram, the Phœnician architect of Solomon's Temple; on the left David, and on the right Isaiah. In the centre is the head of Tubal Cain, with a sibyl on either hand, Persica being on the left and Delphica on the right—both priestesses of the Oracle at Delphi. In the lowest row we have St. Luke in the centre, with Ezekiel on the left and Cumæa, the sibyl, on the right. We are indebted to the Editor of *Bauindustrie-Zeitung* for the photographic plate from which our illustration is taken.

NOTTINGHAM BOROUGH LUNATIC ASYLUM.

WITH our illustrations we publish a perspective view of the Nottingham Borough Lunatic Asylum. The original building was commenced in 1876 from designs prepared by Mr. George T. Hine, F.R.I.B.A. (selected in open competition), providing accommodation for 280 patients; but owing to the rapid growth of the town and extension of the borough boundaries, the asylum, even before its completion, was found to be insufficient for the patients then in the borough. The building is now being enlarged by the erection of an annexe for 250 patients, which will be entirely devoted to males, and the original building will be adapted for female patients only. The new wing is divided into wards to accommodate separately five classes of patients. On the ground floor are day and night wards for epileptics and infirmary patients, also a reception ward for recent cases. On the first floor is a ward for acute cases, and four day wards for chronic patients, the second floor being devoted entirely to dormitories. A large recreation hall, with chapel over, forms part of the new building, which will be used for entertainments and services by both sexes; the hall being also a dining room for the male patients. The old recreation hall will in future be used exclusively by women as a dining hall, and the old chapel will be converted into additional ward space for females. When the asylum is completed, it will provide accommodation for about 320 females and 250 males, and 10 patients in the isolation hospital. A kitchen is included in the new wing for the service of the male asylum, and in the entrance block are rooms for the assistant medical officer; all other store rooms and offices being provided for in the general administrative department of the old asylum. The new and old buildings communicate by a corridor, which passes underneath a portion of the buildings as a subway, lined internally with glazed white bricks, the ground floor of the new building being 10ft. lower than that of the old. This was found the most direct mode of connecting the two buildings. The building generally is constructed of red brickwork, the cornices, window and door dressings, &c., being executed in moulded bricks. The internal walls of all corridors, also all staircases used by patients, will be lined to a



The Lunatic Asylum for the B

Mapperley H

MAIN BUILDING.
ERECTED 1876-80.

GEORGE . T . HINE . F.R.I.B.A.. .



rough of Nottingham.

I.

ANNEX FOR MALE PATIENTS.

CHITECT.

COMMENCED 1887.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

height of 4½ft. with glazed bricks in bands of different colours, and the entire faces of walls of bath-rooms, lavatories, water-closets, slops, &c., will be lined with white glazed bricks. All the day wards, also the dormitories for sick and infirm patients, will have wooden dadoes about 4ft. high, the walls above being plastered. The joiner's work generally will be executed in pitch-pine, stained and varnished. The new building is to be heated by warm air propelled into the different rooms by Blackman's fans, and heated by passing over coils of steam pipes in the basement below the entrance to each ward. The air is conveyed under the ground floor by brick tanks, and thence to the different rooms by vertical flues in the walls. Another system of extraction flues is provided to draw the vitiated air from the various rooms, these flues communicating in the basement story with the base of the three high towers, in the centre of which is a large vertical external shaft. The present works are being carried out under the direction of the architect of the original building, who has had the advice and assistance of Mr. E. Powell, the medical superintendent, in arranging the building most conveniently to meet modern requirements for this class of patients. Messrs. Bell and Son, of Nottingham, are the contractors; and Mr. Harper, the clerk of works for the original structure, is still at his post to supervise the completion of the new wing.

CHIPS.

The foundation-stone of St. Dunstan's College for Boys, now in course of erection on the north side of Stanstead-road, Catford, was laid on Friday. Mr. E. N. Clifton, of East India-avenue, E.C., is the architect, and Messrs. Brass and Son, of Old-street, St. Luke's, are the builders.

The Leeds town council have raised the salaries of Mr. Geo. Tooley, manager of the Meadow-lane Gas Works, and of Mr. Edward Jno. Lloyd, manager of York-street Gas Works, from £200 to £250 per annum; and that of Mr. Wm. Suddaby, superintendent of gas mains and services, from £115 to £150.

A stained-glass window, representing Our Lord's Baptism, has just been placed in Bagnall Church, Staffs. It has been executed by Mr. John Davies, Wyle-cop, Shrewsbury.

A full-length portrait of the late Earl of Iddesleigh, painted by Mr. Sydney Hodges, has just been placed in the Junior Carlton Club.

Mr. George Eli Mellor, builder, of Stockton-on-Tees, died suddenly on Friday. He had been a member of the town council for some time, till Tuesday, November 1st, when he failed to secure re-election.

The memorial stones of new Baptist mission and school buildings in Lamb-street, St. Augustine's, Bristol, were laid on Friday. The building will be three stories in height, the ground floor being arranged as an infants' school, the first floor as class rooms, and over this a hall, 55ft. by 26ft., and committee room. Messrs. Foster and La Trobe, of Bristol, are the architects, and Mr. Edward Walters, of Montpelier, Bristol, is the contractor. The cost of buildings and site will be £2,600.

An altar desk has been presented to Salisbury Cathedral as a memorial of the late Bishop, Dr. Moberley. It is of polished brass, executed by Messrs. Singer and Son, of Frome. The plate has four perforated ornamental quatrefoils, and is supported on each side by brass scroll work.

On Thursday afternoon, the 3rd inst., memorial stones of a theatre which is now in course of erection in Alexandra-street, off Witt-road, Widnes, were laid. Messrs. Sayce and Randle are the contractors.

A reredos of carved oak, the work of Messrs. Frank Smith and Co., of Southampton-street, W.C., has just been placed in Kenchester Church, Herefordshire.

We omitted to state last week that Truro Cathedral is warmed by Mr. John Grundy's patent combined system of pure warm air and hot water. At the opening services last week an equable temperature of 57° Fahr. was maintained throughout the entire building.

Mr. Henry Cunnington, a well-known West of England archæologist, died at his residence in Devizes last week. Mr. Cunnington, who was a grandson of the late William Cunnington, F.S.A., of Heytesbury, the poineer of archæology in Wiltshire, was an earnest worker for the promotion of archæological science, and was especially known through his efforts to insure the preservation of Stonehenge.

ST. JOHN'S CHURCH AND VICARAGE, STAMFORD-HILL, N.

THIS church, completed last year, is built of red bricks. Red terracotta and Mansfield stone are used for large west and for east windows, the only Bath stone introduced being for columns of nave, baptistery, and chancel arch.

The dimensions are as follows:—Nave, 85ft. by 27ft. 4in.; height to top of wall plate, 32ft.; chancel, 32ft. by 24ft., and the vestries are divided by a folding partition, making a room 28ft. 9in. by 13ft., for confirmation and other classes; there is also a semicircular baptistery under west window, and an organ-chamber, 17ft. by 14ft. The tower has been omitted for the preseut. The total cost of the work has been £5,450 (exclusive of architect's commission), the accommodation being for 650 persons. This includes font and pulpit in Caen stone by Mr. Gilbert Seale, of Walworth. Mr. John Grundy carried out the heating, and the whole of the works were executed by Mr. James Holloway, of Lavender-hill, Wandsworth.

The architect's instructions as to the vicarage were that the cost should not exceed £1,500 for everything. This involved a plain residence, including, however, all the accommodation required by the Ecclesiastical Commissioners, and by a judicious arrangement of plan, the position of rooms being rendered necessary by the site, a somewhat picturesque house is obtained, which groups well with the church so closely adjoining it. The principal dimensions are as follows:—Drawing-room, 21ft. by 15ft.; dining-room, without large bay, 15ft. by 13ft. 6in.; kitchen, 13ft. 6in. by 13ft.; study, 12ft. 6in. by 11ft; the materials used being similar to church: red brick, brown tiles for roof, red for tile hanging, with a few of Brown's ornamental and moulded bricks.

The lowest tender, which includes everything but front boundary fence, was that of Messrs. Paine Brothers, of Stamford-hill, for £1,385, and they are now carrying out the works, under the direction of the architect, Mr. Spencer W. Grant, A.R.I.B.A., of 63, Finsbury-pavement, E.C.

PROPOSED HOUSE AT MOTTINGHAM.

THE illustration of the above house given to-day is from the designs of Mr. Leonard V. Hunt, and is proposed to be erected at Mottingham, near Chislehurst, Kent, for Mr. Walter Garratt. The walls are of red brick, partially tile-hung, and the main gable is of half-timber work. The plan is self-explanatory.

The trade year in the Staffordshire Potteries, which closed last week, has been remarkable for the great increase of business done with the United States, notwithstanding the growing competition of American potters, and the extremely low selling prices which have prevailed in the district in every department. The shipments of Staffordshire ware from Liverpool for America are little short of the exports to that country in 1883, which were then higher than in any previous year since 1872. The turnover in the home trade is diminishing, and there is a constant request for a cheaper class of goods from all parts of the United Kingdom.

The President of the Institution of Civil Engineers, Mr. G. D. Bruce, delivered, on Tuesday evening, the inaugural address of the session, in which he sketched the advances made by engineering science during the Queen's reign. In that institution, on the day of Her Majesty's accession, he said, there were 238 members of all classes; on the 20th June, 1887, there were 5,396 members, the total income at the respective dates being £713 and £21,015 a year. Beyond this the institution stood as the mother of many kindred societies dealing with sections of those great questions which fall within the all-embracing profession of a civil engineer.

In our notice last week, p. 709, of the opening of the Catholic Church in Norton-road, Hove, Brighton, it should have been stated the whole of the carvings, including the high altar and the altar to St. Joseph, the new font, the communion rails in stone and marble, with marble steps to the sanctuary, and two side chapels, fourteen new large corbels, angels to nave, a statue of the Sacred Heart over entrance, holy water stoups in marble and stone, and other works to the church, were executed from designs and instructions of the architect, Mr. Joseph S. Hansom, F.R.I.B.A., London, by Messrs. R. Boulton and Sons, of Cheltenham.

Weston parish church, Cheshire, was reopened on Thursday, the 3rd inst., after restoration, carried out by Mr. A. P. Cotterill, builder, of Crewe.

Engineering Notes.

NEW LANARKSHIRE AND AYRSHIRE RAILWAY.—This new railway system, which will connect the Lanarkshire coalfields with the lower reaches of the Clyde, is making good progress. It is at present in course of construction between Barrmill and Ardrossan. The contract involves the construction of about 60 bridges with culverts, retaining walls, platform walls, &c., giving about 90,000 cubic yards of masonry, 1,400,000 cubic yards of excavation, and 90,000 cubic yards of ballasting. The length of the new railway is about 20 miles. The contractor, Mr. M'Alpine, Glasgow, has employed 12 locomotives, two steam navvies, 50 cranes and stone crushers, and 300 waggons, with 2,000 tons of service rails. The bridges on the Kilbirnie branch are all of concrete. At one part of this branch there are 6,000 cubic yards of concrete with an area of 200 yards. The abutments and wings are all built *in situ*; the parapets, belts, and copes are all made in blocks and afterwards set in Portland cement. The facing work is done with Arran sand, which leaves a uniform surface after removing the boarding. A two span bridge thrown over the railway of the Glengarnock Steel Works is built in arches concrete blocks serving the purpose of ashlar The girders of the bridges each rest on a block of Ben Cruachan granite. On the main line, the permanent way to Ardeer, nine miles distant, is laid. The heaviest piece of work on the line is the viaduct over the Garnock, near Kilwinning. It comprises seven semi-circular arches of 50ft. span, and is built of stone taken from Mr. M'Alpine's quarry at Auchenmeade. The height from the water to the rail level is 80ft., and the cost of the structure was £10,000. Near by this station the largest bridge on the line is reached. The span is about 113ft.; length of girders, 126ft.; and weight of steel work employed, 400 tons. There are 1,800 yards of concrete masonry. The branch line to Nobel's Explosives Works has just been finished. There are 29 bridges between the Garnock viaduct and Ardrossan. The South Beach cutting is two miles in length, representing the excavation of about 300,000 cubic yards. In this undertaking Mr. M'Alpine until lately had in his employ 1,200 men. The new line will be opened to Ardrossan in May next.

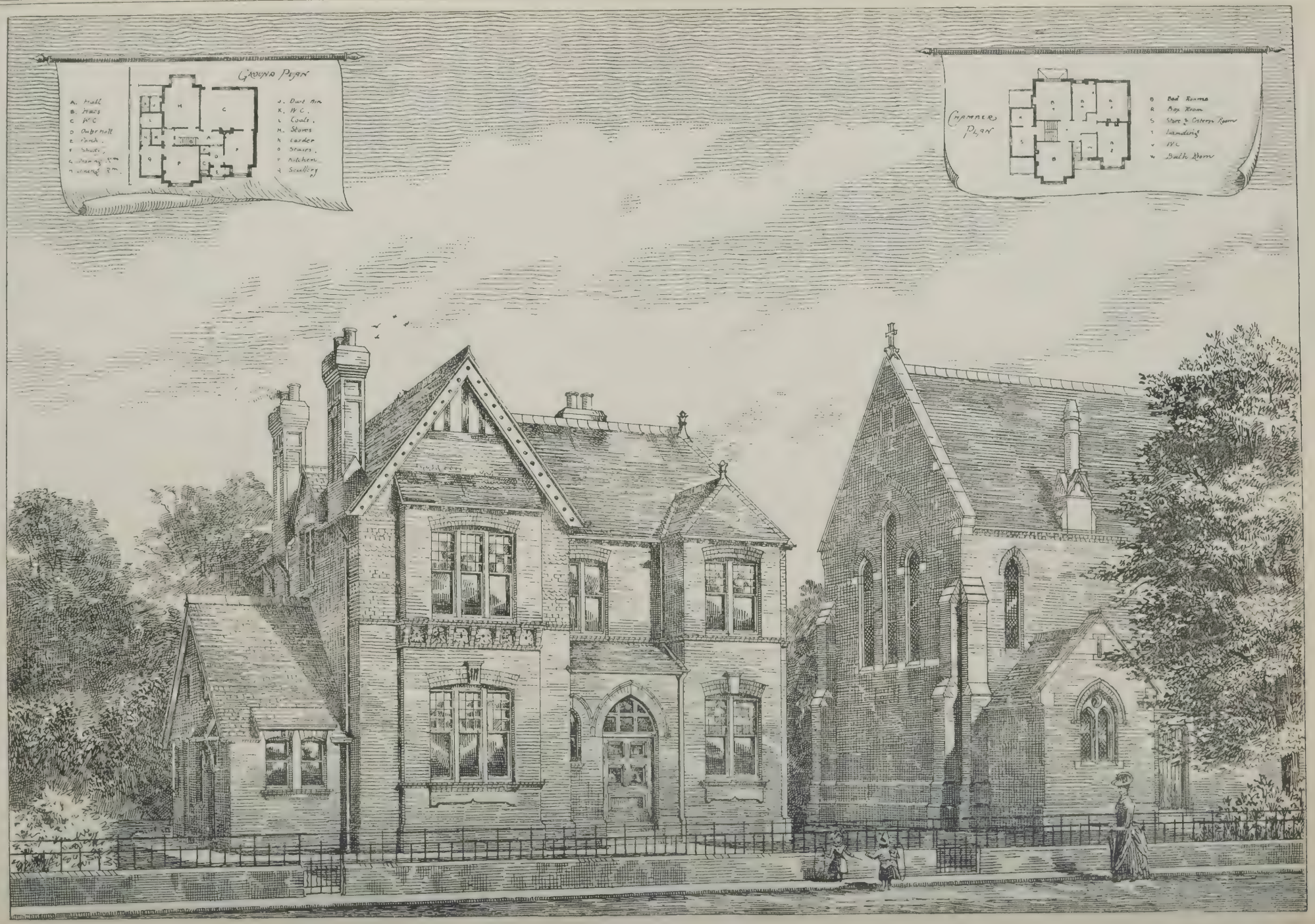
COMPETITIONS.

BLACKPOOL.—In a limited competition for Methodist New Connexion chapel at Blackpool, the plans of Messrs. William Hill and Son, architects, 69, Commercial-road, Landport, have been selected.

PRIZES FOR LINOLEUM AND FLOOR CLOTH DESIGNS.—The Mitcham Linoleum and Floor Cloth Company, Limited, offer to designers prizes to the amount of £200 for designs suitable to linoleum or floor cloth. A series of five prizes will be given for the five best sets of three designs—viz., £75, £40, £20, £15, and £10. Additional prizes are also offered of £20 for the best design of three colours, and £20 for the best design of four colours. The two last prizes will not be awarded for any design included in the 1st, 2nd, 3rd, 4th, and 5th prizes. The directors of the company, assisted by Mr. G. H. Birch, F.S.A., will make the awards, and their award will be final.

Mr. Benjamin Baker, M.Inst.C.E., joint engineer with Sir John Fowler, of the Forth Bridge, delivered, on Friday, the first of the Armistead course of lectures to a large audience in the Kinnaird Hall, Dundee. He gave a graphic account of the construction of the Forth Bridge, illustrated with limelight views. In the course of his lecture Mr. Baker stated that the annual loss of life averaged 1 in 300 of the workmen employed at the bridge, while amongst the guards and brakesmen of goods trains the average was 1 in 192.

The Edinburgh Public Library Building Committee have received a report by the Dean of Guild from Mr. Washington Browne, architect, on the estimates for the erection of the public library buildings. The lowest tenders for the various classes of work have been accepted, and the building will be completed for £20,000, or thereabouts, instead of, as was anticipated, £24,000 or £25,000. This does not include such items as the electric lighting, furnishings, &c.



ST. JOHN'S CHURCH AND VICARAGE, STAMFORD HILL, N.—Mr. Spencer W. Grant, A.R.I.B.A., *Architect.*





Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

VIEW IN NEWCASTLE ON TYNE BY T.M. RICHARDSON, SEN.



THE · BRIDGE · LODGE · NETHERCOURT

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



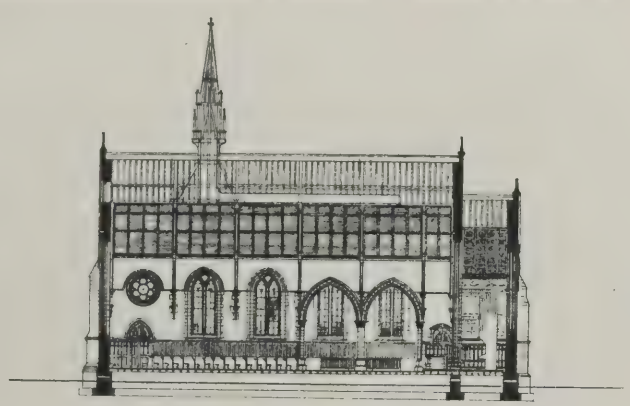
DAVID
PERSICA
EZEKIEL

HIRAM
TUBAL KAIN
ST. LUKE

ISAIAH
DELPHICA
CUMAEA

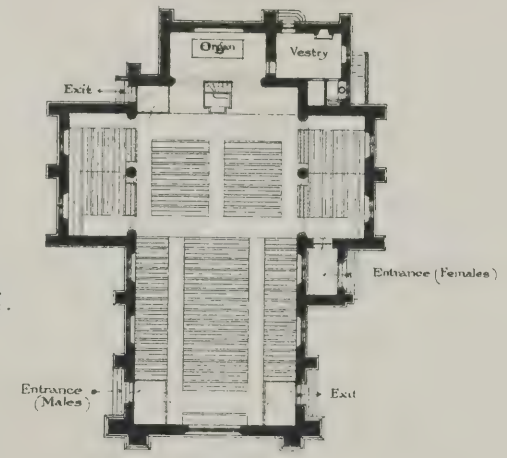
"PHOTO-TINT" by James Akerman, 6, Queen Square London, W.

SPANDRIL FIGURES AT THE NATIONAL ART MUSEUM VIENNA, BY PROF. RUD WEYER



LONGITUDINAL SECTION.

PLAN.





SIDE ELEVATION.

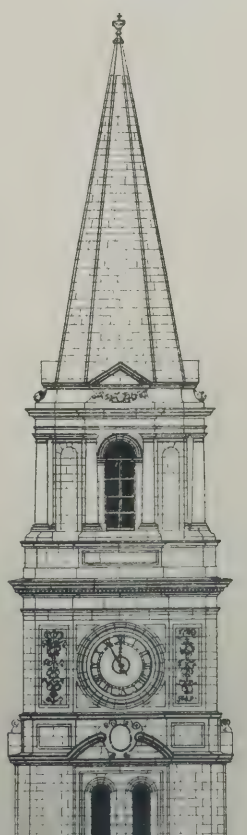
GLASGOW DISTRICT BOARD OF LUNACY.

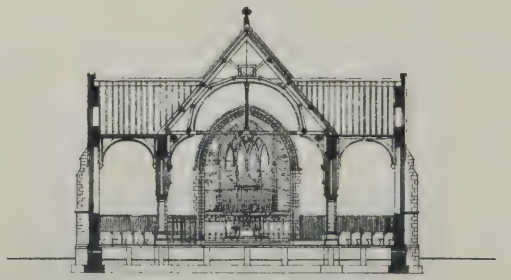
ASYLUM AT HARTWOOD

MESSRS CAMPBELL · DOUGLAS & SELLARS · ARCHTS

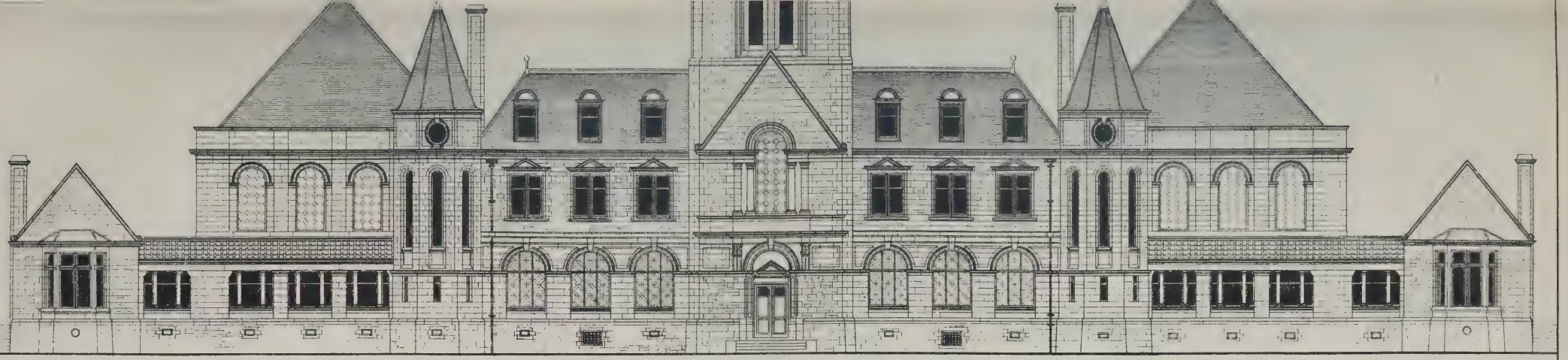


FRONT ELEVATION

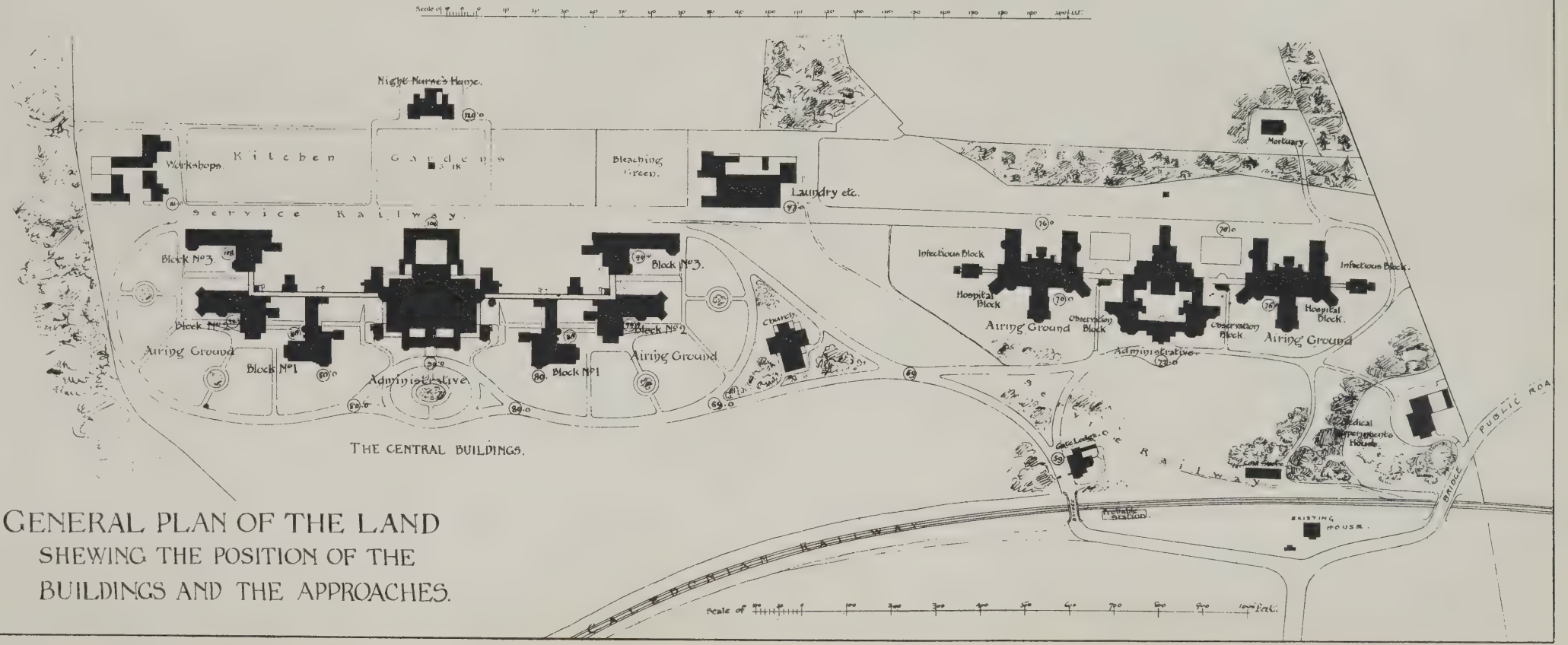




TRANSVERSE SECTION



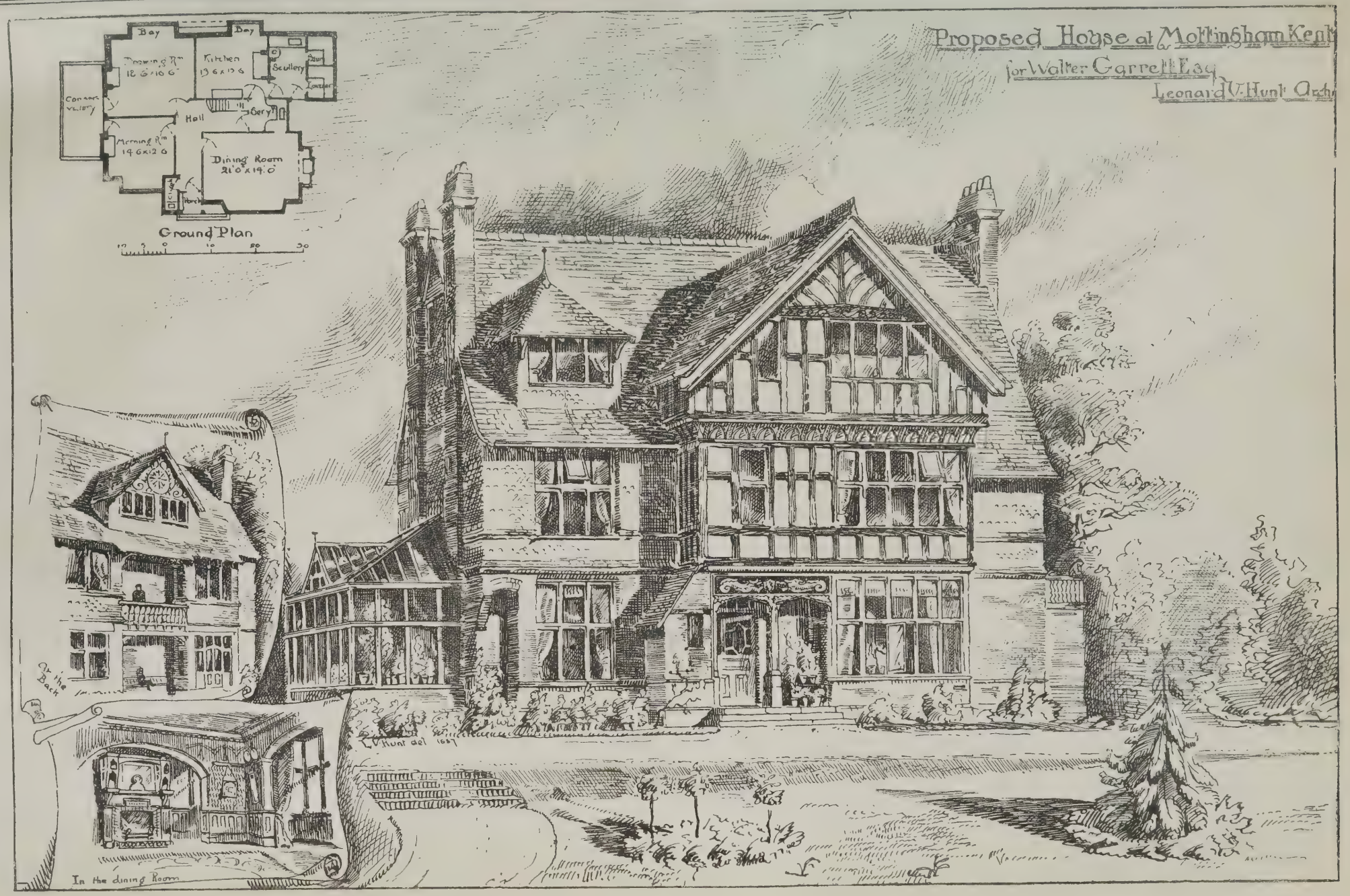
FRONT ELEVATION OF ADMINISTRATIVE BLOCK.



THE CENTRAL BUILDINGS.

GENERAL PLAN OF THE LAND
SHEWING THE POSITION OF THE
BUILDINGS AND THE APPROACHES.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C


Proposed House at Mottingham Kent
for Walter Garrett Esq
Leonard V. Hunt Archt
Bay
Bay
Drawing Rm
18 6 x 10 6
Kitchen
13 6 x 12 6
Scullery
Larder
Conserv.
Hall
Pantry
Morning Rm
14 6 x 12 0
Dining Room
21 0 x 14 0
Ground Plan
0
10
20
30
At the Back
L. V. Hunt del 1907
In the dining Room

Building Intelligence.

BIRMINGHAM.—An important block of property, situate at the junction of Albert-street and Moor-street, Birmingham, is about to be commenced. This building will have a frontage of 120ft., and will be four stories in height. The basement portion will be let off for wholesale wine and spirit vaults, the ground floor for wholesale shops, and the upper floors for wholesale warehouses. A large yard at the rear, covered with glass, will be adapted for an auctioneer's store-room. The front elevation will be Early Gothic in style, and terracotta dressings, &c., will be freely used in the erection. This building is to be erected for Mr. John Swann, from plans, &c., prepared by Mr. John Statham Davis, architect, both of Birmingham.

BOTHAL.—Bothal Church, Northumberland, is being restored from plans made by Mr. C. Hodgson Fowler, F.S.A., of Durham. This is one of the most interesting churches in Northumberland. The church dates from the early part of the 13th century; but all that remains of that date is the north arcade and the chancel. In the latter part of the 14th century a south aisle had been added and clerestories built, and the whole church re-roofed. These 14th-century roofs have been taken off bay by bay, repaired, and put back, the whole church remaining as it was rebuilt at the above date. Every window in the north and south aisles contains some beautiful painted glass of the above date. This has been carefully releaded on the work, and put back in the same position where found. The church also contains a very fine alabaster monument, with two recumbent figures of the Ogle family, dating from the early part of the 16th century. During the restoration, a quantity of old stones have been found, leaving no doubt that both an Early Norman and Transitional church stood on the same site. The remains of a quantity of Saxon crosses have been found—some very fine samples of work at that date. The work is expected to be completed early next spring. Messrs. R. Carse and Son, of Amble, are sole contractors, and Mr. T. Carse clerk of works. The restoration is costing about £2,000.

DODBROOKE, DEVON. — The parish church having undergone a much-needed restoration, was reopened on Sunday. The church is in the Perpendicular style, and consisted previous to the restoration of a chancel and nave, with south aisle and a square tower, at one time surmounted by a spire. The last restoration took place in 1846. The restoration has included the erection of a new north aisle, this addition providing about 90 sittings. The architect was Mr. J. D. Sedding, of London, and the contractors were Messrs. S. Farr and Sons, of West Alvington. The chancel has been entirely rebuilt, the flooring being of Upton wood and slate set in diamond pattern, the steps leading to the altar formed of slabs of the same stone. The Communion table and its rails are of oak. The choir seats are of wainscot oak with linen-panelled fronts. The north aisle is divided from the chancel and nave by an arcade of three new Dartmoor granite arches, and three old ones taken from the ruins of the now disused church of South Huish, replaced by a new one about 15 years ago. The screen of Dodbrooke is well known to students, and is by many considered the finest in Devon. The west window of the north aisle was formerly the east window in South Pool Church, and is now filled with stained glass. In the south aisle the removal of the ceiling has exposed an oak roof with carving and bosses. The west end gallery has been taken away. The new seats are of pitch-pine, with linen-panelled backs and fronts. The work has been carried out at a cost of about £2,000.

GUISBOROUGH.—The foundation-stone of a new Grammar School was laid at Guisborough on Friday, last week. The buildings are being erected from plans by Mr. Alfred Waterhouse, R.A.; and will consist of school premises, with accommodation for boarders, and head master's house. Some old scappled ashlar, obtained by pulling down the almshouses, has been re-used for external walls up to the window heads of the ground floor, relieved with buff terracotta plinth, stringcourses, and mullioned windows. Above the ground floor red pressed bricks, in Flemish bond, pointed with black ash mortar, are used, and relieved with terracotta dressings. There will be a bell turret on the roof, and the roofs will be slated. A carriage archway will be pierced in the centre of the building; and on the west side is the schoolroom, 41ft. 3in. long by 23ft. 3in. wide; this has a fireplace at each end, the floors consisting of wood blocks laid diagonally in tar, and the walls of glazed bricks from floor to ceiling, ivory white and grey in colour, interspersed. On the east side of the archway is the boarders' dining-room, 23ft. 3in. by 18ft. On the first floor are class-room, master's room, and dormitory. Mr. A. White, of Guisborough, is the contractor, and Mr. John Cook clerk of the works. Messrs. Wilcocks, of Burmantofts, are supplying the terracotta and glazed bricks.

LAUNCESTON.—The new town hall at Launceston, opened by the Lord Chancellor on Friday, is 90ft. long by 43ft. 6in. wide, and seats 800 persons; it is one of the largest public rooms in Cornwall. The Tudor style, of civic character, has been chosen by the architects. The hall is entered from the Municipal Buildings on one side, and from a porch on the other. The principal front faces the Castle and main approach to the borough from the railway station. At the other end, internally, is the platform, having ladies' and gentlemen's retiring-rooms, with external entrances and lavatories, &c., adjoining. The roof is of hammer beam construction, with a ceiling formed in cants above the arched form of truss, with moulded ribs at the intersections. There are large openings in the ceiling for the efflux of foul air, which is drawn off through trunks in the roof of Boyle's air-pump ventilators on the ridge. The walls are plastered internally above a bold dado of pitch pine. The building is of the local stone, contrasted with doorways, mullioned and transomed windows and copings, of Bath stone from Monk's Park quarry. In the main front there is some characteristic foliage carved by Mr. Harry Hems, and a shaft has been placed at the point of the gable to receive, it is hoped soon, a life-size statue of the Queen. The roofs are covered with Delabole slate. A fire-engine house has been erected close to the hall. The contractor for the whole is Mr. E. Rendell, and the total cost, exclusive of land, is rather over £2,000. The buildings have been erected from the designs and working drawings, and under the direction of the joint architects, Messrs. Hine and Odgers, Plymouth, and Mr. O. B. Peter, Launceston. Mr. Waymouth acted as clerk of the works.

METROPOLITAN BOARD OF WORKS.—At the meeting of this Board, held last Friday week, applications were received from candidates for the appointment of district surveyor for the district of Charlton, Lee, and Kidbrooke, in succession to the late Mr. James Collis. There were 32 candidates, and the voting was taken by ballot. The number was in the first place reduced to five—viz., Mr. W. L. Spiers (36 votes); Mr. W. J. Hardcastle (31); Mr. W. H. Stock (27); Mr. H. H. Bridgman, C.C. (23); Mr. M. L. Saunders (19). A second ballot was taken, resulting in the election of Mr. Spiers. Mr. E. Mossop upon the subject of bribing vestry officials then introduced a deputation from the Vestry of Chelsea, who presented a memorial asking the Board to insert in one of their Bills to be submitted to Parliament in the next Session a clause which should make the person who offered the fee or reward mentioned in section 64 of the Metropolis Local Management Act, 1855, liable to penal consequences. In support of the memorial, Mr. Arthur Cooke reminded the Board that some time ago it was publicly mentioned that officers in the service of the Chelsea Vestry had been invited to accept commissions on parochial contracts, and the surveyor to the vestry, who made the allegations, was subjected to an action for libel in consequence. The suit fell through, but the matter cost the vestry a sum of £30. It was not merely that attempts at bribery had been made, but the members of the vestry had reason to believe that in some cases the attempts had been successful, and one of their officials had been dismissed for that reason. The vestry were of opinion that something should be done to prevent bribing practices, and suggested that the Metropolitan Board should introduce a clause into their General Purposes Bill, or introduce a special Bill to meet the case, so that persons who attempted to bribe officers of the vestries and district boards might be brought within the law. The memorial was referred to the Works Committee for consideration and report. The same Committee was also instructed to consider and report as to the desirableness of inserting in one of the Board's Bills a clause giving power to the Board when forming new streets to provide that all the ancient lights and other easements interfered with by the new buildings erected shall be dealt with by compensation and not by injunction.

NEWCASTLE-ON-TYNE.—The memorial stone of the College of Medicine was laid on the 4th inst. Messrs. Dunn, Hansom, and Dunn, of Eldon-square, Newcastle, are the architects. The first contract has been carried out by Mr. Walter Scott, of Newcastle, for £2,000. The second contract, which provides for the completion of the sections of the building at present to be constructed, is in the hands of Mr. S. B. Burton, whose tender, about £15,000 in all, was the lowest submitted. The building replaces an older college, which has been acquired by the North-Eastern Railway Company. The complete design provides for covering the whole of the site, leaving a quadrangle in the centre. The western and southern sides are not being built at present, but will contain space for the extension of the physiology, laboratory, and animal pathology departments, and a wing containing a residential hall for fifty students. The college now being erected consists of the principal (north) front, facing Bath-road, and the east wing. This wing contains the anatomical department, and is practically cut off from the other buildings. On the ground floor is the dissecting-room, 70ft. by 30ft., lit by a "ridge and furrow" roof. Adjoining is a large locker-room and lavatory, and both are floored with asphalte. On the same floor is the anatomy theatre (for 150 students) and professors' private room. Above is a bone room, 20ft. by 20ft., and a room, 20ft. by 15ft., for the curator of the museum. Direct access is provided to the museum from the anatomy wing. There is a basement containing a summer dissecting-room, 20ft. by 20ft., two rooms, 41ft. by 30ft. and 30ft. by 28ft., for comparative anatomy, a mortuary and infection-rooms, with private yard; also a heating vault, coal cellar, and store-rooms. The internal walls of this wing are entirely faced with glazed bricks, and foul air is extracted by heated shafts. The whole building is warmed by coils in the various rooms. The main front contains the entrance, in the centre, under a tower, with oriel window, and through a vestibule into the hall and staircase. Right and left of entrance are rooms for the porter and registrar. The remainder of the ground floor is occupied by the council and professor's room, 35ft. by 25ft., materia medica room, 25ft. by 25ft., and smaller lecture theatre, 38ft. by 25ft. A staircase of oak, with double flights of steps, leads to the upper floor, which contains the library and examination hall, 80ft. by 35ft., and the museum, 60ft. by 35ft. The walls and ceilings are panelled in oak and plaster. In the upper part of tower is a smoking-room for students. The building is designed in the Elizabethan style. The mullioned windows are being carried out in stone, and the walls and dressings in red bricks and terracotta, the former being supplied by the Normanby Brick and Tile Co., Middlesbrough, and the latter by Messrs. Doulton and Co., of Lambeth. Mr. Relph is the clerk of works.

SHUSTOKE.—The parish church of St. Cuthbert, which was partly demolished by fire, through lightning, on the 1st of June last year, was reopened on Monday week by the Lord Bishop of Worcester. The roof of the nave and chancel, the windows, and all interior furniture—including the pews, font, pulpit, and organ—were consumed by the flames, one of the bells—the treble bell—was cracked, and, with the exception of that of Sir William Dugdale, the great antiquarian, all the monuments, in the possession of which the church was so rich, were hopelessly disfigured and injured. The church was also injured by lightning in 1801. The church has now been completely restored and partly rebuilt at a cost of £6,000. Messrs. G. F. Bodley, A.R.A., and Garner, of London, were appointed architects, and the con-

tract was taken by Messrs. Stephens and Bastow, of Bristol, who have been represented by Mr. Charles Stacey; while Mr. David Knight has acted as clerk of the works. The old Norman font, which fell a victim to the flames, has been replaced by a new one—an exact copy of the original—and presented by Mrs. and Miss Dugdale, of Blyth. A new pulpit of richly traceried design in oak, with a stone base, is another special gift. The upper part of the chancel arch has been rebuilt with carved corbels on either side, that on the south side representing Edward I., and that on the north Queen Victoria. On the outside of the east belfry window the mitred head of St. Cuthbert has been reproduced.

South Shields.—The works in connection with the laying out of the South Marine Park at South Shields, from the designs of Mr. Matthew Hall, the borough engineer, are approaching completion. During the summer an ornamental terrace, 400ft. long, and facing Sea View, has been constructed. The wall is built of dark red bricks, relieved by stone piers, and is surmounted by cast-iron balustrading, with stone pedestals at intervals of 20ft. The lower portion of the park is approached from the terrace by means of broad flights of Aberdeen granite steps. Mr. F. Mackey was the contractor, and Mr. J. Peebles, the landscape gardener, has laid out the flower beds and walks. An addition to the North Park is in contemplation, ground facing the Lawe Cottages having been secured, and the designs prepared by the borough engineer. To complete the South Park, a road 50ft. in width, and forming a straight thoroughfare from Ravensbourne-terrace to the beach, is about to be made. This road will form the southern boundary of the park, and is to be constructed by the Harton Coal Company, who are inviting tenders for the work. South Shields now possesses two public parks, and these, with the pier promenade, the stretch of level sea beach from the pier to Trow Rocks, the salt water baths, and other attractions, should place the town in a position to compete with neighbouring seaside resorts.

Woking.—The foundation-stone of Christ Church, near Woking Station, was laid on the 10th by the Duchess of Albany. The ceremony was conducted by the Bishop of Winchester. The church will be built of red brick and stone, with wide and lofty nave and no aisles; when completed, will seat about 800. The character of the work is 13th century, from the designs of Mr. W. F. Unsworth, Poet's Corner, Westminster. The contractors for the first section of the work are Messrs. James Harris and Son, of Woking.

CHIPS.

On Wednesday week an organ, built by Messrs. Hill and Son, of London, at a cost of £250, the gift of Mr. Arthur Ashton to St. Editha's Church at Church Eaton, Staffs, was dedicated.

New board schools in Shakespeare-street, Loughborough, Leicestershire, were opened last week. The buildings are of red brick, with Hollington stone dressings, and are Tudor in style. Mr. G. Hodgson, M.I.C.E., was the architect, and Mr. W. Needham, of Loughborough, was the builder.

A new reservoir is being constructed at Woodcock Hill, Harefield Grove Farm, for the storage of water for Rickmansworth waterworks. The contractor is Mr. Collins.

The City Commissioners of Sewers decided on Tuesday to take immediate steps for the completion of the widening of Ludgate Hill on its south side, and, with this object, to serve notices on the leaseholders and occupiers of the houses numbered 37, 39, 41, 45, and 47, for the acquirement of these interests. It was also resolved to repave the carriage-way of Cheapside with asphalte, at an estimated cost of £3,600.

The ratepayers of Denny and Dunipace have adopted a report by Messrs. Kyle, Dennison, and Frew, Glasgow, for utilising Garvald Burn as a source of water supply. The estimated cost is £5,700.

The Earl of Harewood has given a very valuable site, containing 3,127 square yards, to the new parish of St. Luke, South Stockton-on-Tees, on which it is proposed to erect schools, parsonage, and church. Mr. Weatherill, architect, Stockton-on-Tees, has been commissioned to prepare the necessary drawings.

The Bishop of Nottingham is having a new altar erected in Lincoln Cathedral at his own cost.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Association of Public Sanitary Inspectors.—The first meeting of the fourth session of this association was held at the Westminster Town Hall, on Saturday, when Mr. Hugh Alexander, of Shoreditch, chairman of the Council, delivered his inaugural address. He pointed out that the association had grown in popular estimation, and urged that the vibration of public thought and sentiment upon health questions had been very clearly indicated in many ways. The full ripeness for legislative action had been clearly manifested in the report to the Royal Commissioners, and also by numerous Bills and suggestions directed to the amendment of the existing sanitary law. A report on this subject had been drafted and presented by their Council to the President of the Local Government Board, and had been received most favourably. The report declared that the most essential amendments required in sanitary law to secure efficient administration were—(1) That sanitary officers should be duly qualified, and should only be removable from their position by local authorities for misconduct, neglect of duty, or proved incompetence. (2) That sanitary officers should be held more directly responsible for the abatement of nuisances, and should be required, on thir own responsibility, to serve notices on behalf of local authorities, requiring all necessary works to be done for that purpose, such notices to be read to the local authority or committee appointed for such purpose at their meeting, and if approved should be adopted, and proceedings ordered to be taken for the abatement of nuisances. Penalties to accrue from the date of inspection notice. (3) That more simple, stringent, and summary powers should be given for the abatement of nuisances; and, lastly, that a minimum rate of salary should be enacted for sanitary inspectors. A testimonial was presented to Mr. G. B. Jerram, of Walthamstow, on his retirement from the position of chairman of the council, which he has held since the formation of the association. Mr. Jerram, in acknowledging the gift, expressed his satisfaction that the cause of sanitary reform was gaining ground in public estimation, but said at present sanitary inspection in the metropolis, as well as in the provinces, was inefficiently performed.

Birmingham Master Builders' Association.—The annual meeting of this association was held on Tuesday. Mr. J. Bowen presided, and there were also present Messrs. G. Twigg, W. J. Whittall, G. Raby, E. Giles, Albert Smith, and E. J. Bigwood (secretary). The annual report stated that the committee regretted that they were unable to record any permanent improvement in the state of the trade, which continued at the same dead level as for the past six years. The association having given notice to the operatives of a general reduction of wages, meetings were held with each branch of the operatives, but no progress was made. Eventually, arbitration having been rejected, the matter was settled at the existing rate of wages for three years; the whole of the operatives accepting an amended arbitration rule, and the stonemasons and plumbers agreeing to the insertion in the wages rule of the words, "Superior and inferior men to be rated by the foreman or employer." The balance-sheet showed £14 8s. 4½d. to the credit of the association. Mr. Alfred S. Smith was unanimously elected president for the ensuing year, Mr. C. H. Barnsley was appointed vice-president, Mr. W. J. Whittall was re-elected treasurer, Messrs. Thomas Barnsley and W. Sapcote were reappointed auditors, and Mr. E. J. Bigwood was reappointed secretary. In the evening the members met at dinner, Mr. J. Bowen, the retiring president, in the chair.

Birmingham Architectural Association.—On Friday night about five hundred ladies and gentlemen attended the conversazione and exhibition of architectural drawings, held at the Assembly Rooms, Edgbaston, in connection with this association, which was founded in 1873, and at present is the only provincial society affiliated with the London Architectural Association. The papers and designs submitted in Birmingham are in all cases the same as those submitted in London, and in addition to this the whole of the class drawings executed in London are forwarded to Birmingham for the inspection of the students. The London A.A. Library is also equally available to Birmingham men. There are at present seventy members in the society, this number being an increase of five on the year. The exhibition of drawings lent by members and friends of the association was exceptionally good, and included representations of most of the recently erected local buildings of note, and in addition there were drawings of prominent buildings in different parts of the country. Numerous water-colours, pencil sketches, cartoons, monumental brasses, and photographs were also shown. One of the features in the display of photographs was a fine collection representing works by Burne-Jones. The chief of the drawings, &c., were lent by the following:—Messrs. Aston Webb, W. H. Bidlake, W. Millard, F. Evans, Osborn and Reading, Henman and Timmins, Proud and Faulkner, Essex and Nicol, D. Arkell, Dunn and Hipkiss, J. J. Bateman, J. Cotton, M. B. Adams, J. A. Chatwin, V. Scruton, George and Peto, Crouch, Butler, T. W. F. Newton, W. Hale, Hawley Lloyd, H. Naden, W. Lethaby, Phené Spiers, M. J. Landsell, Ingall and Son, J. P. Osborne, R. W. Edis, J. A. Cossins, J. Brooks, J. Douglas, E. J. May, A. Lee, J. Oldrid Scott, Freeman Smith, A. B. Phipson, Wood and Kendrick, and C. E. Bateman.

Edinburgh Architectural Association.—The Council of the Association announce that they have secured more accessible and otherwise more convenient rooms, situated on the ground floor of No. 42, George-street, where in future the business of the Association will be conducted; the honorary secretary's private address is, as heretofore, 5, North St. David-street. The opening conversazione of the Association was held in the new meeting place last (Thursday) evening, when an address was delivered by Mr. Hippolyte J. Blanc, president, and the prizes gained by students last session were distributed. The twenty-ninth annual report of the Council, submitted at this meeting, stated that the Association had been efficiently maintained during the past session. The progress in all departments had been conspicuous, and the position of the society more firmly established. At the commencement of the financial year the members numbered 276, and during the session 65 names have been added to the roll; while, owing to decease and resignation 39 names have been withdrawn—showing a nett increase of 26, or a total of 302. The financial condition of the Association is satisfactory.

Glasgow Philosophical Society.—The eighty-fifth session of this Society was opened on Thursday, the 4th inst. Dr. J. B. Russell, Medical Officer of Health for the city, who occupied the chair, delivered the presidential address, remarking that it was exactly a quarter of a century since he received his diploma as a member of the Society. Dealing with "The Sociological Aspects of Sanitation," he remarked that it was sometimes hinted that the work in which a medical officer was engaged was opposed to the laws of the universe, or rather to the doctrines of Herbert Spencer, expressed by such phrases as "the survival of the fittest," and "the selection of species." He argued that, granted the most unfit died from epidemics, round every case of this kind there survived groups more or less unfit from the results of the diseases. Under those conditions the most efficacious method of promoting the survival of the fittest was to prevent diseases by the removal of their causes. Passing in review the various communicable diseases, he emphasised the facts—(1) that diseases had the property of lateral extension; (2) they also had the habit of endemicity; (3) that local habits which fostered endemicity were artificial, and, therefore, remediable; (4) that even those communicable diseases which could scarcely be said to live upon uncleanliness were all aggravated thereby; (5) that the soil which sustained the communicable disease in the endemic condition, and promoted the epidemic expansions was the same which produced general unwholesomeness; and (6) that whoever persisted in a manner of life calculated to promote communicable disease injured himself first, but next, and with certainty, his neighbours. The practical question was, "What am I to do with my dirty neighbour?" and the

principle to be strictly followed, both in the case of the personal and the local administrative unit, must be not to do anything for them, but to make them do it for themselves, and bear the expense as they would reap the benefits.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The following is a syllabus of the meetings of this society for the present session :—

Nov. 14.—"Victorian Architecture and Originality," by Basil Champneys. Exhibition of Drawings by W. Hill, F.R.I.B.A.
Nov. 28.—"The Legal Registration of Architects," by J. W. Connon, F.R.I.B.A.
Dec. 12.—Annual Dinner of the Society.
Jan. 16, 1888.—"The Transitional Periods of Gothic Architecture," with illustrations, by Rev. Canon Scott.
Jan. 30.—"Some Simple Principles Connected with the Strength, Stiffness, and Stability of Structures," Professor Barr, B.Sc., C.E.
Feb. 6.—"Horace Walpole, his life and times, with some notice of the condition of Architecture and the Fine Arts during the latter half of the 18th century," by W. H. Thorp, A.R.I.B.A. Exhibition of Drawings by J. H. Greaves.
Feb. 20.—Subject to be announced. Aston Webb, F.R.I.B.A. Exhibition of drawings by T. Butler Wilson.
March 5.—Subject to be announced. Wm. Emerson, F.R.I.B.A.
March 19.—Nomination of Officers.
April 30.—Secretary's Report; Election of Officers; Members' Soirée.

MANCHESTER ARCHITECTURAL ASSOCIATION.—At the opening meeting for the present session, held on Tuesday week, an address was delivered by the president, Mr. A. H. Davies-Colley, A.R.I.B.A., in which he reported that the R.I.B.A., which he looked upon as the central architectural body, had been much improved, and had gained much in the confidence of the profession at large by the introduction of younger men, all, or nearly all, of whom had done excellent work in the London Architectural Association. Union was strength, and it was important that architects should present an unbroken front if they intended to make architecture a close profession—a proposition in which he concurred. The president then considered the steps which an architect's pupil should take to fit himself for subsequent life, pointing out that the more competent and useful a youth made himself the more responsible would be the share of the work allotted to him, and he would thus have the opportunity of having mistakes corrected for which, if only discovered when he was in independent practice, he would have to pay heavily. In sketching, he urged students to spend a large proportion of the time allotted them to a general examination and study of the building—work which was harder and more troublesome than draughtmanship; it was also desirable to approach the work with a mind half teachable and half sceptical, so as to note the good and weak points in a design. The student would gain much power from making drawings of the figure and sketching from nature.

NORTHERN ARCHITECTURAL ASSOCIATION.—The first meeting of the winter session was held in the Old Castle, Newcastle-on-Tyne, on Monday last. Mr. G. G. Hoskins, of Darlington, the president, occupied the chair. Mr. Hoskins, in his opening address, referring to the Imperial Institute, said such an important and national building should have been thrown open to competition to all architects in the kingdom. When the R.I.B.A. by-laws were settled upon, a definite basis would be offered for federating existing societies with that body. He strongly approved of obtaining Parliamentary powers for the compulsory registration of architects, but thought the working of the scheme should be left with the Institute. He hoped the members of the Association would give a strong expression of opinion in favour of this course. Drawing attention to the Exeter Theatre disaster, he said useful lessons were to be learnt from such calamities. Mr. Hoskins then read a long and exhaustive essay upon theatre construction, treating the subject chiefly from the fire prevention point of view. A vote of thanks was passed to the president on the motion of Mr. Tillman. Mr. Rich moved that the paper be printed. Mr. W. J. Moscrop, of Darlington, in seconding, suggested a special night should be set apart for its discussion. The hon. sec. (Mr. F. Rich) read an interesting paper suggesting the subjects for lectures and discussions during the session. Short discussions arose as to the Leeds Architectural Association and the case of Mr. Birchall, and upon the conditions for a local competition at Birtley, Durham.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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THE "BUILDING NEWS" DESIGNING CLUB. (In reply to numerous inquirers, we cannot undertake to send the rules of the club by post, or to answer individual inquiries. The rules were published in the "B.N." of Nov. 4, and intending competitors must get that number.)—R. M. B. (All drawings sent to us are returned—whether used or not.)

Correspondence.

ARCHITECTS' ASSISTANTS' PROVIDENT FUND.

To the Editor of the BUILDING NEWS.

SIR,—Perhaps Mr. Chambers and your readers may remember my letter some time back, in which I appealed to assistants generally to help me in the formation of a committee to consider the "Federation Bill" with regard to the parts that affected assistants. I do not suppose that many of your readers will credit it, but it is nevertheless a fact that I received only *two* answers; therefore the movement fell through.

Will assistants kindly note this, and bear it in mind, that if the above referred to movement is to succeed, they must wake up and exert themselves, not wait for others to do work for their good, and without assisting them whatsoever? From my own personal knowledge the majority of assistants I am acquainted with will be only too glad to avail themselves of the benefits conferred by such a fund; but they do not show any disposition to help to make the proposal an accomplished fact any further than becoming members when it is formed.

All manner of tales are told to excuse themselves from taking a forward part. One who was old and big enough to knock me down with ease, stated he was too young; and another said he had no experience in anything of the kind before, therefore could not, but would be pleased to join the society when formed; another lived too far away; another thought there were better men than himself to be got—in fact all manner of lame excuses. I have come to the conclusion that assistants are—shall I say, too *modest?* They also put me in mind of a tale I heard, which I may as well relate. An American State official was so in the habit of receiving "considerations" to assist him in deciding which party to vote for, that when a measure was introduced that would bring about, should it become law, a considerable increase of his salary, he could not be prevailed upon to give his vote in favour of it till he had received the accustomed "consideration."

I do not wish to infer that assistants require to be bribed; but this I will say, that a considerable amount of coaxing is required to get them, *not* to stand in the light of their own interests. I have not the slightest doubt but it is the dear and laudable wish of every assistant to be in practice on his own account some day. A moment's consideration must convince them that if they are so neglectful of their own interests, they will never be able to attend to those of a client. I hope now assistants will *wake* up—they have slumbered long enough. I wish Mr. Chambers every success in his undertaking, and shall attend the meeting on the 18th inst., when I hope to see a crowed room.—I am, &c.,

R. W. COVENTRY DICK.

34, Lady Somerset-road, Kentish Town, Nov. 7.

A MODEL EXIT FOR THEATRES.

SIR,—Mr. S. Beale, in your last, suggests a scheme for dividing laterally all public stairs which he will find is identical with a scheme of mine set forth at length in a letter to your journal, 23rd Dec., 1881, and commented on in your editorial in following issue (30th). The suggestion was not favourably received, and I did not go into the matter further. The objections seemed to be, firstly, that the public would not submit to the restrictions involved by the "gangways" (what a suggestive phrase that is), and, secondly, that such barriers would be broken down in the rush. The latter objection, I think, is fully overcome by Mr. Beale's idea of carrying up supports to the ceiling.

At all events, I am glad Mr. Beale brings the matter again into notice, and it is very satisfactory to learn that there is a prospect of carrying the suggestion into practical effect.

What I wished to convey was the fact that there can be no safety in any moving mass of human beings, except in military "alignment." Mr. Beale's little sketches show this much better than my letter. It illustrates the difference of a "march past" and a "disastrous rout."

A good commander could get his division out of a public building in 10 minutes or less. An ordinary assemblage, without military instinct or guidance, can only have this instinct or direction imparted by *artificial contrivance* as before suggested.—I am, &c.,

D. BRADE, F.R.I.B.A.

SIR,—Mr. Sydney Beale's idea about exits to a theatre is not quite novel. Last year the magistrates of this city (Manchester) insisted on new staircases being built to the upper circle and gallery. These I superintended, and provided each with a central handrail, but different in detail to that shown in Mr. Beale's sketches. Of course, I entirely agree with his views.—I am, &c.,

EDWARD SALOMONS, F.R.I.B.A.

31, South King-street, Manchester, and 39B, Old Bond-street, London, Nov. 8.

THE FUTURE OF THE ARCHITECT, AND "THE ARCHITECT OF THE FUTURE."

SIR,—Professor Corfield, in the letter which you published last week, informs us that he has been practising as a sanitary expert for more than 15 years; and it may interest him to know that I "comparatively unknown," specified and carried out drainage works years before that. I do not, however, propose to reply to the Professor by *tu quoque*. I have, as the lawyers say, "got what I wanted," and that is his refusal to prove, in the only certain way possible, that he possesses the knowledge of which he pub-

licly asserts architects are ignorant. His reason or excuse for not doing so is that my request was "impertinent"; but he must not complain if I and others place a different interpretation upon the grounds of his refusal. He need not have introduced the name of Professor Roger Smith into this discussion; but I will at once inform him (it may be from my obtuseness and want of due appreciation, or it may be because I am so much in the *working* world), that I hold a "Grimthorpean" opinion of "Professors" of all kinds, and I am quite unable to rise to professional flights of fancy, particularly in matters architectural. Mr. Roger Smith, however, is a well-known architect, and, from my knowledge of him, I should say that he would be one of the last men to "follow the example of the Professor" in an endeavour to bring architects into disrepute.

As to attending lectures on sanitary subjects, I may say, without any feeling of disrespect to Professor Corfield, that so far as I am concerned they will not be lectures given by him; because I can obtain precisely the same information in a much easier, and perhaps more reliable way, by going to my bookcase and taking down certain books on sanitation, of which it is just possible the Professor, in the course of his 15 years as a "sanitary expert," may have heard, written by a certain S. Stevens Hellyer, of Newcastle-street, Strand. *Verbum sap.* Life, however, is too short to waste much of it in discussions with professors of sanitation, sanitary experts, and inspectors of nuisances. I take leave of Professor Corfield with a profound bow, and I pass on to the much more important observations of Mr. Hugh Roumieu Gough.

I may at once tell Mr. Gough that I have also got from him "what I wanted," and that is the practical admission that his statement in the *Times* of October the 1st was a general one, and thas he is not able to quote a distinct case of that "ignorance of the most elementary laws of sanitation" which he laid at the doors of "very many so-called architects," and thus, I think, we may leave the purely "sanitary" part of the points raised. Mr. Gough, in his earnest letter in last week's BUILDING NEWS, reverts to the question which naturally arises out of the perpetual attempts to lower architects in public estimation, and he vigorously urges forward the proposed Registration Bill, to procure, as he says, "the compulsory registration of all at present in practice or duly qualified, and a test examination or examination for all hereafter desiring to enter the profession, not the Institute merely." That such a Bill is needed I am distinctly of opinion, unless it can be clearly shown that membership of the R.I.B.A. carries with it, in the public eyes, all that such a Bill would procure, that is, *a properly trained and qualified architect.* There is, however, to my mind, a danger in founding the necessity of the Bill too much upon sanitary considerations, because the Legislature will very properly say that *existing* Acts of Parliament in London, and in the provinces, fully provide for the protection of the public in such matters, and, from my knowledge of such Acts, I can say that, if properly administered, they most certainly do. There is the far larger question of the general aptitude and technical skill of the architect in *all* branches of his business, and it is to that the profession must adhere, and prevent, by every means in its power, its place being occupied by those not possessing such qualifications.

I cannot see in what way the profession could possibly be the worse if such a Bill as was drafted by the Society of Architects—modified, of course, as further study of the subject might suggest—became an Act of Parliament, and I cannot see why the unqualified support of the Institute should not be forthcoming to secure the passing of a Bill having for its object the welfare of the profession at large; whether or not the bulk of that profession had enrolled itself at No. 9, Conduit-street. I respond willingly to Mr. Gough's appeal, and ask others to do so; and, putting aside *all* that has gone before, let us, in the most open and candid way, see what it really is which leads the Institute to hold aloof. I know that a Registration Committee has been appointed by the Institute, but I have not yet heard that it has even met. If it has met, it would be interesting to hear the conclusions at which it has arrived; if it has not, it would be well that further time should not be lost in bringing it together.

To my mind, however, the more satisfactory way of settling, once for all, the present petty squabbling between the Institute outsiders and the Society of Architects is to request the Council of the Institute to grant the use of the meeting room for a conference between outsiders, the members of the Society of Architects, and the members of the Institute; the proceedings at which should be thoroughly open, and be reported. One or two active members of the Council of the Institute should be present armed with distinct authority to officially reply to questions which it may become necessary to ask, and the main object should be to affiliate, so far as possible, and with due regard to the dignity of all, those bodies, to whom certainly good does not arise from the present estrangement. If the result of that meeting should show irreconcilable divergence, we shall at least know the true grounds of that divergence. If, on the other hand, a *modus vivendi* should show itself, I have not the least hesitation in saying that great benefit to all will result, and the prospect of passing a Registration Bill will be nearer than it has yet been—that is, of course, assuming that it is hereafter conclusively determined by the profession that such a Bill is necessary.

I have already extended this letter to a greater length than I desired, and that must be my reason for not replying to "M. M.," further than by saying that he is an optimist; I am a pessimist, at least, so far as the "Future of the Architect" is concerned.—I am, &c., WM. WOODWARD.

7, Duke-street, Adelphi, W.C., Nov. 7.

THE PAINTER-ETCHERS' EXHIBITION.

SIR,—In your notice of the exhibition of the "painter-etchers," which appeared on the 4th inst., there was a sentence which might lead to misconception. After a reference to one or two etchings, the artist's name being given in each instance, there followed: "An effective view of 'Dordrecht,' by C. S. Van Gravesande (14), has a great depth of tone. The thirteen illustrations to Bunyan's 'Pilgrim's Progress' (19) are replete with life and character."

This might lead to the credit of these, the "Pilgrim's," etchings being given to C. S. Van Gravesande, while, in point of fact, they are the work of Mr. William Strang, who is only referred to generally about three-quarters of a column further down. By giving publicity to this, you will greatly oblige.—I am, &c.,

Nov. 7. IAN.

COLLAPSE OF WALLS OF BURNING BUILDINGS.

SIR,—The expansion of brick by fire heat may be estimated at rather above half that of wrought iron; and of mortar at about one-fourth more than that of wrought iron. The mortar joints in the wall may occupy, say, one-fifth to one-sixth of the height of the wall. There is no accurate data as to the maximum heat developed at Whiteley's fire. It, however, depends on the nature of the contents, &c., consumed, and the accumulation of draught currents. If there is free lime, &c., in brick or mortar, there is added to the expansion more or less disintegration, which would become not the least potent cause of collapse. We may assume that the interior surface of the brickwork exposed to the fire expanded, say, 1in. in 8ft. or 10ft., vertically and horizontally, which would produce a distortion by buckling, or curving inwards, dish-like, of the inside half-thickness of wall, both vertically and horizontally, leaving for a time the outside half-thickness (say, for convenience of description) not much disturbed; in the meanwhile, air gets in between these inside and outside half-thicknesses, or slices, and it may become gradually expanded by heat and help to force them further apart until the whole wall collapses.

In setting iron girders the usual practice appears to be to build the ends solidly in the wall to act as a tie; but by having cross flanges at ends the wall may be built close to these on side towards interior of building, and space left for expansion on their outside; but this space is of no use without the ends of the girders are set upon rollers or rockers, as is done for bridge girders, because the rigidity of wall would not be sufficient to withstand undisturbed the expansive pushing out, or horizontal thrust, of loaded girder end if resting upon a rough bearing plate or block.

If building timber joists into walls, it is a safe method to bevel off the upper corner equal to the bearing of the end in the wall, which allows the projecting portion of joist, if broken accidentally, to drop down without disturbing the wall, by the leverage which it would exert if built in the wall in the usual way.—I am, &c., ALEX. BLACK.

PROFESSORS OF SANITATION.

SIR,—A suggestion has been brought forward to create a new order of beings, "Professors of Sanitation." There are at present two kinds of professors: The University professor, a man of profound learning and general culture adopting some department of knowledge as his special province; the other a person practising some calling of a professional nature, but not a recognised profession—a phrenologist, for instance—who, possessing no degree by which to distinguish himself, adopts the meretricious title of "professor." With which of these *would* the new professor rank? That will, of course, depend upon the merits upon which his claim is based. Let us examine these.

The principles of house sanitation or drainage are both few and simple: That the main drain be laid external to the premises; means of access to same provided for inspection or insertion of rods; disconnection from public sewer and ventilation. That is the whole theory of house drainage, about which there is such an absurd fuss. This may be acquired by anybody of ordinary intelligence in the short space of three months, or even less, and another three devoted to sanitary appliances, water supply, &c., would exhaust the subject. Now, there is no experienced bricklayer who has not a thorough knowledge of house drainage far exceeding that—and considerably more practical—of any (with exceptions) medical practitioner, and this constitutes but a fraction of his knowledge. Sanitary plumbing, again, is the everyday duty of the plumber, and many matters, similar to a bricklayer, apart from this is he acquainted with. These combined, then, are the materials from which we are to construct the new *professor*. And well might he be termed so. We need scarcely say it is a gross absurdity.

Every qualified architect undergoes now a test in sanitary science, and it is all but impossible for any person in the profession, were he to read but the professional journals, to be otherwise than acquainted with sanitary science.

In conclusion, I have engaged in many sanitary works of magnitude in which the employer or client has consulted a friend or medical man, and in general the theoretical fads advocated have been the laughing-stock of every mechanic, and even labourer, engaged upon the work.—I am, &c., CHAS. R. GUY HALL.

15, High-street, Kensington.

SANITARY ASSOCIATIONS AND HOUSE DRAINAGE.

SIR, — "C. E." has not brought forward any independent evidence to support what I called an untrue assertion — viz., that "it is now generally acknowledged that no traps should intervene between the trap on the main outlet and the soil-piping." When engineers require to make, or do make, untrue statements to support their recommendations, there is likely to be something wrong about them.

In Mr. Rottenburg's case, it was not a question of whether the work should be done without or with a trap at foot of each soil-pipe; but the work was already done with the trap, and said work had been previously examined by the former engineer of this association and no objections stated, so that the new engineer was virtually finding fault with his predecessor, as well as with my plan of doing things. I have no reason to suppose the new engineer is any better than the old one—who has begun business on his own account as a civil engineer.

As "C. E.," on page 673, would have us infer that sanitary associations, "unlike tradesmen or patentees," have no temptation to cause unnecessary expense to their clients, I wish to know where the temptation came from, in this case, to recommend unnecessary work on the

plea of pretended improvement? The Association, so far as I can judge, wished to make itself appear smart at the expense of its client; but it calculated without its host. It has yet to justify its recommendation.

As to the general question of trapping off the soil-pipes from the drain where practicable, or of using said soil-pipes to ventilate the drain, I do not think "C. E." has said anything to show that the sanitary associations that practise the latter style do their work in the way that is best and safest for their clients. To make the paltry expense of the traps an excuse for their omission is all humbug. I do not find my customers object to that. They are generally quite willing to trap off the servants' closet from the nursery and visitors' closets, &c., and *vice versâ*. In 1876, two years before the formation of any of these sanitary associations, I published, in the first edition of my book on "Plumbing and House Drainage," a diagram showing the soil-pipe ventilating the drain; but this was principally for tenement houses where the soil-pipe was often in centre of house, and it was difficult to get a trap, or one would not be put in. I called this a second-rate style of doing the work. For villas, mansions, or where it could be done, and the client was willing to pay for the best job, I recommended trapping off the soil-pipes and keeping the drain air out of them, and so in many cases not allowing either sewer or drain air to get access to either soil-pipe, waste-pipe, or rain-pipe of the house. Surely common sense teaches that if sewer and drain airs are dangerous, it is better to keep both out of the house entirely if it can be done.

"C. E." very foolishly, in my opinion, says no, while also telling us he puts the main trap as near the sewer as possible—as if he wished as much drain air as possible to blow into the house should a closet trap lose its seal; or, as often happens during severe frost, an earthenware closet gets broken, &c. This, therefore, is the real issue between us: whether it is safer to do the work so that no drain air can get into the house supposing the closet or soil-pipe leaked, or whether it should get in.

Allowing it to get in is equivalent to placing a barrel of gunpowder below each bed and then boasting that there is not the slightest danger, because they have looked in half-a-dozen times and the barrel was still there; but when they go the seventh time it may happen that neither barrel nor client are there.

On page 674 "C. E." misrepresents me in saying, "Mr. Buchan speaks about disease germs from one untrapped, ventilated, soil-pipe passing into another, and through closet trap." I never said "through closet trap"; but through a leak in the soil-pipe or at the closet, as often happens, or through closet trap, of course, *if its water seal fails*, the water seal of closet, in "E. C.'s" style, being the only protection to the house and its inmates from the drain.

For "C. E." to tell us that putting in a trap at foot of each soil-pipe is adding "innumerable traps," is all nonsense; while, instead of bewildering the average householder, the trap shows at a glance where the soil-pipe joins the drain, &c. His objection is also fanciful that the air would blow out, so as to be offensive, at the fresh-air inlet outside when the closet was used, especially if the trap is near a window. Now, how is it, it does not do so in practice? Simply because if the trap is near a window the fresh-air inlet is placed to one side, or some other precaution taken to avoid offence. Moreover, this *momentary* puff-out would be into the outer air outside of the house. And it is not air from the main drain, but merely the fresh air that was going in and up the soil-pipe momentarily blown back.

As to "C. E.'s" objection to the trap at the foot of the soil-pipe that it "seriously interferes with the flushing force of the water," that is all imaginary as regards my traps, while its benefits otherwise counterbalance that objection a hundredfold.

In closing, I beg to state that, in my opinion, a house, even well done on "C. E.'s" system, is ten times more dangerous to the inmates than one well done on the sectional system. I had to put the first sanitary association right, when it began its work in 1878, by using a couple of old-fashioned traps, stuck end to end, as a first-class sanitary appliance. This was stopped, and, instead, they used my traps. Then they thought the paraffin test better than my smoke test. They had to give this up, owing to not being able to localise leaks easily with it, and take to the smoke test. They had better follow me a third time, to the advantage of their customers, and trap their soil-pipes too, or either myself or the rising race of registered plumbers may do it instead.

I think the sudden and lamented death of the late Professor Fleeming Jenkin, F.R.S., the originator of these sanitary associations, through blood poisoning, should have taught the engineers of said associations the lesson that they cannot be too careful in keeping disease-breeding germs at as respectful a distance as possible.—I am, &c.,

W. P. Buchan.

Sir,—Referring to the letter from "C.E." in the Building News of 28th October, I shall be glad if you will allow me space for a few remarks in reply to the statements made.

Mr. Buchan deserves all the credit we can give him for his improvements in connection with sanitation, and it does not become "C.E.," as a sanitary engineer, to boast of the number of houses examined every 12 months. There is every probability of the numbers decreasing annually, as public confidence, so far as I am able to judge, at the present time is not increasing towards the sanitary associations, and gentlemen directly connected with some associations appear to be rather doubtful of the "improvements recommended" by their own engineers. I am informed that the president of a sanitary association allowed a good ordinary plumber to renew and overhaul all the drains and sanitary arrangements connected with his house, without consulting the engineer of his own association.

"C.E." admits there are exceptional cases where the soil-pipe should not be used as drain ventilator, as when the pipe is placed inside a house, &c.

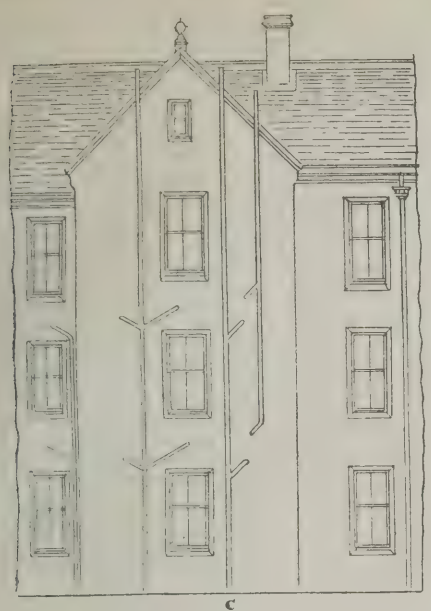
In my opinion, if a soil-pipe placed and fixed on the outside of a wall does not require to be disconnected from the tail drain, there is no reason why it should be disconnected, if fixed on the inside, and "C.E." has not given any explanation in support of his statement. The bugbear of "great danger" by using inside soil-pipes is simply an idea, and without the slightest foundation in the execution of all good work. There are many advantages obtained by placing the pipes inside the walls; as they are protected from frost and accidents of all kinds, and when properly arranged and fixed, the pipes can be tested and examined at any time; and the practice is equally as good a protection against drain gases as if placed on the outside, when good materials are used, and the joints are well made. The soilpipe, with all its branches to w.c.'s, should be tested with water and made perfectly water-tight, and this is very simply done by inserting a plug at the foot of soilpipe; capping, or pluging all the branches to w.c.'s, and filling the pipe with water at the top above the roof, or where it is intended to terminate; and the water test should be left in the pipes for, at least, five or six hours, to make sure that the whole system, including the ventilation-pipe, is perfectly water-tight. I never find any difficulty in applying the above test before the w.c.'s are connected, and before the soilpipe is connected to the fireclay drain. After the connections are made, the smoke-test should be applied, to prove the joints at w.c.'s, and the soilpipe-joint to drain; therefore, in the first place, with well executed work the soil-pipe can with safety be placed inside the house; and another advantage is the more rapid current of air passing through the pipe, owing to the pipe being warmer inside the house, especially during cold weather.

"C. E." states that the arguments do not justify the use of traps at the foot of each soil-pipe. As this is the main question at issue, I would like to explain the facts fully, and by to state that it is not supposition or theory, but the results of careful tests; and when doing so I beg to refer to the accompanying drawings. Plan A. Elevation A and the section, drawn to a small scale, shows the system generally adopted by the Sanitary Associations, and the reference letters on the plans refer to the same apartments—viz., W, w.c., B, bathroom, H, housemaid's closet, R, the corner of a room, and the plans show the 1st and 2nd floors, and a scullery on the ground floor, with grease box at the front of window, as indicated by the broken lines on the two plans. The drains shown on plan A is the summit of the drainage system of a mansion house, or large villa, and between the soil-pipe shown and the disconnecting trap there are two soil-pipes, A and B, before we reach soil-pipe C, shown on the plans. The Sanitary Associations condemn the traps at foot of soil-pipes as shown at T on plan B, and they ventilate the drains by means of the soil-pipes as shown at C, plan A, with the result, that by flushing soil-pipe A, there is a downward current of air in B and C, and the same applies in A and B when one of the w.c.'s connected to C is used and flushed with water—that is, when the w.c.'s connected to one of the soil-pipes are flushed the current of air in the whole system is reversed, and the large quantity of stinking air, from soil-pipes and drain, is forced before the water, &c., and out at the grating of disconnecting trap, and the discharge often continues for a considerable time at the rate of from 10ft. to 300ft. per minute, according to the height of soil-pipe, fall of drain, and the quantity of water, &c., passing through the pipes. Another defect in this system is due to the small air gratings used by the sanitary associations, at the disconnecting traps, which are not large enough to admit sufficient air for two or three soil-pipes off one drain, and very often the gratings are only sufficient to supply one, or, at the most, two of the 4in. pipes. I have often observed, when testing the currents of air, that the long tail drain does not give a circulation of air nearly so good as the short length of drain at the foot of soil-pipes, therefore the system recommended by Mr. Buchan has the advantage of a much better circulation of air in the pipes, a much safer distribution of the discharge of foul air from soil-pipes and drains when flushing w.c.'s, and during the passage of water from waste pipes, &c.

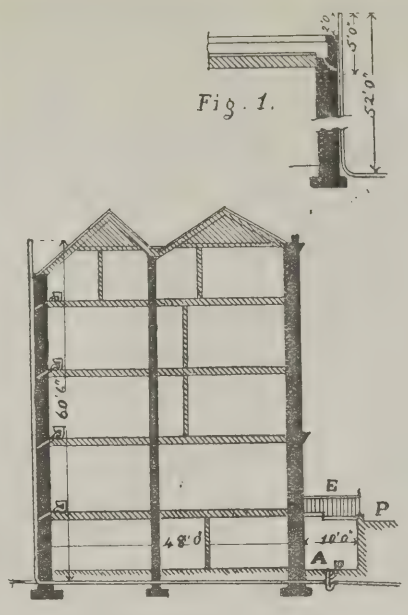
Referring to the discharge of foul air, it has four escapes on the system condemned by sanitary associations, whereas, on the system they recommend, the foul air has only one point of escape. When the drainage is arranged on the sectional system, as shown by plan B, each soil-pipe is used without affecting the current of air in any of the rest, and not affected by the discharge of water from baths, basins, and sinks, &c., as is the case when the soil-pipe is connected to the drain direct, without a trap.

"C. E." wishes to maintain that the traps of earthenware closets are reliable against siphonage; but I much regret to state that such is not the case, as some of the traps are very unreliable and very easily siphoned, and, therefore, admit drain gases into the house; and as this is one of the most important details, every care should be taken to secure the most reliable drain trap and place it near the foot of soil-pipe, as shown on Plan B, at T, and the summit of the drainage system ventilated by means of pipe V, shown on plan B and elevation B. "C. E." also objects to the traps, as they interfere with the energy of the water. I consider this a very weak objection, as we cannot get much flushing power from two or three gallons of water passing from the cistern through a 1½in. pipe (1½in. being the largest generally used) to the w.c., through the w.c. trap, and one or two bends before it reaches the vertical soil-pipe, and another bend at the bottom before it enters the drain; when entering the drain the water is much scattered, and its flushing energy reduced to a minimum.

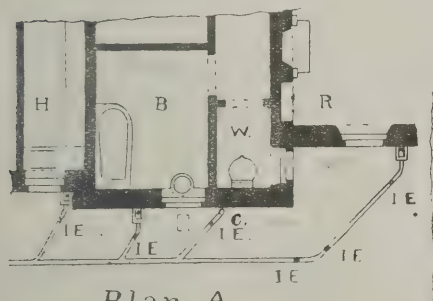
Some other means should be provided for flushing and cleaning the drains, and I prefer a tilting basin, which can be supplied with water as circumstances may permit; and if placed in a position as shown on plan B, at T B, with a large basin hinged and fitted in a manhole in such a way that it can easily be removed when it is necessary to inspect the drain, and covered over with a plate or other air-tight cover. "C. E." objects to the noise of water in the traps when placed at the foot of soil-pipes; but this can be prevented, and arranged in such a way as will not give offence to the most sensitive person. And "C. E." calls the arrangement of traps near the house "dangerous"; but I maintain there is less danger with the sectional system than there is with the faulty system recommended by the sanitary associations.



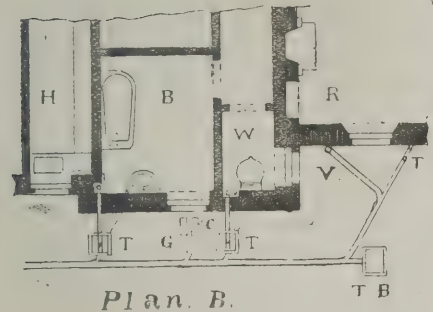
Elevation, A.



Section.



Plan A.



Plan, B.



Elevation, B.

Fig. 1.

I was asked a few days ago to examine a a house where the drains and plumber work had been renewed a few months ago according to the specifications and under the directions of a sanitary engineer from a sanitary association, and, as I had occasion to take some notes and sizes as shown on the section, E is the main entrance to house, P the street pavement, and A the area about 10ft. wide. The sanitary engineer has placed the air grating as indicated near A, which is the nearest possible position to the entrance door. The drain is continued through the house, and receives soil-piping from five w.c.'s, and to the same drain is connected, after passing through traps, all the wastes from sinks, baths, basins, and washing-tubs, and, owing to the passage of so much water in the drain from the various fittings, the drain gases were forced towards the trap in area and out at the grating placed near the main entrance door. When I went to the top of soil-pipe to test the current of air, the anemometer showed generally a downward current in the soil-pipe and ventilation-pipe off the w.c. traps, and it was after waiting a considerable time I got an upward current for a few minutes at the rate of 83ft. per minute, and the temperature at A in the area was 56°, at the top of the soil-pipe 59°, and the air inside the pipe at top during the upward current 64°. The w.c.'s were flushed with about two gallons, and the flushing of one nearest the top of house caused a downward current of 250 lineal feet in the 4in. soil-pipe and 3½in. ventilation-pipe in less than one minute, and discharged at the grating in area near the front door. This is a very bad arrangement, discharging such a large quantity of stinking air at a point where every precaution should be taken in the opposite direction.

Again, let us consider for a moment the advantage of disconnection at the foot of soil-pipes in all such cases; (1) the discharging of any bad smell from the soil-pipe during flushing of w.c.'s at the back of house, and at a safe distance away from the house, and not at the front entrance; (2) a regular current of fresh air constantly passing up the soil-pipe, except when flushing the w.c.'s; (3) the risks arising from siphonage reduced to a minimum by the large fresh air inlet near the foot of soil-pipe, giving a rapid upward current in the pipe, when the trap prevents all drain smells from entering the soil-pipe and ventilation-pipe off w.c. trap; and such a preventive was urgently required in the house referred to, owing to the kind of earthenware w.c.'s used. I observed that the flushing of some of the upper w.c.'s siphoned 1in. of water out of the trap on principal floor.

At the side of the soil-pipe shown in section, was situated a bath and basin waste-pipe, also serving as a rainwater-conductor, and discharging into an open trap; and when I tested the current of air passing up this pipe the anemometer showed an average of 273ft. per minute against 83ft. in the soil-pipe; and the latter was extended about 4ft. above the wall head. I think that this alone should be sufficient to show "C. E." and his brother engineers belonging to other associations the advantages of disconnection from a long tail drain, such as I have described, and shown in the section.

"C. E.," when referring to my former letter on this subject, states that it "contains mere assertions unsupported by argument." I simply stated the results of a few tests and experiments, and I did not think it required any argument to show "C. E." that when a downward current takes place, the air must find an outlet, and the greater numbes of outlets so much the better when placed in a proper position.

There is another point in "C. E.'s" letter deserving a remark or two, where he hints at tradesmen and patentees having pecuniary interest and the sanitary associations no such interest. I have no doubt but the statement is correct so far as the associations are concerned; but I question the assertion when applied to some of the engineers of some associations. I refrain from giving particulars in the meantime, and beg to inform "C. E." that people who live in glass houses should not throw stones.

"C. E." states near the end of his letter that the system he advocates is "thoroughly tested hundreds of times yearly, and is found to be perfectly satisfactory under all conditions"; and he omits to state the process of testing—viz., when the work to be tested was executed under the directions of a sanitary association's engineer, he first goes over the whole house and fills all the traps with water to prevent smoke from passing the traps into the house, and after the traps are well filled the smoke test is applied, and, of course, does not show any siphoned traps, and any escape at a bad joint can be filled up with putty or clay. Every sanitary engineer may not act in the way I have stated—and I hope the majority do not; but it is well known that some do so.

Fig. 1 shows a rainwater pipe used as ventilator of a short tail drain. The top of the pipe was finished about 2ft. above the top of parapet, with a branch connection to platform gutter 5ft. below the top, and the full height of pipe is about 52ft. When the anemometer was placed on top of pipe, it showed an upcast current of 160 lineal feet per minute. When the branch to gutter was filled up to prevent any air passing into the pipe, the upcast current was 70ft. per minute—that is 90ft. lineal of air drawn down the branch from gutter to the pipe by means of the upward current of warmer air passing up the pipe. This shows a cheap and safe system of ventilating a tail drain, and proves that the upcast goes straight to the top, and draws an additional supply at branches, as shown, instead of discharging any drain gases at the branches.

Referring to iron pipes, used by some of the sanitary associations for drains: By using iron, the first outlay is much more than the cost of the best glazed fireclay. After the coated iron pipe is used for the passage of sewage, it gives off a very bad smell, and begins to rust inside and outside in a few months. I consider that work of this kind is a great waste of money, to begin with, will prove a great nuisance, and must be removed in a few years.

This is the third period, during 150 years, that iron has been used for drainage, and the best of the solutions, used at the present date to protect the iron does not appear to be much better than the kind of coating used many years ago.

The sanitary engineer, when describing inside fittings, generally recommends everything larger or smaller than stock patterns; and when it happens that the work is executed according to the engineer's specification, the proprietor has often to pay the cost of new patterns for articles which are no improvement on general goods and fittings as made by the best manufacturers. The word "fad" used by "C. E.," on 674, is applicable to work of this kind, as practised by the sanitary associations at the expense of a too-confiding public.—I am, &c.,

Nov. 2. CLERK OF WORKS.

Intercommunication.

QUESTIONS.

[9456]—**Crushing Weight of Stones.**—Will you kindly inform us what is the crushing weight per cube inch of the following kinds of stone—viz., Portland "Base" and "Whit Bed," Bramley Fall, York, Bath, Beer, Doulting, Aberdeen granite, and Cornish granite?—R. C.

[9457.]—**Sham Stained Glass.**—Can any reader give me the particulars of a method of imitating stained glass other than covering it with "Vitremanie"? I imagine I have seen an account of a simple method quite recently brought out.—TERTIUS.

[9458]—**Plumbing and Hygiene.**—Does not the Plumbers' Company of London hold examinations for the purpose of registering master plumbers? If so, would you kindly furnish me with the name and address of the secretary so that I may write for particulars? I should also feel obliged if any of your readers could give me data and show how to work out the following question in hygiene, given in the Honours stage of the Science and Art Exams. of 1887:—How much work in foot-tons can be expected from a diet consisting of cooked beef, 10oz.; bread, 24oz.; butter, 1oz.; and potatoes, 20oz.?—HYGIENE.

[9459.]—**Concrete Roofs.**—What is the least substance with safety of concrete to cover a flat roof on a shop to be projected about 18ft. by 22ft. wide? It is suggested that 3in. of concrete gauged about 1 to 8, and laid on match boards, with planed joists 9 by 2, 30in. apart, would be sufficient. If it is covered again with a coat of the cheap British asphalte or pitch, and that could be coated with ½in. of cement plaster in summer, if the asphalte got soft with the sun, and there would be more means to do it then. 2nd. If a basement was put in at once, nothing less than 14in. for retaining side walls I suppose should be put in, or concrete walls. The object of using concrete instead of zinc or lead is that it may not cost more and be better if it is used for a store for materials or to keep plants in tubs, &c.—H. MELBOURNE.

[9460.]—**Formula.**—Will any reader inform me if 4·4ft. is the correct value of T in the formula—

$$T = \sqrt{\tfrac{1}{5} R^2 + \tfrac{3}{5} R^2 + \left(\frac{W}{H}\right)^2} - \frac{W}{H}$$

When D = ·98ft. H = 6ft. R = 7ft. W = 2cwt.—H. B.

[9461.]—**Picture and Chimney.**—In the course of some alterations to a house I find that a picture is being damaged by the heat from a chimney. My client does not wish the picture removed if means can be found for stopping the mischief. Can anyone tell me of a suitable non-conducting material to put on the back of picture or on wall?—PERPLEXED.

[9462.]—**Stopping Wood Joints.**—I should be glad if any of your numerous readers could inform me the best way to stop the joints of a wood-block floor in which the blocks have shrunk considerably. I have used whiting and size, but I find they dry up and work loose in the joints. Cement is also objectionable.—SALISBURY.

REPLIES.

[9440.]—**Roof.**—On further examination of "Excalibur's" question, I infer that he means the roof to have framed couples without principals, each pair of rafters being tied together by collars with suspending pieces and longitudinal pieces 3in. by 2in. spiked to the upper and lower collars. If this is what he means, the chief strain would be where the lower tie or collar is framed to the rafters. Such a roof would answer, though I should have preferred a cross-braced couple as being more economical.—G. H. G.

[9441.]—**Early English Foliage.**—The foliage of the caps in the Trinity chapel of Canterbury Cathedral, which are examples of transitional work brought into this country by William of Sens, is a free treatment of the Corinthian acanthus leaves. This type of capital was much used in France at this period, and it was derived directly from Greek rather than Roman models. The builders of the Early English period used a stiff kind of foliage, the stalks of which seem to be growing out of the neck-mould of the shaft. This foliage was more or less conventionalised from natural leaves and flowers. At first small plants and grasses were chosen, and of these chiefly the buds and opening leaves, with their stalks thick and full of sap, were taken as models. Water and other cresses were favourite types, and the leaves and fruit of the oak, vine, and ivy. At a later period in the style the French artists worked from more fully-developed models. The ivy, vine, holly, maple, and wild rose are to be found in the rich carvings executed about this time. Later still, the natural leaves and flowers were more and more closely copied until we arrive at the graceful wreath-like foliage of the Decorated period.—A. C. W.

[9447.]—**Buenos Ayres.**—"K." will find a very interesting paper on Buenos Ayres in the "B.N." for Sept. 2nd, 1887, read before the English Literary Society of Buenos Ayres," by Frank E. Tnicke, architect, evidently practising in that town.—PUP.

[9450.]—**Masonry and Stone Cutting.**—In answer to the question put by Mr. Hanson, relatively to the strength of stone under efforts of flexion, such as in the case of architraves and door lintels, I beg to say that it is an absolute fact that both the Greeks and the Romans used the stone in such positions with its beds placed vertically, and such manner of using the stone also occurs in Mediæval buildings. My authority is "L'Art de Bâtir chez les Romains," by Monsieur Choisy, a thoroughly reliable work. M. Choisy is an engineer, and he has for years carefully inspected Greek and Roman structures on account of the French Government. As to the explanation of that fact, I believe we may consider a stone beam as, to some extent, resembling a timber beam formed of superposed layers of boards. If we take a beam 9in. by 9in. formed of nine layers of 1in. boards, neither glued nor nailed together, and place the beam with the boards horizontal. In flexion the boards act independently—they will slide over each other, and the beam will be able to bear nine times the bearing weight of one board. If we place the boards, vertically, then, as the resistance to flexion is proportional to the square of the depth of beam, each board will bear 81 times the bearing weight of one board, and the beam will be, therefore, 81 times stronger when the boards are placed vertically, as when they are placed horizontally. If the boards be glued together by some glue—which, for the sake of argument, we may suppose less resistent to shearing than the timber of the boards—the timber beam will then act exactly like a beam of sedimentary stone, and it is evident that its resistance to flexion will still be less when the boards are horizontal than when the boards are vertical.—LAWRENCE HARVEY, Teacher of Scientific Masonry City and Guilds of London Institute.

[9450,]—**Masonry and Stonecutting.**—The statement is made relative to "flexion." The conditions of a "wooden lintel" are not similar, hence not a parallel case. I am not aware of any sufficient data, experiments on a large scale, to warrant the statement. It may, however, be readily admitted that stones of the laminated class would offer a "greater resistance" on edge than flatwise. The advantage, however, is questionable, for, in this climate mouldings lying outside the plane of the face, would suffer considerably, while the risks attendant upon inaccurate bearing would be much greater. On the other hand, if the stones were not "seamy," but thoroughly homogeneous, such that the stone shows no signs of stratification and the quarry-bed difficult to determine except by the "feel," the advantage (divided by a safety factor) must be small. Mr. L. Harvey, in my opinion, was unfortunate on more than one point of his lesson, particularly in "working a block of stone, &c.," and succeeding paragraphs, and then in a dozen words smashing the method as it deserved to be. Why is not the word "archstone" as suitable as "voussoir"? Surely the need of technical education suggests simplicity, not confusion.—JOHN POWELL.

[9450.]—**Masonry and Stone Cutting.**—Stone of a sedimentary description used in a position subjected to a transverse strain will offer most resistance placed with the beds vertically and running parallel with the face as in the case of an architrave for example. This is not generally recognised in modern practice, and it is objectionable in exposed positions to place the stone face-bedded. A stone spanning an opening placed with the bed vertical, and running parallel with the plane of the opening, is somewhat analogous to a flitch beam supported at ends.—J. DAY.

[9452.]—**Norman.**—Durham choir is stated to have been built by Bp. Carilipha, 1093—1096, and to have been completed in 1128. Norwich was built 1096—1119.—G. H. G.

[9455.]—**Technical Education.**—Consult Mr. E. C. Robins' "Technical School and College Building," which contains particulars and detailed drawings of laboratories.—G. H. G.

CHIPS.

The City of London Court of Common Council, after a long discussion, have rescinded their recent determination not to appoint a City Architect in succession to the late Sir Horace Jones, but to select a City Surveyor at a salary of £800 a year. The motion was carried by 91 votes to 70, and it was further resolved to appoint a City Architect at a salary of £1,500 per annum.

The Committee of the Royal Irish School of Art Needlework, Clare-street, Dublin, have made arrangements for the holding of a Decorative Art Exhibition in Dublin next February.

Mr. Edward Augustus Gruning, F.R.I.B.A., of Gresham House, Old Broad-street, E.C., has been appointed as a Deputy-Lieutenant for the City of London.

The town council of Cardiff decided, on Friday, to place a bust of the late Alderman Jones, formerly a builder and contractor in the town, in the vacant niche on the staircase of the town hall.

A question as to the ownership of the stained-glass windows which were formerly in the banqueting hall at Oakwells Farm House, Bray, Berkshire, was before Mr. Justice Kekewich, on Wednesday and Thursday in last week. The windows, which were said to date from the time of Henry VI., had been removed to Mr. Grenfell's residence, Taplow Court; but a Mr. Smith claimed that he was entitled to them under a lease by which he undertook to pull down the ancient structure. Eventually it was stated that a settlement had been arranged.

On Saturday the Lord Mayor opened the new park at Kilburn, which will be called the "Queen's Park. It covers 30 acres of ground, and was formerly the property of the Ecclesiastical Commissioners. The plot was used, eight years since, as the place of the annual show of the Royal Agricultural Society, and was afterwards presented by the Commissioners to the Corporation in trust for the inhabitants of the locality. The Corporation has expended £3,000 in laying out the ground, in planting, draining, and in constructing footpaths, under the direction of Major A. Mackenzie, Superintendent of Epping Forest, and has determined to provide for the future maintenance of the park out of the proceeds of a legacy left by Mr. William Ward for charitable purposes.

The first section of the new church of All Saints, Peterborough, was opened on Tuesday week. Mr. Temple L. Moore, of Hampstead, is the architect, and Mr. J. Thompson, of Peterborough, the contractor.

LEGAL INTELLIGENCE.

THE CHUBB LOCK AND SAFE COMPANY V. JOSEPH WITHERS.—In the Chancery Division on Friday, Mr. Bunting, on behalf of the plaintiff company, moved, before Mr. Justice Kay, for an injunction to restrain the defendant (trading as Thomas Withers, of West Bromwich), and Mr. Appleyard, an auctioneer, of Hartlepool, from selling or offering for sale, or stamping, marking, or otherwise representing locks or safes to be the manufacture of the plaintiff company when they were not plaintiffs' manufacture. The evidence of Mr. Reeves, agent for the plaintiff company, showed that the defendant Appleyard offered for sale in Hartlepool locks which bore the name of Chubb upon them, but which were the manufactures of Withers. When Reeves spoke to him about it, Mr. Appleyard said the locks were Chubb's manufacture, as no one would dare to imitate them, as they were patent locks. The locks, however, were not Chubb's manufacture. With regard to the safes, the motion would have to be amended, as it appeared they bore the defendant's name and not that of the plaintiffs. The defendants were unrepresented, and his Lordship made the following order: To restrain the defendants from offering for sale any locks marked with the name of Chubb that are not Chubb's manufacture, and from marking or selling any such locks with the name of Chubb, and from otherwise representing that locks not of Chubb's manufacture are Chubb's locks.

RE W. J. BUXTON.—The bankrupt, described as of 10, Gray's-inn-square, architect and surveyor, applied last week before Mr. Registrar Giffard to pass his examination. His liabilities were returned at £7,146, and debts fully secured £4,005; assets, £422 10s. 8d. The bankrupt said that he commenced business in 1878 with £400 capital, and in 1883 he borrowed about £1,000, which was still owing. He built a large house at Sunningdale of the value of £4,000, but could not get a larger offer for it than £3,000, which barely covered the outlay. He did not discover that he was insolvent until the institution of the present proceedings. The Registrar allowed the bankrupt to pass his examination.

VALUE OF LAND IN THE CITY.—On Saturday the Recorder of London and a special jury heard at the Guildhall a claim for compensation, fixed at £25,000, made by the City of London Real Property Company against the City Commissioners of Sewers, which body had compulsorily acquired a piece of freehold land belonging to the claimants. The land in question was situated at 159, Fenchurch-street, and 21 and 22, Lime-street, and was purchased by the claimants at auction in March, 1885, for the sum of £16,700. The total area was 1,374sq.ft., on which the claimants intended to erect central offices for their own business. The Commissioners, however, propose to carry out public improvements in the locality, and require for this purpose 560sq.ft. of the land, which had been cleared of the former buildings and on which some progress made with the erection of the new structure. A number of professional witnesses were examined, who generally agreed that, though the claimants had not paid more than £12 16s. per foot for the land, it was now worth £16. They differed, however, materially as to the price which should be paid for the 560ft. proposed to be taken, the highest figure quoted by the surveyors for the Commissioners being £11,700. Eventually the jury awarded £11,400.

Mr. James Fullbrook, builder, of Studd-street, Islington, died on Monday, aged 57 years.

A font, sculptured in white marble, has just been placed in Ecclesall Church, Sheffield, as a memorial. The design represents a kneeling angel with outspread wings, supporting a large scalloped shell for holding the baptismal water. It rests on a platform of the same material, all highly polished. The work is by Mr. James Forsyth, of Finchley Newroad, London.

The memorial stone of the Jubilee Cottages in Old-street, Clevedon, Somerset, was laid on Friday. The building will accommodate four aged persons or married couples. There are four living rooms, 10ft. square and 10ft. high, entered from an open central porch, four pantries, and two double sculleries. The materials employed are red bricks, from Warne's Clevedon Works, for the walling, with gables in half-timber work. The architects are Messrs. Lingen Barker and Cross, of Weston-super-Mare and Clevedon, the builder being Mr. Dowland.

The Lord Bishop of Durham consecrated, on Tuesday, the new fishermen's mission church of St. Andrew, in the Croft, Hartlepool. It is of red brick, with stone pointings, and is seated for 230 persons. The church has been built from the designs of Mr. C. Hodgson Fowler, F.S.A., architect to the Dean and Chapter of Durham, at a cost of £1,300.

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FAILURE TO COMPLETE WORKS.

THE inability of contractors to complete works at a given date proceeds from various causes. Those who undertake to carry out work at a low tender have a certain interest in not fulfilling their engagement as to time; the delay gives them the chance of throwing up their responsibility or of increasing the cost. Sometimes the contractor is unable to complete the work at the time specified owing to extras ordered, or through interference of employer or his architect; sometimes the drawings are not ready, and delay in ordering work is thereby caused. From whatever cause delay proceeds, those who put agreements into force need to be on their guard, or they may be led into expense. A dispute arising out of such circumstances has been reported, and came before Mr. Justice Butt the other day. The plaintiff, Rawles, sued the Hornsey Local Board for the value of materials and labour expended in sewering, metalling, and making good a road. He had entered into a contract with the Board to complete the work by January 21, 1886, at the price of £410; but this was not done, and the Board gave him an extension of time. At the end of the extended period the work still remained incomplete, and the surveyor of the Board, under a clause in the contract, gave the plaintiff notice to accelerate the rate of progress. This notice not being complied with, the Board took the works out of plaintiff's hands, and completed the road at a cost of £435. Thereupon the plaintiff claimed £328 odd. The Board replied that under the agreement they had a right to give notice and take over the works; but in the argument it was conceded that this clause provided only for the work not being proceeded with to insure completion by the specified time, and did not apply after the expiration of that time. The Board further disputed the value of the work executed by the plaintiff, and made a counter claim for the amount of their loss by his breach of contract. These were the points of the case, which occupied a long time in discussion, and on which considerable evidence was taken. The Board has spent more money to complete the work than would have been the case if the plaintiff had fulfilled his contract, as they had obtained the advantage of a public tender. They had clearly not looked into their legal obligations before taking the course they did. After the time of completion had expired the defendants extended the contractor's time, and finding this time had been exceeded, took possession of the work and completed it. By thus extending the time the Board had clearly waived their right in the matter; the contract was no longer binding on the plaintiff. In giving judgment, Mr. Justice Butt held that the defendants, having "waived their right to take possession of the works on the plaintiff's failing to complete at the specified time, were not justified at law in taking possession when they did; but found that the plaintiff was not entitled to any damages, he having been a gainer, rather than a loser, by being turned out, as the work could not have been completed for the contract price. As regards the plaintiff's own breach of contract in not completing in time, his Lordship said that the damage which the defendants had shown arose from their own act in taking possession of the works, and not from the plaintiff's breach." The plaintiff's claim was to be taken as on a *quantum meruit* for the work he had done, and from the evidence and prices in the bill of quantities, his Lordship found the plaintiff entitled to no more than £157 6s. 8d., for which amount judgment was given with costs. The decision is instructive in several points. The extension of time was an admission on the defendants' part that operated against them. Having given the contractor an extension of a few weeks, they practically acknowledged the time was not sufficient, and closed the door against further interference on their part. Instead of taking possession of the works at the close of the contract period, and charging the contractor with the expenses, they allowed him to go on in his own manner before putting into execution their threat. The custom of taking over the work of an unfinished contract is not common, and, at best, is an undesirable proceeding, often attended with loss. A new contract has to be prepared, or, if the work is undertaken at measure and value prices, the chances are that the employer is put to a great deal of expense and trouble without a very certain chance of recovering damages. When a contractor fails to complete, the employer has a remedy by law; he can rescind the contract, and maintain an action for damages against the contractor. In some cases the Court will enforce specific contracts.

The principle upon which the Court decided in the case of the Hornsey Local Board is that any interference on the part of the employer justifies the assumption that the parties have entered into a fresh contract. It is this principle that ought to be kept in view by those who are called upon to advise employers. A man contracting to do a work for a certain sum can recover nothing unless the work is performed, or it can be shown that the defendant has taken posession. A contractor cannot recover on a special contract unless it be performed. The time of performance or that fixed in building contracts ought to be very clear. If time is to be of the essence of the contract it should be so stated, or at least there may be circumstances that imply so much; but in the ordinary building contract it is very usual for the parties to agree to an extension of time without waiving the contract. A small delay in completion will not entitle the owner to hold back payment, though if the delay has been injurious the owner can only seek compensation in damages. Let us imagine a case where a builder undertakes to complete a house by a certain date for a certain amount but fails to do so; a week or two elapses before it is finished. In the meantime the owner takes possession of the house. It would be unreasonable to think the plaintiff has by such delay forfeited his right to compensation for the work done, and this was the ruling of Chief Justice Tindal in "Lucas v. Godwin." In accepting the house the owner admits that it is of some benefit to him, and such benefit is worth paying for. Of course anything, however unreasonable it may be, can be agreed to in writing: if it is a condition precedent that nothing shall be paid if the work is not done by a certain day, the contractor has to bear the cost; but building contracts are not so severely worded. In point of fact, the practical difficulties in the way of completion are increased by the ordering of extras, by the acts of employers, and other causes to which we have lately referred, and which all tend to mitigate the time condition, and make it easier for the contractor.

But, though the penalty is not often put into operation, those who frame contracts and conduct works ought to take a lesson from such a case as that to which we have referred. We will suppose a builder is proceeding very slowly with the work; the time for competition is near. Is the architect or employer justified in taking the building out of the contractor's hands and completing it? Of course, this will depend on the contract. When there is a clause to the effect that, "If it should appear to the architect that the work is not properly executed, or with due expedition, it shall be lawful for him to give notice to the contractor to alter or to expedite the work, and, if he fail to comply, to take the work out of his hands and to recover penalties," the architect can proceed after giving such notice. Most contracts provide that if the contractor shall delay the performance (except on account of strikes, &c.) the architect may give him notice, and, in case of default of so many days, enter upon, and take possession of, the works, and employ other persons to complete same, &c. In some specifications a time is mentioned for enforcing forfeiture clauses, or providing for the avoidance of the contract, and we here give a form which this sometimes takes:—"It is hereby agreed that should the architect be at any time dissatisfied with the nature or mode of proceeding with, or at the rate or progress of, the work or any part thereof, he shall have full power to procure and make use of all the labour and materials which he may deem necessary, deducting the cost of such labour and materials from the money that may be then due, or that may become due to the contractor. It is expressly agreed that the possession of this power by the architect shall not in any degree relieve the contractor from his obligation to proceed in the execution of and to complete the works with the requisite expedition, or to maintain them; and it is provided that should the contractor fail to proceed in the execution of the works in the manner and at the rate of progress required by the architect, the contract shall, at the option of the employers, but not otherwise, be considered void, so far as relates to the work remaining to be done; and all sums of money due to contractor, together with all materials and implements, and all sums of money named as penalties, shall be forfeited to the employer, and the amount shall be considered as ascertained damages for breach of contract."

This clause is not often inserted in agreements, but, as we have pointed out, the architect in exercising his powers under the clause must do so before the time specified for the completion. In "Walker *v.* London and North-Western Railway" this clause was introduced, the particulars of which case may be found in the Law Reports. The right of rescinding contract must be exercised also in a manner that cannot be mistaken; it would be unreasonable and unfair to serve the notice on a builder who had been led to expect leniency owing to various acts of the employer or his architect. But the point to be urged is that if notice is given it should be acted upon. By allowing time to elapse the builder is led to expect that the delay will be overlooked. The circumstances attending the case to which we first alluded point to the same conclusion, that the employer by not putting in force the power to take possession of the works at the right time, cannot reasonably do so afterwards.

THE VALUE OF THE MODEL IN ARCHITECTURE.

NO one will question the use of models to the architect, though whether the art of modelling should be added to his other accomplishments is quite another matter. We have invariably urged the value of a model of a design, such, for example, as that made for the Tower Bridge, and those of Piccadilly Circus and the new Admiralty Offices. An assemblage of buildings or a quadrangular group can be very inadequately represented by elevations. For example, a quadrangular plan would require at least two elevations, one external and one internal, of

each block, and if there are four blocks, there would be eight elevations required. Should there be two or more courts inclosed, the number of elevations would be increased. And this detailed manner of representing the façades is, after all, exceedingly unsatisfactory, as the elevations do not give any idea of the grouping or connection, of the depth or perspective appearance of the blocks; each is, as it were, a mere stamp of the façade on the flat. A model, in short, is the only means of obtaining the solid effect, the light and shadow, or, so to speak, "colour" of a building, and on this primary ground alone we consider it deserves the attention of the architect. Mr. J. C. L. Sparkes, in his paper on "Modelling," read at the Architectural Association, referred to the latter value of the art. What he says about the distribution of light and shadow on any detail such as a panel, is true enough. The designer is called upon not merely to design in the abstract a certain feature, as a panel or relief ornament, but to design it with reference to the lighting and its position in relation to other parts. He takes as an illustration the diverse treatment a panel designed to be exposed on the sunlit side of a building requires when its mission is to decorate a staircase with a narrow top-light; also the totally unlike conditions of out-of-door statuary exposed to strong sunlight and that in darkened churches or under canopies. Each of these positions calls for a different arrangement of ornament or drapery. For example, the strong sun-lighted façade may be well broken up in its plan, and the carving deeply undercut, to give shadow and relief; the interior wall, or panelled relief, which only gets an imperfect or subdued light, ought to be treated broadly, and the direction of the light considered. In dark interiors, breadth of surface and the avoidance of elaborate relief is essential, as the fretted ornament would look nearly black under these circumstances. Who has not noticed the almost black appearance of the carved diapering in the spandrels of the arcades in Westminster Abbey? Every detail, as Mr. Sparkes said, ought to be modelled to contribute to the general tone, whether in the direction of breadth and light or fretted dark.

But the author might have gone further, and pointed to the value of "tone" to the architect. It is one of those things which he seldom thinks about. What we mean by this word is the proportionate quantity of light to shade in a building—the distribution of light and shadow. Take, for example, the river front of Greenwich Hospital, which is always a pleasing object in the scenery of the river. The great quandrangles which open to the river contribute their share of shadow, and impart an agreeable tone or colour to the façade when seen with the sun on it. The river front of Somerset House is another example of this play of light and shade; in the latter the masses occur in the open loggias or screens of columns. In a general view of St. Paul's the west front is well broken up by the shadow of the portico; even the dome, when lighted up by the sun, has a charming "tone" due to the peristyle which encircles its base, giving apparent solidity and pleasingly varying the sharp lights of the columns and circular cornice by the shade of the inter-columnar spaces. Imagine a lofty dome and tambour without a peristyle, with nothing to break the monotony of light on its rotund surface. It is needless to multiply examples of the value of shadow, about which Ruskin has spoken so eloquently in his "Lamp of Power." The masses of broad shadow on a building, or in a sculptured tympanum or panel, serve the same purpose in each. They give value to the flat surfaces which otherwise would become monotonous and barren; but it is in the distribution of these masses that the artist's work can be distinguished. The masses of shade should never be evenly distributed, but if possible placed in points to give variety and breadth to the composition: here and there should be deep shadows to impart gradation to the masses of lesser shade. It is this art of giving tone and point to a façade or a group of sculpture that can nowhere be so well studied as in the model. The sculptor indeed models his work in clay, but the architect is left to the resources of drawing entirely. Only the real artist can deal with masses of solids on the flat; the average architect cannot give what his design lacks, and so we have to endure yards, indeed, miles of uninteresting architecture. As we have before said, the study of the solid is neglected in England, and one great aid is lost to the artist. In Germany, as Mr. Lawrence Harvey said, modelling is one of the subjects in every architectural school; in France it is also made to subserve instruction in design and construction. The value of a knowledge of the subject is at least important; it enables the architect to combine and group his buildings in a manner which only perspective in the hands of an expert can approach, and as one speaker said, it helps the architect to "see round the corner of his work." Schools of modelling are rare here. The South Kensington Museum affords the architectural student the best study of work in the solid that we know of, and some excellent plaster and cardboard models are to be seen at the Crystal Palace. Till design is taught on a different and more reasonable system than it is in England, the architectural pupil will be an unwilling learner, and the architect will be content to study his effects on paper, notwithstanding the admitted advantage of being able to realise the solid effects, light and shade, of a design by modelling it. There is no need that the architect should himself turn modeller, but that he should encourage the art whenever he can, and, in all complex arrangements of buildings and streets, have models prepared. For instance, it was an impossibility to realise the appearance of the proposed buildings on the site of Piccadilly Circus without a large scale model. This was prepared, the surrounding buildings also of the Circus being made of cardboard and coloured to represent the façade, by which means a better idea of the proposed erection could be obtained than by drawings. Apart from the pictorial value of models so prepared, there is a different use for which they are invaluable to the architect, namely, a technical means of arranging and studying combinations which the old masters used in their works.

THE UNIFORM TESTING OF PORTLAND CEMENT IN GERMANY.

WE have frequently directed attention to the want of some standard regulations for the testing of cement, and we have recently received a copy of the revised rules drawn up by the German Cement Manufacturers' Association, and published under the authority of the Minister of Public Works in July last. In issuing this document in the form of a circular, addressed to all interested in the use of Portland cement, special attention is drawn to the fact that the prescribed tests are intended only for the comparison one with another of various samples of Portland cement, and not for the investigation of the properties of Portland cement, as contrasted with other kinds of hydraulic cements, in which latter case many other matters would require to be studied. We append a complete and literal translation of these regulations.

GERMAN REGULATIONS FOR THE UNIFORM DELIVERY AND TESTING OF PORTLAND CEMENT.

Signification of Portland Cement.— Portland cement is a product arising from the calcination of an intimate mixture of lime and argillaceous materials, as essential ingredients, burnt to a state of incipient vitrification, and subsequently reduced to a powder as fine as flour.

I. *Packages and Weights.* — Portland cement should, as a rule, be packed in standard casks of 180 kilograms tare, and about 170 kilograms nett, or in half-casks of 90 kilos tare, and about 83 kilos nett. The tare weight is to be marked on each cask. If the cement is required in casks of a different weight, or in bags, the tare weight must be plainly marked also on these packages. Leakages, as also differences in weight of individual packages, must not exceed 2 per cent. of the total weights. The casks or sacks must, in addition to the weights, bear the name of the maker or the factory mark upon each.

Rationale of Par. I.—In the interests of buyers, and for the security of trade, the employment of a uniform weight (per cask) is strongly insisted upon. For this purpose, the weight selected has been that of 180 kilos tare = about 400lb. English, as being by far the most usual and commonly employed cask throughout the world.

II. *Time Needed for Initial Set.*—Portland cement, according to the purpose to which it is to be applied, can be furnished either of a quick-setting or slow-setting description. Slow-setting cements are such as require two hours or longer to take their initial set.

Explanation to Par. II.—In order to determine the time required for the set of a cement, a slow-setting cement is stirred up with water for three minutes to a stiff slip; a quick-setting cement is stirred for one minute only, and the resultant slip is spread out in a single operation upon a glass plate so as to form a pat about 1·5 centimètres thick, sloped off round the margin to a thin edge. The slip used in the production of this pat should be of such a consistency that the mixture, when placed upon the glass plate with a spatula, should only spread towards the edges of the plate after repeatedly tapping the plate; in most cases from 27 to 30 per cent. of water will suffice for this purpose. As soon as the pat has hardened sufficiently to resist a slight pressure with the fingernail, the cement is to be considered as having become set. For the accurate observation of the time required for the initial set and for the determination of the beginning of the setting, which (as the cement must be stirred up before the setting commences) is a matter of importance in the case of quick-setting cements, a standard test-needle is to be employed; the weight of this cylindrical needle is 300 grams, and its area is equal to 1 square millimètre; it ends with a flat extremity cut off at right angles to the axis. A hollow metal cylinder 4 centimètres in height and 1 centimètre in diameter is placed upon a glass plate and filled up with cement slip of the above-described consistency. The interval of time which elapses before the standard needle fails to penetrate the entire depth of the pat is noted as that required for "the beginning of the set." The time which elapses before the test-needle no longer makes any perceptible impression upon the solidified cement is taken to be "the time needed for the set." As the set of the cement is influenced by the air-temperature and by the temperature of the water with which it is gauged, higher temperature tending to increase the rapidity of set, and low temperature retarding the same, it is recommended, in order to obtain uniformity in results, to undertake these determinations at a mean temperature of from 15° to 18° Celsius (59 to 64 Fahr.) both for air and for water. During the setting period a slow-setting cement ought not to develop a sensible amount of warmth, while, on the other hand, quick-setting cements may indicate a considerable increase of temperature. Portland cement when stored for some time

becomes slower in set, and increases in tensile strength, when kept dry and free from contact with draughts. The still-prevalent opinion that Portland cement deteriorates in quality by long keeping is therefore erroneous, and specification clauses which insist upon freshly-ground cement should be abolished.

III. *Fixity of Volume.*—Portland cement must be unchangeable in volume. As a decisive test of this fact, a pat of neat cement made up on a glass plate, and protected from too rapid evaporation, placed in water for six hours and kept under observation for a lengthened period, must show no warping or hair-cracks at the edges.

Explanation to Par. III.—In carrying out this test the pats prepared from slow-setting cement for the determination of the setting time must be placed in water after 24 hours, or, at any rate, after they have become completely set. In the case of quick-setting cements, a shorter time only need elapse. The pats in the case of slow-setting cements must be protected from draughts and from sunshine until they are thoroughly set; this can best be done by placing them in a covered box, or beneath a damp cloth. By this means the formation of cracks due to evaporation, which generally arise in the middle of the pat, and which might be mistaken by the uninformed for cracks due to blowing, is avoided. If during the induration under water any warping or fine hair-cracks at the edges of the pat become manifest, these appearances indicate most undoubtedly the blowing of the cement—that is to say, that in consequence of an increase in volume a splitting of the particles of the cement is taking place, with a gradual loosening of the cohesion at first obtained, which may lead to the entire disruption of the material. The appearances due to blowing generally become manifest in the pats as early as the third day, but in all cases an observation extending over 28 days is sufficient.

IV. *Fineness of Grinding.* — Portland cement must be ground so fine that a sample of the same should leave a residue at the utmost of 10 per cent. on a sieve of 900 meshes to the square centimètre (5,806 per square inch). The thickness of the wire forming the sieve to be half the width of the mesh aperture.

Rationale and Explanations to Par IV.—One hundred grams of cement to be employed for each sieve-test. As cement is scarcely ever used without sand—in many cases, indeed, with a large quantity of sand—while the cohesive strength of a mortar is the greater the finer the cement of which it is composed is ground (as then more particles of the cement come into play), therefore the fine grinding of the cement is of the utmost importance. These considerations would appear to indicate that the fineness of the particles should be uniformly tested with a fine sieve having meshes of the stated size. It would, however, be erroneous if the value of the cement were alone to be determined by the fineness of the grinding, as indifferent, tender-burnt cements far more frequently occur in a fine state of subdivision than good, hard-burnt cements. But the latter, even if coarsely ground, would indicate greater cohesive strength than the former (tender-burnt cements). If the cement is to be used mixed with lime, it is advisable to employ a very finely-ground, hard-burnt cement, the higher cost of producing which will be repaid by the vastly improved quality of the mortar.

V.—*Tests of Cohesive Strength.*—The cohesion of Portland cement is to be determined by testing a mixture of cement and sand. The tests must be applied upon a uniform system both in tension and compression, and by means of test samples of the same shape, of similar section, and with apparatus of the same pattern. Besides these tests, it is advisable to determine the cohesive strength of the neat cement. The tests of tensile strength must be conducted with test samples, having an area of fracture of 5 square centimètres (0·775sq.in.), the tests for compression with cubes with a superficial area of 50 square centimètres (7·7503sq.in.)

Rationale of Par. V.—Because it is not possible uniformly to form an empirical opinion concerning the behaviour of the cement with sand by means of the tests of the cohesion of the cement without the addition of sand, especially when it becomes a question of comparing the results of samples of cement from different factories, it has been decided to undertake the test of the cohesive power of Portland cement by means of a mixture with sand. The trial of the cement without the addition of sand is advisable when it is required to compare samples of Portland cement with mixed cements and other hydraulic cementing agents, because by means of the neat test the special excellence (the cohesive strength peculiar to Portland cement, and in which the remainder of the hydraulic cements are inferior to it) is more prominently manifested than when tested with sand. Although the relative proportional strength when tested by compression and that when under tension varies in the different hydraulic cements, the tensile strength is very commonly employed alone to indicate the value of different samples of hydraulic cements. This, however, is liable to give erroneous results; as, moreover, in practice the mortar depends most prominently upon its strength when in compression, it is evident that the only reliable test must be that of its cohesive strength under compression. In order to obtain the necessary uniformity in the system of testing it is recommended that apparatus and utensils of the same pattern as those in use at the Royal testing station at Charlottenburg should be adopted.

VI. *Tensile and Compressive Strength.*—Slow-setting Portland cement must have a minimum tensile strength of 16 kilograms per square centimètre (227·5lb. per square inch) when tested with three parts by weight of normal sand to one part by weight of cement, after 28 days—one day in the air and 27 days in water. The compressive strength must be not less than 160 kilograms per square centimètre (2,275·7lb. per square inch). In the case of quick-setting Portland cements the cohesive strength at 28 days is generally less than the above figures. It is therefore necessary that when the breaking weights are stated the time needed for setting should also be given.

Rationale and Explanations.—As different cements may vary very considerably in respect to their power of uniting sand, in combination with which they are commonly employed, it is of special importance in comparing several cements that they should be tested with a large proportion of sand. For this purpose it has been found convenient to take three parts by weight of sand to one part of cement, as with three parts of sand the cohesive properties of the different cements can be exerted in a proper manner. Cement which exhibits a higher tensile strength as compared with its strength under compression permits in many cases of the use of a larger percentage of sand, and consequently commands, as it may also do on account of its greater tensile strength with a given amount of sand, a relatively higher price. The decisive test of tensile strength is that at 28 days, because when comparing different samples of cement the cohesive strength cannot be satisfactorily ascertained in a shorter time. Thus, for instance, the breaking weight of cements which differed very greatly at seven days are found to approach one another very closely at 28 days. The tensile strength at 28 days is regarded as the necessary test after delivery of the cement. If, however, it is desired to obtain a test in seven days, this can be done by means of a preliminary test when the proportion extant between the tensile strength at seven days and that at 28 days for the cement in question has been ascertained. This preliminary trial can also be conducted with neat cement when the proportional strength of the neat cement to that mixed with sand after 28 days has been established. It is of advantage in all cases, wherever practicable, to extend the tests with the specially prepared cement samples over a longer period of time (than 28 days) in order to learn the behaviour of various cements with a greater interval for induration. Sand with grains of equal size and of the same quality must be employed to insure uniformity in the results. This "normal sand" is obtained by taking the purest possible quartz sand, drying it, passing it through a sieve of 60 meshes per square centimètre (387 meshes per square inch) to remove the coarse particles, and separating from it the fine particles, which go through a sieve of 120 meshes per square centimètre (774 meshes per inch). The respective wires to be 0·38 millimètre and 0·32 millimètre in diameter. As all quartz sands do not give similar results when used in the same way, it is necessary to ascertain whether the sample of sand employed corresponds in its results with the normal sand furnished for testing purposes by the officials of the German Cement Manufacturers' Association, which sand is also used at the Royal testing station at Charlottenburg in Berlin.

Description of the Tests to Ascertain the Tensile and Compressive Strength.—As it is essential that uniform results should be obtained in testing the same cement in different localities, it is of the utmost importance that the following rules should be very minutely attended to. To attain correct average figures, at least ten sample blocks must be prepared for each experiment.

Preparation of the Cement-with-Sand Tests: for Tensile Strain.—The sample blocks may either be prepared by hand or by means of a mechanical contrivance.

(*a*) *Preparation by Hand.*—Five moulds, rinsed out with water, are placed upon five pieces of blotting-paper soaked in water, and laid upon the metal plate or glass slab used for making up the tests. 250 grams of Portland cement and 750 grams of dry normal sand are then weighed out, and well mixed dry in a hand-bowl. 100 cubic centimètres = 100 grams of pure soft water are next added, and the compound is vigorously worked up and incorporated for five minutes. With the mortar thus prepared the five moulds are filled at a single operation, and each is pressed so full that the cement stands up in a well rounded mass above the top level of the mould. By means of an iron spatula, from 5 to 8 centimètres wide and 35 centimètres in length, weighing about 250 grams, the heaped up cement is then beaten down, beginning with light taps directed rather sideways and gradually increasing in strength until the mortar is driven into the mould, becomes elastic, and shows water at the top. It is absolutely essential that each mould should receive a series of blows, carried to this point and lasting about one minute. (A subsequent addition of mortar with an extra beating-down process is not permissible, because it is requisite that the test samples made up from the same cement at various testing stations should be of equal density.) Any superfluous cement rising above the surface of the mould may finally be scraped off with a knife, and the surface may be smoothened with the same. The mould is carefully removed, and the test block is placed in a box lined with zinc and furnished with a cover to guard against unequal evaporation from the tests, caused by variations of temperature. In 24 hours after being made up the test blocks may be put in water, and it is necessary

to see that they remain under water during the whole period of induration.

(*b.*) *Preparation by Mechanical Means.*—After the mould furnished with a filling-box has been placed upon the bed-plate and fastened down by means of the two thumb-screws, 180 grams of the mortar prepared as set forth in *a* are introduced into it for each test, and the iron moulding-core is dropped into its place. By means of the beating apparatus devised by Dr. Böhme, 150 blows of a hammer weighing two kilograms are next delivered upon the core. The filling-box and the core are then removed, the surface of the test block is scraped level and smoothed over. The moulds and tests are detached from the bed-plate and dealt with as in the case of *a*. If the above instructions are accurately complied with, hand work and mechanical preparation furnish fairly uniform results. In any disputed case, however, mechanical preparation must be resorted to.

Tests for Compression.—In order to obtain uniform results at different testing stations when testing for compression, it is necessary to employ mechanical means for the preparation of tests. 400 grams of cement and 1,200 grams of dry normal sand are stirred together dry in a hand-bowl; 160 cubic centimètres = 160 grams of water are then added, and the whole are stirred together and thoroughly incorporated for five minutes; 860 grams of this mixture are then introduced into the filling-box of the cubical mould, which has been duly attached by screws to the bed-plate. The iron core is placed in position, and on it are delivered 150 blows by means of the beating apparatus of Dr. Böhme, with a two-kilogram hammer. After the filling-box and core have been removed, the test-block is scraped level and smoothed, detached along with the mould from the bed-plate and dealt with as described in *a*.

Preparation of the Tests Made from Neat Cement.—The moulds must be oiled slightly on the inner edges and placed upon a metal or glass plate (without blotting-paper under them). Weigh out 1,000 grams of cement, add 200 grams = 200 cubic centimètres of water, and thoroughly incorporate the mixture (best done with a pestle and mortar) for five minutes; fill up the moulds, rounding off the upper surface well above the edges, and proceed as in the case of *a*—the moulds, however, must not be detached from the test-blocks until the cement is sufficiently set. As the aim, in beating the cement into the mould, is to obtain test-blocks of equal solidity, the volume of water employed with very finely-ground or with quick-setting cements is to be proportionately increased. The quantity of water used must always be indicated in stating the breaking weight.

Treatment of the Test Blocks During the Testing Process.—All tests must be made directly the blocks are taken out of the water. As the period while exposed to stress has an influence upon the results, during the time the tension is being applied, the increase of load must amount to 100 grams per second (13·2lb. per minute). The mean of ten tests for tension shall be deemed the actual tensile strength. In testing for compression, in order to obtain uniform results, the pressure must always be applied on two opposite sides of the cube, not upon the base on which it was moulded and the wrought upper surface. The mean of ten tests shall be taken as the definite strength under compression.

THE SOCIETY OF ARCHITECTS.

THE opening meeting of the fourth session of the Society of Architects was held on Tuesday evening in the Society's new rooms, St. James's Hall, Piccadilly, S.W. The President, Mr. JOSEPH J. LISH, of Newcastle-on-Tyne, occupied the chair. Mr. E. CLERK ALLAM moved: "That a new rule to be numbered as the first be adopted—viz., that this society be known as 'The Society of Architects.'" Mr. FREDERICK BANKS seconded the motion, which was carried unanimously. The following gentlemen were elected as members:—William Henry Crease, 2, Back-street, Taunton; James Farrar, 29, Northgate, Halifax; Louis Jackson, 14, Dives-road, S.W.; John Varley, Skipton; George Malam Wilson, Bideford; and Henry John Wright, 4, Museum-street, Ipswich. As associates—Rev. James Hyslop, 23, Normanton-terrace, Derby, and William Jackson, 199, Mansfield-road, Nottingham. Forty nominations for membership were read.

The PRESIDENT said he regretted to announce that since their last meeting they had lost three members by death—Mr. John Moir, 55, St. Michael-street, Dumfries; Mr. Arthur Hasland, A.R.I.B.A., Percy Chambers, Charlotte-street, W., lecturer on architecture at the Polytechnic Institute; and Mr. Luis Antonio Coyne, Edinburgh—and he proposed that letters of condolence be sent to the representatives of these gentlemen. This was seconded by Mr. R. CRUWYS, and agreed to. On the motion of the President, seconded by Mr. T. R. RICHARDS, votes of thanks were awarded to Mr. W. H. Seth-Smith, senior vice-president, for his gift of a handsomely carved oak chair for the President; and to Mr. C. Stanley Peach for his services as honorary architect for the alterations to, and furnishing of, the hall, special mention being made by the President of Mr. Peach's excellent designs for the wrought-iron gas-fittings.

Mr. EDGAR FARMAN, hon. sec, announced that Mr. G. Benson, secretary of the York Architectural Association, has presented a copy of his work on "Picturesque York" to their library; this was acknowledged with thanks. On the motion of the PRESIDENT, the balance-sheet for the past year was received and adopted.

The President then delivered his

INAUGURAL ADDRESS.

In his introductory remarks, Mr. Lish congratulated the members on the healthy condition of their membership roll. Since last session 48 members had been added to the list, and in addition 40 nominations were in hand. During the past session papers had been read by Messrs. Seth-Smith and Robert Walker, of Cork, on "The Proposed Statutory Registration of Architects," both well reasoned, thoughtful, and valuable contributions to the subject; Mr. Appleton read a paper on "Sanitary Notes"; Mr. Basil Champneys one on "Architectural Styles, Old and New"; Mr. W. Allport one on "Housing the London Poor"; Mr. C. H. Searle one on "Quantity Taking," to be followed during the coming session by a second paper on "Specifications"; Mr. G. H. Robertson one on "The Law as Affecting Architects"; Mr. Ernest Farman one on "The Law of Party Walls and Easements"; while Mr. Ellis Marsland contributed a most useful paper on "Architects and the Metro. Building Act." He thought they could not have too many papers of this practical kind. The president also referred to the conference in May last on the proposed Registration Bill and to the recent visit to York, adding that the programme for the present session would include, besides Mr. Searle's paper previously referred to, a paper by Mr. Walter Emden, on "The Prevention of Fires in Theatres"; one by Mr. J. Leaning on "The Relation of Architect, Surveyor, and Builder"; one by Mr. Edgar Farman on "The Architect as an Arbitrator"; and others by Mr. H. R. Gough, their ex-president; Messrs. Seth-Smith, J. Starkie Gardner, and G. A. T. Middleton. Having referred to Lord Randolph Churchill's recent utterances anent science and art at Newcastle, the president suggested that perhaps architects would do well to consider each for himself whether there were not some substratum of truth beneath Lord Randolph's strictures, and endeavour to bestow more attention on the scientific aspects of the problems before them, and on the practical work of the present day, even if this compelled them to give less time to the study of the art of the past. The president continued:—Architects are said to be "losing ground every day." How is this condition of things to be dealt with? Foreign competition has led to the methods of the foreigner being closely scanned to see in what direction he may be beaten. This has resulted in a demand for "technical education," that we may be in a position to meet him with his own weapons. This policy is of interest to us as a profession. We also have determined "competition" to deal with in our own borders—a home-grown article—which cannot be ignored. Architects complain that much of the legitimate work of the profession is passing more and more into the hands of the civil engineer, the sanitary expert, the surveyor, the builder, and "others," whom the public, in some cases, regard as having more scientific or more practical knowledge, or as having more of both. Why should not the architects set to work to qualify themselves to out-distance the engineer, the surveyor, the "expert," the builder, and the "others" in those qualifications which have gained them the preference? If a *Volunteer* beats a *Thistle*, there may be some talk of "out-sailing"; but the net result will be a re-casting of lines to beat the victor. The men preferred before us are favoured simply by reason of their supposed or asserted superior acquirements, their acquaintance with the *technique* of the trades, with the peculiarities, and with the values of building materials and appliances, with drainage, with sanitation, with problems in statics, and with the thousand and one things which the student of art has all too frequently classed with the hewing of wood and with the drawing of water; but the presumed possession of which, and the common sense and business capacity which such acquirements seem to indicate, give confidence to the client that such a one is more to be trusted with the spending of his money. The public wants its work to its own liking, and if architects are not equal to its demands they will be brushed aside, and others employed in their stead. As for the higher reaches of art, the average client is not deeply concerned. But that he should receive twenty shillings' worth of value for the pound sterling, is a matter which is never absent from his mind for long periods. Why should it be? For years past we have been rendered familiar with the homilies on education of those who would advise us as to methods of culture. But we may express a wish for a somewhat clearer understanding of what is embraced in this term "educate." With the educational standard of the Institute we, of course, are all familiar; but the students who have satisfied the requirements of its examiners are amongst those who complain of the ever-increasing encroachments of those who are supposed by them to be less competent to take the architectural fences, which seems to indicate that there is yet room for improvements in our methods of training. Professor Roger Smith, in his excellent introductory lecture to the classes in architecture at University College, says that the object of the education of the architectural student should be to fit him for practice—that is for business. Now, the business of an architect, as we know, is primarily the designing and construction of buildings. The designing section can no more be divorced from the construction, and construction from design, than the flesh can be divorced from the bone, without prejudice to the final result. The authors of those Mediæval works in this country, so cherished by the modern architect, were not designers merely, but "builders," I doubt not—though builders of a masterly type. There are modern architects who are fast resolving themselves into mere picture-liners—though masters at that. They can bespatter double-elephant with architectural "grace-notes," without limit; but others are preferred before them—others less worthy than they. Such is the burden of their plaintive symphonies. The late Mr. Whichcord, when President of the Institute, made a strong appeal in favour of greater attention being given to the more practical side of the profession of architecture, and I am inclined to think that his remarks are as appropriate and as necessary to-day as they were in 1880. The thorough-going exponent of the graphic, as distinguished from the practical department of the profession, places himself in the hands of Providence and of the quantity surveyor, and if these fail to supply him with the necessary data, "the practical suitability of his buildings for their purposes, the provision for best schemes of ventilation, of drainage, and other matters of sanitation or of convenience, of the first importance, are very much left to take care of

themselves." The "art architect," as he has come to be designated—though why it should be less of an impertinence to pose as an "art" architect than as a "superior" surveyor, I leave for those learned in such matters to determine—the art architect, I say, has his headquarters in London. He is occasionally to be met with in other large centres; but it is the exception to find the provincial practitioner cultivating that "lean and hungry look," resulting from an exclusive consumption of the sauces, the spices, and the condiments which constitute the commissariat of his brother who exalts art and despises business. It is some satisfaction to think that it would be difficult for him to secure an enduring foothold under such an examination as that of one of our Metropolitan societies, which includes some tests of practical acquirements, and, as far as it goes, is an honest attempt to wipe out the reproach which attaches to merely artistic attainments. The aim and the ambition of every architect is to have works—not to depict—but *to build*. Yet there are amongst us those who profess to despise any acquaintance with practical matters, though some knowledge of such subjects might be of value to those whose purpose it is to build. Ours is a profession, and the only one, in which men can be found who are ashamed to know their business. The pupil-apprentices of our large engineering establishments, such as the Stephensons, the Hawthorns, the Neilsons, the Kitsons, and Sharp, Stewart, and Co. are trained not only at the drawing-board, but are required to take their share of the work "in the shops." They are set to pattern-making, to moulding and casting, to the work of the coppersmith, to forging, and to boiler-building. They work at the lathe, and in the erecting shops, take part in constructing the engine or the machine in its complete form. This class of training has produced engineers who are in request in every quarter of the globe. If you were to question such being "practical" men, they would think you had taken leave of your senses. Should you venture to suggest to the "art architect" that he might be a practical man, he would look upon you as a fit subject for an asylum. But while the engineers referred to can hold their own against all the world, the art architect is being pressed out of the field; often by men much inferior in artistic ability and education. The one is a thoroughly trained, "all-round" man, the other is, on one side, a finger-post pointing to art. Turn him round, and he points to nowhere. An architect, whilst being well grounded in questions of art, should be so much of an engineer as to be able to calculate the capability of every piece of material he puts into a building. This may be denominated hum-drum, and inimical to fine conception. Such a practice regularly indulged in, however, would eliminate much of the crudity from first thoughts, and save much after heart-searching. Most architects, at one time or another, will have felt the need for and value of such a qualification, or have regretted its non-possession. From "many a faut it wad free us," and from many disappointments to boot. Indeed, in the matter of education, it would be safe to say that the architect would not be the worse for knowing something of most things lying "between the lower chalk and the moon"; unless, forsooth, this piling up of the knowledge should cause life to become what an electrician would describe as "short-circuited." Some architects have acquired much of their knowledge of materials and of trade processes by acting as clerks of works prior to commencing practice, and this is a course presenting many advantages to the young architect. Perhaps as much cannot always be said of the advantages to the building he supervises. Some time spent in the foundry, and in the pattern-making department of an ironworks, and a little time at the anvil, under such an instructor as the late Alfred Newman, would give such a "grip" of the subject that one would for ever after design ironwork, both cast and wrought, with a power that could be secured by no other means. Then, again, some time might profitably be occupied in the yard and workshops of the timber merchant. Then the "laboratory" of the profession—the office of the quantity surveyor—should not fail to be mentioned. Here the budding architect will be able to range all his information into line, and test his acquirements by getting at close quarters with the facts. The gentlemen who take out the quantities for our buildings must, as we are aware, know what next and next of every stroke of the pick and of the chisel; how and by what stages the work is dressed and is set; must be familiar with the whole range of details and with every class of construction; must be expert at calculating loads and strains; must be as much at home with the work of the artisan as the workman himself; and, in the matter of figures, must be able to pass muster as newly wound-up calculating machines. Indeed, there is not a solitary piece of information about structural work or about materials and methods but can be pressed into service in this department of practice. Here, then, is a field for those staggering under the weight of "genius." The knowledge of synthesis possessed by our architectural chemist must be as profound and as far-reaching as his power to analyse. Have we not heard it whispered that quantity surveyors have had drawings placed in their hands in which it was difficult to discover more than what a chemist would call "a trace" of constructional detail to guide them in their work. How necessary, then, to this surveyor is the power to construct as well as the power to dissect. Extended knowledge in this, as in other fields, would, moreover, develop a modesty for which, I am afraid, our profession is not over proverbial, and make the architect into a scientific constructor in the best sense of the term. Further, as to expenditure, you will not fail to know whether the question "What will it cost?" is the first or is the second; it will certainly not be the last word of the client. I know that there are numerous architects who have a wide, and a deep, acquaintance with various branches of scienee and with practical matters. My contention is that our profession would benefit by a more general diffusion of a knowledge of science and of trade processes amongst us—an acquaintance with which would benefit every practitioner, and would not be without its advantages to his clients. There are in the profession, unfortunately, those whose word can rarely be quite relied upon when that word has reference to estimating. If, in dealing with such, the estimates should come in at £50,000 instead £25,000, is it to be wondered at if the client should say, in his wrath, "All men are liars." With the bringing about of much reckless and unreliable estimating, the system of competitions has had much to do, but the time for ridding us of this anomaly is not yet. Everyone who aspires to the title of architect should—and it ought to go without saying—know so much of values as to estimate within a reasonable amount of the cost of any work he may be called upon to carry out. It would be a singular professional life, however, which could be spent without its record of blundering in costs, and in other matters. But this question of exceeding of estimates is such an exceeding reproach to our profession, and is working such an infinitude of mischief, that one could wish to see every individual practitioner resolve to have utterly done with the cankerworm, so far as he is concerned. Of course, all this is very much removed from mere "art," though very closely allied to "building"; but as all the circumlocution and red tape of the drawing board and the T-square are merely preliminaries to the ultimate building—the power to build well, and with economy, should surely not be inferior to the power to delineate effectively. We are engaged in the art and *practice* of architecture, be it remembered, and whether our rendering of art be surprisingly beautiful or as ugly as sin, the more we know of trade processes, of materials, and of prices, the more satisfactorily shall we be able to acquit ourselves of the claims made upon us by the client. Respecting the movement for the formation of a provident fund for architects' assistants, for those who are in the stage preliminary to practice, if it should be determined to establish such a fund, I hope its scope will be widened, so as to embrace engineers' and surveyors' assistants within its benefits. I think I shall be expressing the sense of the members when I say that the Society of Architects will give its countenance to any movement of this kind. Self-help, however, is the best help, and if the assistants really desire to establish a provident fund, they should give evidence of their wishes in that direction by attending the meeting to be held on Friday night, for which purpose this room has been granted. As a society taking a special interest in the question of registration, the Bill for that object, with the various suggestions for its improvement embodied therein, is about ready for presentation to Parliament. The labours of the Registration Bill Committee have not been carried on without cost—considerable cost—as you can readily conceive. Such expenditure has hitherto been met by the committee out of their own pockets, coupled with some monetary assistance from the Society of Architects—the society contributing the sum of £45 towards the expenses. Now, however, that it is proposed to bring the measure before Parliament, funds will be required for this purpose. It ought hardly be necessary to say that having induced a committee to undertake the burden of the work of drafting the Bill, the professions interested should now undertake the burden of the cost to be incurred in passing the Bill into an Act. With a view to bring this subject practically before the country, it has been suggested, amongst other measures, that treasurers be appointed in all important centres, with powers to receive subscriptions in furtherance of the Bill. I need not go into the details of the draft Bill. Reference, however, has been made to builders and to their designing of houses. After a Registration Act has come into force, builders and other practical men will still continue to design, as well as build, domestic works—and many of them, we know, are well qualified to do so—but what the Act is expected to secure, so far as architects are concerned, is, that those persons desiring to practise as architects shall give evidence of an intimate acquaintance with the materials and with the *technique* of the several trades concerned with building, and we may presume that ultimately candidates will have to show something approaching as sound and as wide a knowledge of building as the builder himself, and that they shall, superadded to this, be expected to have such information on scientific and on sanitary matters, such a knowledge of building law, and such an acquaintance with art, as no builder can be looked to to possess. Some fear that compulsory examinations will be a bar to men of genius entering the profession. But it is surely not of less moment in this work-a-day world that we should be qualified all round to build soundly and well, than to build with a view to the picturesque. I have no fear that an examination of a thoroughly practical kind will stamp out, or even damp down, the more artistic instincts; but will rather be a help to the student to distinguish himself in the higher reaches of the profession, whilst giving him a command of such a fund of scientific and technical knowledge as will insure truth, as well as point to his pencil. Under the existing *regime*, when a youth enters the office of an architect, if he should have an irrepressible love of hard work bubbling up in him, he may find his architectural acquirements at the termination of his articles more advanced than at the outset; but there is no compulsory examination looming up before him to demand application and enforce study, and no one standard of acquirements agreed upon and made equally binding upon all our students. This lack of one fixed standard for all students will account for much of that unequal culture which now marks the profession; a condition of things which would quickly be altered for the better if the passing of a standard examination was rendered compulsory over the whole kingdom before practice could be entered upon. This, I take it, is even of more importance to the public than to architects. Independent of the church, the law, and medicine, several cases will occur to you in which examinations are applied as a test of fitness for practice or business. This is the case now with colliery managers. Accountants have their compulsory examinations. The analytical chemists and the apothecaries also have their examinational qualifications. The plumbers are registering and proposing a code of tests of fitness for the following of their craft, and I cannot bring myself to think, gentlemen, that an architect will rank as less than the least of one of these.

Mr. Robert Walker, of Cork, proposed a vote of thanks to the President for his interesting and practical, though somewhat discursive, address. He thought Mr. Lish had been a little

too severe upon the art-architect, for although gentlemen who professed to regard art almost to the exclusion of construction, and who were not fettered by exigencies of cost, were to be found among the last generation of architects, the race appeared to be nearly extinct now.

Mr. HERBERT GRIBBLE, A.R.I.B.A., speaking as a member of the Institute and of the Registration Committee, wished the Society of Architects a flourishing future and all success in its useful work. Some anxiety had been expressed as to the principles which would guide the committee in registering the professions, but he believed they would be found to be just, and neither too severe nor too lenient to candidates for admission. He begged to second the vote of thanks to the President for his excellent address.

The motion was supported by Mr. SETH-SMITH, who remarked that he should have preferred to have seen the Registration Bill promoted by the Institute; but as they did not seem inclined to move in the matter, the committee felt there was no alternative but to proceed. The Bill had been so drafted that its operation would be in the hands of the Institute if they chose to act, and the public would, he believed, receive the proposal favourably, as no attempt was made to increase the professional scale of fees.

In reply to the vote of thanks, which was carried by acclamation, the PRESIDENT said he believed the public would not suffer architects to practise much longer without demanding from them some qualification as to fitness to exercise their profession, and this would be gained by the Registration Bill. It was of small moment what body was to give the Bill legislative force; the main principle was to insure a general examination for all practising as architects.

BUCHAN'S IMPROVEMENTS IN VENTILATING CHURCHES, HALLS, AND SCHOOLS, &c.

IN our columns on August 21st, 1885, and August 6th, 1886, we referred to the improvements in ventilation introduced by Mr. W. P. Buchan, sanitary and ventilating engineer, of 21, Renfrew-street, Glasgow. To-day we call attention to what he has done in providing a simple "formula or data for calculating the size of the main outlet pipes and ventilators."

As to this Mr. Buchan says:—

"As the sites and sizes of buildings are so various it is difficult to publish a working rule suitable for all cases, more especially when *monetary circumstances* form a factor in judging. A building, such as a church or school, &c., freely exposed to the wind all round, and especially if on raised ground, will be well ventilated with about half the provision for outlet ventilation that would be required for a similar building if in a sheltered position, and with high buildings near or round it.

"Upon this understanding it may be stated that for the outlet ventilation of churches, chapels, and halls, seated for, say, from about 300 persons upwards, the rule may be to allow from half a square inch up to a square inch and a half of outlet for each person. The medium being one square inch of outlet for each sitter. Another basis of calculation may be to allow from ¼in. to 1½ square or superficial inches of outlet for each 120 cubic feet of space. It is generally better to have two, three, four, or more outlets in the ceiling than only one, and especially for low and flat ceilings. A regulating valve is used to stop ventilation when heating up, &c.

"Allowing the half square inch of outlet for each seat for a church seated for 800 means either one 24in. diameter main outlet pipe with one of my 42in. ventilators, or two 17in. diameter pipes with two 30in. ventilators. One square inch of outlet area, again, for each of the 800 would need either a 34in. diameter main outlet pipe with 54in. ventilator, or else two 24in. diameter pipes with ventilators to suit. Of course, a half-filled church can do, *pro tem.*, with less than a well-filled one, but when the church or hall is full, and too little ventilation provided, complaints are sure to be made, especially in warm and close weather.

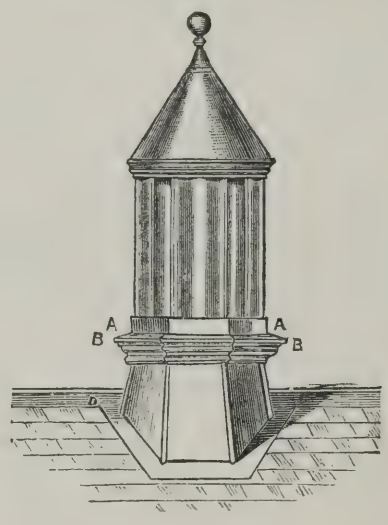
"The cubic capacity of some churches seated for about 800 is about 100,000 cubic feet, giving 125 cubic feet for each of the 800. In others the allowance is more or less, as the case may be.

"In practice I have supplied three 30in. ventilators, each with 17in. diameter, outlet pipe (and self-acting valve boxes), for a well-exposed church, seated for about 900, being nearly ¾in. of outlet to each. In another case only two that size for 850, while in one case for an old church, seated for about 1,000, only one 17in. diameter outlet pipe was ordered! If, in this latter case, *the attendance* was only 200 or 300, then the one 17in. outlet with 30in. ventilator might do for a time, under such circumstances.

"For some small country churches, seated for fully 400, one 33in. ventilator with 20in. diameter main outlet pipe does very well, or two 24in. or 27in. ventilators with 14 to 16in. diameter outlets. When well-exposed and seated for 250, a 30in. or 27in. ventilator with 18 or 16in. diameter outlet may do; but all the better the larger.

"Churches, &c., open to the ridge require no piping, unless where, as often done of late, my self-acting valve boxes are used, when a short piece of pipe about 2 or 3ft. long is needed between the top of the open-roof valve-box inside and the ventilator outside.

"For schools (and, to some extent, for small churches or halls holding less than 300) the allowance for outlet ventilation should be much greater per head than above, as schools are occupied for a longer time, and daily, and



by young growing people; hence, from 2½ to 4 square inches of outlet for each pupil is needed, and provision ought to be specially made to prevent down-draughts upon the heads and bodies of the children. It is a crime to keep children sitting chilled and shivering below ventilators that allow oft-repeated or prolonged down-draughts. There is great room for improvement throughout the kingdom in regard to this. The pretended ventilation, again, sometimes provided by means of holes in the ceiling and outer roof, opening directly into the garret or space between the outer roof and the ceiling, is generally a sham and also a great nuisance owing to down-draughts. Police and law courts might rank like schools.

"When a church or a school, &c., is well ventilated (and asphalted) below the ground floor, less direct fresh-air inlets are necessary.

"Hospitals require extra good ventilation, and, according to Dr. Parkes, an allowance of from 1,500 to 2,000 cubic feet of space for each patient, fully 12 to 16 times as much as in second paragraph above, so in same proportion that means from 6 to 18 square inches of automatic outlet ventilation for each patient; but Dr. Parkes seems to wish nearer 60in. for each, in addition to window ventilation. This 1,500 cubic feet of space for each, in the case of 20 patients, would need a ward, say, 80ft. by 26ft. by 14½ft. And 60 square inches of special outlet for each means either four 20in. diameter outlet pipes, or two 28in. with exhaust ventilators to suit. If, however, ample outlet ventilation sooner made the patients well, it would soon pay itself. Special provision ought to be made to protect the patients from down-draughts and chills.

"For rooms in houses, &c., allow about 10 square inches of outlet area for the room, and then from 2 to 4 square inches more for each person in it. I have never seen too much outlet ventilation provided for either church, hall, school, or room, &c., although often too little."

In reference to the question of showing exhaust ventilators set up above the ridge of a building, Mr. Buchan says truly that seeing it is admitted ventilation is necessary:—"Ventilators have, therefore, as legitimate a right to be seen on buildings as chimneys, and should be freely exposed to their motive power, the wind. Architects should assist in making them presentable without marring their efficiency."

The illustration here given shows an attempt to do this with a plain No. 2 (octagonal-base A A) ventilator for a church at Bearsden, near Glasgow, the architect designing and providing the seat B B. In this case two ventilators were placed on the church, as shown, and the architect writes:—"They improve the appearance of the roof by breaking the long outline of the ridge."

In connection with the ventilators, Mr. Buchan's Self-acting Anti-down-draught and Inspection Valve-Boxes have been fitted up in the garret above the ceiling. We understand that a large number of these valve-boxes have been used for schools, halls, and other buildings, as well as for churches, since our recommendation of them in the BUILDING NEWS of 6th August, 1886.

MASONRY AND STONE-CUTTING.*

By LAWRENCE HARVEY.†

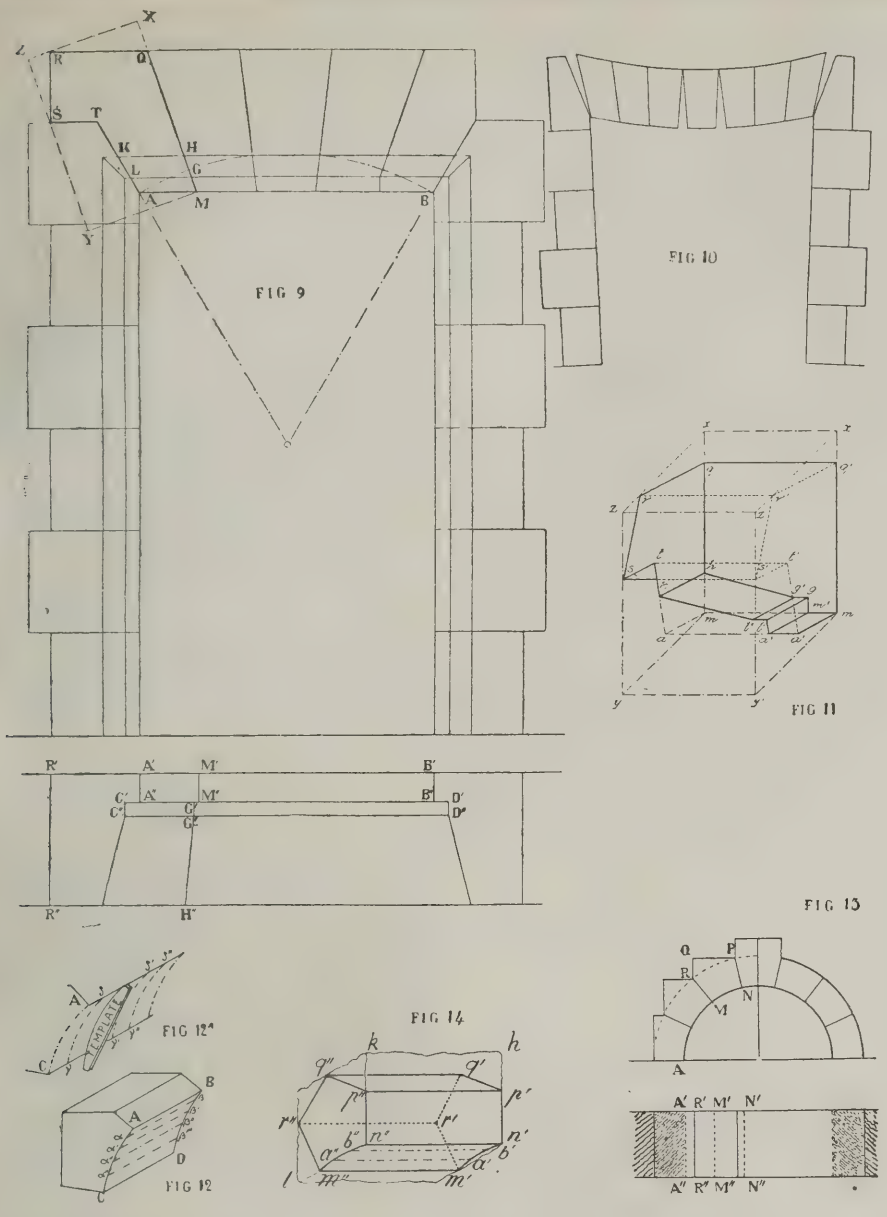
SECOND LESSON.—FLAT ARCHES.

IN our example (Fig. 9) we show the interior elevation of a square-headed doorway. The faces A′ A″ and B′ B″ shown on plan are the outside *reveals* of the doorway; the narrow fillets C′ C″ and D′ D″ are the *rebates* to lodge the thickness of the door; the distances C′ A″ and D′ B″ which separate the rebate from the reveal are its depth; the *splayed* sides towards the interior of the wall allow the door to be more conveniently opened than if they were straight. The uppermost stone of the door jamb rests on the wall and forms the abutment of the arch. The voussoir next to this is the *springer*. In our opinion, for a square-headed door formed of stone voussoirs the thickness or vertical dimension of the head or lintel should be equal to, at least, ⅔ of the width of the doorwary, for only a part of the joint of each voussoir receives a solid abutment from the wall; that is, the part of each joint which is above an arc of a circle drawn from the centre where the joints of the voussoirs converge. The ends of the voussoirs below this arc are really only a load, and not a help, to the safety of the archway. The centre of convergence for the joints of the voussoirs is usually the apex of an equilateral triangle formed on the opening A B.

In Fig. 10 we have shown how a flat arch is destroyed; the joints gape at the bottom part of the keystone and at the upper part of the springer, so that the first voussoir turns round its lower arris next to the springing line. To prevent this, the first voussoir is often made with an elbow, as shown on the left hand of Fig. 9; the weight of the wall above the elbow helping to keep this voussoir firm, so that it partly belongs to the jamb of the archway. On the right-hand side of Fig. 9 we show how the lower part of the joints of the voussoirs are sometimes cut so as to be perpendicular to the soffit of the arch; but, as we have said before, such devices are nearly as objectionable

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† As many readers know, this subject, of which there is no English textbook in existence—is now in a fair way to receive the attention it deserves. The City Guilds Institute is taking the matter up, and the Institute of British Architects will probably move one of these days in the same direction. A series of classes for the use of architectural students to enable them to obtain, by the means of masonry, a thorough knowledge of the geometrical operations which find constant application both in architectural drawing and construction, is now being held at the City Guilds Institute, South Kensington, on Monday evenings, from 7.30 to 10, commencing on Monday, October 17th, 1887. The series is divided into three courses of ten lessons each. We have availed ourselves of Mr. Harvey's assistance to place the notes and diagrams of these lectures before our readers, convinced that they cannot fail to benefit students generally.—ED. B.N.]



as the acute angles they are made to correct. In our opinion, the best arrangement is to make the joints of the voussoirs simple planes, and just ease them at their lower part by rubbing, so that from the dotted arc downwards they come not into close contact. At all events, broken bed-joints must never be used for the keystone, for this should be made rather longer than required, and rammed in as tight as possible. The cutting of the keystone at the back should be done on the work after the stone is in its place, which will be found very easy to execute. As to the use of elbows, we think it is more a question of taste than of construction; if used, they must be worked with the greatest care and bedded in cement, so as to prevent any danger of unequal pressure in settling.

We shall now cut the voussoir A M Q R S T (Fig. 9). The stone from which it will have to be cut must be as long as the thickness R′ R″ of the wall (see plan), and its end face must be at least equal to the dotted line X Z Y M (see elevation), which comprises the elevation of the voussoir. We give that stone in perspective (Fig. 11).

Let $x\,m\,m'\,x'$ be its natural bed in the quarry; we work that surface to a true plane and delineate thereon the face of the joint M Q (Fig. 9), this is the polygonal figure $q\,q'\,m'\,m''\,g'\,g''\,h\,q$ (Fig. 11), which we get by making $q\,h$ = Q H, $q\,q'$ = R′ R″, $q'\,m'$ = Q M, $m'\,m''$ = M′ M″, $m''\,g'$ = M G, $g'\,g''$ = G′ G″. Then, with the help of a square, we work the two end planes $x\,m\,y\,z$ and $x'\,m'\,y'\,z'$ of the stone, and draw on both of them the outline of the stone in elevation; these outlines are (Fig. 11) $a\,m\,q\,r\,s\,t$ and $a'\,m'\,q'\,r'\,s'\,t'$. We can now work the lower bed joint $a\,t\,t'\,a'$ of the voussoir, thanks to the directing lines $a\,t$ and $a'\,t'$, across which we can lay our straight-edge. We shall cut in the same way the sides $s\,t\,t'\,s'$, $s\,r\,r'\,s'$, $r\,q\,q'\,r'$.

As to the soffit of the voussoir, we might begin by working the whole of the surface $a\,m\,m'\,a'$, and then from that pass on to the rebate and the splay. But this would involve a waste of labour, as part of the surfaoe $a\,m\,m'\,a'$ will have to be removed, To avoid this, on the plane of the lower joint $a\,t\,t'\,a'$ we delineate $t\,t'\,a'\,a''\,l'\,l''\,k\,t$, the real outline of that face by making $a'\,a''$ = A′ A″, $a''\,l'$ = A L, $l'\,l''$ = G′ G″; and then we have all the directing lines $a'\,a''$ and $m'\,m''$, $a''\,l'$ and $m''\,g'$, $l'\,l''$ and $g'\,g''$, $l''\,k$ and $g'\,h$ required for working the planes which form the soffit of the voussoir.

WORKING CYLINDRICAL SURFACES.

To work cylindrical surfaces, such as the soffit of the voussoirs in an archway, two methods can be used.

In the first method (Fig. 12) the curved arris at each end of the voussoir is delineated by the help of a head mould taken from the elevation of the arch. The two curves, A α, $a'\,a''$; B β, $\beta'\,\beta''$ are then used as guiding lines, and the cylindrical surface can be then worked with the help of a straight-edge as easily as a plane. The stone is knocked off between the curves, so that a straight-edge laid along parallel lines, such as A B $\alpha\,\beta$, $a'\,\beta'$, $a''\,\beta''$, &c., shall coincide in every part with the surface of the stone.

In the second method (Fig. 12A) a templet is used cut to the shape of the arch. The upper arris, A B, and the lower arris, C D, of the stone beds are used as directing lines; the stone is worked so that the templet placed in any position, $\gamma\,\delta$, $\gamma'\,\delta'$, $\gamma'\,\delta''$, &c., perpendicular to the directing lines, shall coincide in every part with the surface of the stone. This second method of working a cylindrical surface has to be used where the ends of voussoirs are not normal to the soffit, but are either skew planes or other surfaces such as cylinders and spheres.

RIGHT SEMICIRCULAR ARCHWAY.

As the simplest example of cutting cylindrical surfaces, we shall take a semicircular archway. Such a archway of free stone in a brick or rubble wall is sometimes finished by a circular extrados concentric with its soffit as in Fig. 13, right hand side; but more often the stones are finished by a horizontal surface P Q and a vertical joint Q R, as on the left-hand side of Fig. 13. It is such a voussoir M N P Q R (see elevation, Fig. 13) we intend to cut.

Firstly, we must select from the quarry a block of stone (Fig. 14) forming a prism, the length of which will be more than equal to the thickness A′ A″ of the wall, and the base $k\,n''\,l\,i$ of which will contain the vertical elevation of the voussoir; but it is not necessary that the head of the stone should be a rectangle. We begin the work by forming the plane $k\,n''\,l\,s$ and we draw thereon the head $m''\,n''\,p''\,q''\,r''$ of the voussoir, taking care that the side $n''\,p''$ coincide with the bed of the stone, as this side is one of the bed joints of the voussoir. As all the voussoirs are identical in shape from the dotted extrados to the soffit, it will be better to use a mould in cardboard cut out to the shape R M N P, and then the workman will only have to draw on the stone the lines P Q and R Q.

Now, we shall work by the help of a square the surfaces of the bed joints, that is the surfaces $k\,h\,n'\,n''$ and $r''\,r'\,m'\,m''$. Then on the surfaces we draw the outlines of the bed joints of the voussoir, such as $p''\,p'\,n'\,n''$, and using the arrises $p'\,n'$ and $r'\,m'$ as guiding lines we work the other end of the stone to a plane. We draw again on this last plane $m'\,n'\,p'\,q'\,r$, the outline of the head of the voussoir, and then complete the two remaining planes $p''\,q''\,q'\,p'$, and $q''\,r''\,v'\,q'$. The cylindrical soffit can be finished nearly as easily as a plane by the help of a straight-edge and the two guiding arcs $m''\,a''\,b''\,n''$ and $m'\,a'\,b'\,n'$ (Fig. 14).

(To be continued.)

CHIPS.

H.R.H. Princess Christian will open the new school of cookery and the girls' club-rooms, recently erected from Mr. Gough's designs, to-morrow (Saturday). Messrs. Wallace Bros., of Barnsbury, were the builders employed. The new buildings are additions to St. Clement's Schools, Leverstreet, City-road.

The old chimes in the tower of Lenham parish church were started on Friday, after remaining silent for eight or ten years. The machinery, which is a fine specimen of the ancient method of playing tunes on church bells, and which had fallen into bad repair, has been restored and repaired, and nine tunes added, as a Jubilee memorial, contributed by the inhabitants of Lenham. The whole of the work has been carried out by the well-known firm of Lund and Blockley, clock and carillon manufacturers, of Pall Mall, London. The same firm has just erected a full quarter turret clock in the parish church of Birchington, Kent, as a Jubilee memorial.

A mission building is about to be erected in the Fishmarket Close, Edinburgh, from plans by Mr. Robert Wilson, of Queen-street, in that city. It will be Scottish in style, will cost £2,700, exclusive of site, and will consist, on the ground and first floors, of classrooms and reading-room, and, on the upper floor, of a hall seated for 300 people.

The foundation-stone of the Children's Jubilee Hospital at Gateshead-on-Tyne will be laid on Friday, December 2nd. The building is being executed from designs by Mr. W. H. Dunn, of St. Nicholas' Buildings, Newcastle, selected in competition, and will be of red brick, with stone dressings and half-timbered gables. At present only the administrative block and one of the proposed four wards will be proceeded with.

The Royal Scottish Society of Arts have awarded honorary silver medals to Major H. L. Mackenzie, of Stirling, for a paper on his improved military sketching protractor, and to Mr. Wm. Bennett, governor of the city poorhouse, Edinburgh, for his description of improvements in apparatus in bundling firewood.

CONTENTS.

Failure to Complete Works 745
The Value of the Model in Architecture 745
The Uniform Testing of Portland Cement in Germany 746
The Society of Architects 748
Buchan's Improvements in Ventilating Churches, Halls, Schools, &c. 750
Masonry and Stone-Cutting 750
Our Lithographic Illustrations 752
Sketches of Silvermiths' Work 752
Sketches of Decorative Furniture 752
Wayside Notes 773
Notes from Edinburgh... 773
Convention of the American Institute of Architects at Chicago... 774
Metropolitan Railway Bridges... 774
St. Cuthbert's Church, Kensington 775
Books Received 775
Building Intelligence 776
Competitions 776
Engineering Notes... 777
Architectural and Archæological Societies 777
Correspondence 778
Intercommunication 779
Our Office Table 780
Meetings for the Ensuing Week 780
Legal Intelligence... 780
Stained Glass 781
Tenders 782

ILLUSTRATIONS.

WEST KENSINGTON CONGREGATIONAL CHAPEL. — A MENTONE VILLA.—A CHAPEL FOR THE TROPICS.—HOTEL DE VILLE, COMPIEGNE. — NORTH LEITH PARISH CHURCH.—HOUSES ON ST. CATHERINE'S ESTATE, BROXBOURNE.—WINDOW IN NEWCASTLE CATHEDRAL.—SKETCHES OF SILVERSMITHS' WORK AND DECORATIVE FURNITURE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

WEST KENSINGTON CONGREGATIONAL CHURCH.

In the competition for this building, the "conditions" seemed to suggest a rather close adherence to the ordinary church-type of nave, aisles, and chancel. To lessen the practical inconvenience of this type for Congregational worship, the architects of the successful design adopted the system of wide nave-arches and few columns. The nave is thus divided into several nearly square ceiling-compartments, each of which is filled with an octagonal wooden ceiling of its own. From these ceilings, which are tied round their base by a strong curb, the outer roof is strutted up. There is a central tower at the crossing of the nave and transepts. An external view of the original design appeared in the BUILDING NEWS some years ago; but in execution the tower and some other features were considerably modified. Internally, the walls are lined with buff terracotta bricks. Outside, they are of Yorkshire parpoint, hammer-dressed to an even face, and the architectural details are of Ancaster stone; the roof is tiled. The church seats about 1,000 persons, on the ground floor, without galleries. The architects were Mr. James Cubitt and Mr. J. M. Brydon, and the clerk of works Mr. C. Osborne. The total cost was between £9,000 and £10,000.

A MENTONE VILLA.

This drawing was done to send to the Royal Academy in 1886, where it was favourably hung. The idea is such a house as would be suitable for the residence of an Englishman in the Sunny South. S. J. N.

A CHAPEL FOR THE TROPICS.

This is also an unexecuted design. The windows should be of thin slabs of stone or marble perforated in a close pattern. If doing the drawing again, I should be inclined to put deep brackets to the wide eaves. S. J. N.

HOTEL DE VILLE, COMPIEGNE.

Mr. Mitchell's drawing herewith reproduced to-day furnaces a study of a very suggestive façade. The town of Compiègne, situated about a hundred miles from Paris by rail on the Great Northern, was once more prosperous than now, when the place for generations was the fashionable residence of the French monarchs, who here obtained good sport in the forests of the neighbourhood, and enjoyed the pleasures of the chase in its very extensive park. The forest occupies an area of 30,000 acres, and is noted for its oaks. The Royal Palace at Compiègne has a grand façade overlooking the woods, with a terrace 4,800ft. long. The building is of the time of Louis XV., and was built from the designs of Gabriel. Napoleon erected a fine hall, in the form of a gallery, and the interior of the palace was elaborately furnished. The chief object of interest in the town to the architect is the Hôtel de Ville, now illustrated. Its front elevation, which measures about 71ft. wide, is surmounted by a clock and bell tower of picturesque design, and its dormers are rich in detail. This tower was a favourite with the late E. W. Godwin, who more than once adapted its general form in his designs. The church of St. André, which is of 13th-century date with Late Gothic aisles added, is worthy of a visit, and the curious marble font in St. Anne's Church is put down in the guide books as remarkable.

NORTH LEITH PARISH CHURCH.

The new hall and class-rooms in connection with North Leith parish church, which have been erected in Great Wellington-street, Ferry-road, were opened last month. The buildings which are in the Gothic style, have been erected from designs prepared by Mr. Hippolyte J. Blanc, Edinburgh. On the ground flat there is a large hall capable of accommodating 900 persons, and an infant class-room, with gallery for 180 children. On the second flat there is another hall which provides accommodation for 150 persons, and which may be divided into class-rooms by means of folding partitions. A house of three apartments is provided for the caretaker, and there are also a kitchen, vestry, lavatories, and a heating chamber, the buildings being heated on the high-pressure system. There are four exit doors, two in Great Wellington-street and two to Allan-street, and all the internal arrangements are of the most complete description. In the large hall the platform will accommodate about 100 persons. The buildings are mainly of bright red sandstone from a Dumfriesshire quarry. The cost will be about £3,000.

HOUSES ON ST. CATHERINE'S ESTATE, BROXBOURNE.

These houses are from the designs of Mr. R. T. Blomfield, M.A., architect.

WINDOW DESIGNED FOR NEWCASTLE CATHEDRAL.

The pencil drawing from which our illustration of this window is reproduced was exhibited in the late Exhibition of the Royal Academy. In the centre St. Michael is represented with the scales of ultimate justice, Satan, in company with the damned, being seen on the one hand, and the redeemed are shown on the other, while above is seated The Majesty, with angels round the Throne, as well as in the tracery of the window. Mr. E. Frampton is the author of the composition. The great east window of the church has been filled with glass by Messrs. Clayton and Bell. Last Sunday the Cathedral was opened, and in the BUILDING NEWS of last Friday will be found a general interior view of the building, showing the new fittings of the choir by Mr. R. J. Johnson, F.S.A., the architect. We also gave an exterior view of the Cathedral by T. M. Richardson, sen.

A banquet was given at Louth on Thursday evening, the 10th inst., to Alderman James Fowler, J.P., F.R.I.B.A., on his retiring from the office of mayor of that borough.

A school, which has been erected at the cost of the Mayor of Conway, from the designs of Mr. F. M. Lockwood, Chester, as an adjunct to the National Schools, and so avoid the necessity of establishing a school board for the borough, was opened on Friday.

At the last meeting of the Leeds Town Council the town clerk read a letter from Messrs. T. and C. Hawksley, consulting engineers to the corporation, referring to the fact that they had for twenty years been connected with the corporation, and desiring to present to the corporation a "loving cup" of silver, covered with gold gilt, which they forwarded. The gift was accepted with thanks.

Among the receiving orders in bankruptcy announced in Friday's *Gazette* appears the name of G. Hopkins, Henry-street and St. John's Wood, builder.

Mr. R. Phené Spiers has prepared a work on "Architectural Drawing," which will be published in a few days by Messrs. Cassell and Company. The book will be illustrated with nine coloured and fifteen plain plates.

SKETCHES OF SILVERSMITHS' WORK.

We give illustration to some sketches of art silversmiths' work, mostly made this year. The Louth Borough mace was presented to that town in honour of Her Majesty's Jubilee by Mr. James Fowler, thrice mayor of that town. It is of silver gilt, and has the Royal arms engraved on the head, and an inscription commemorative of the occasion; a neatly-designed rest for the mace is also shown. The other mace is made for the Borough of Brighton, and is silver gilt, richly enamelled, with the Brighton Corporation arms, and the Royal arms; it being also in commemoration of the Jubilee. There is on the head of it a portrait of Her Majesty. It is about 4ft. long, was designed by Mr. Somers Clarke, F.S.A., and made by Messrs. Elkington, of London. The Ascot Jubilee Cup was modelled by Mr. H. H. Armstead, R.A., and made by Messrs. Hancock, of Bond-street. It represents Tennyson's "Morte d'Arthur," the side we have shown being in illustration of the scene where Arthur is conveyed on the barge:—

"'Then,' murmured Arthur, 'place me in the barge.'
So to the barge they came. There those three queens
Put forth their hands and took the king, and wept.
But she that rose the tallest of them all,
And fairest, laid his head upon her lap;
And loosed the shattered casque, and chafed his hands,
And called him by his name, complaining loud."

The cup at the bottom of the page was made by Messrs. Hancock some time since, having been exhibited in the Saltaire Exhibition. It represents a Bacchanalian feast and dance. It is beautifully executed, and is, we believe, at present the property of the Goldsmiths' Company.

SKETCHES OF DECORATIVE FURNITURE.

We give illustration to-day to a few articles lately designed and manufactured by Messrs. Hindley, of Oxford-street, whose exhibit at the last Architectural Association conversazione was much admired on account of its superior workmanship and good design. The Writing Table, at the head of the page, is part of a suite; it has four drawers and a bevelled mirror at back, a shaped shelf below just giving the necessary room for the feet when in use. The little Hanging Bracket is useful in a bedroom for medicine, and is made of pine, well enamelled. The China Cabinet is also of pine, enamelled white, and has shelves for china or other art objects above; and, lined with a terracotta plush, below there is a cupboard with raised panels and mouldings. The legs are carved, and the cost of this cabinet, which is nearly 7ft. high and 2ft. 9in. wide, is £12 10s., which is remarkably low, considering the good work put into it. The Renaissance Cabinet next it is of mahogany, inlaid with tulip and satin-wood; it is lined with a pale blue plush, which contrasts well with the colour of the mahogany. Messrs. Hindley have been designing some very cosy ingle-nooks, one of which we intend to illustrate in a future number.

CHIPS.

Six of the windows in the church of St. Clement, Eastcheap, E.C., one of those built by Wren, have just been fitted with stained glass from the studio of Mr. A. Taylor, of Berners-street, W., completing the series commenced by the churchwardens in 1877.

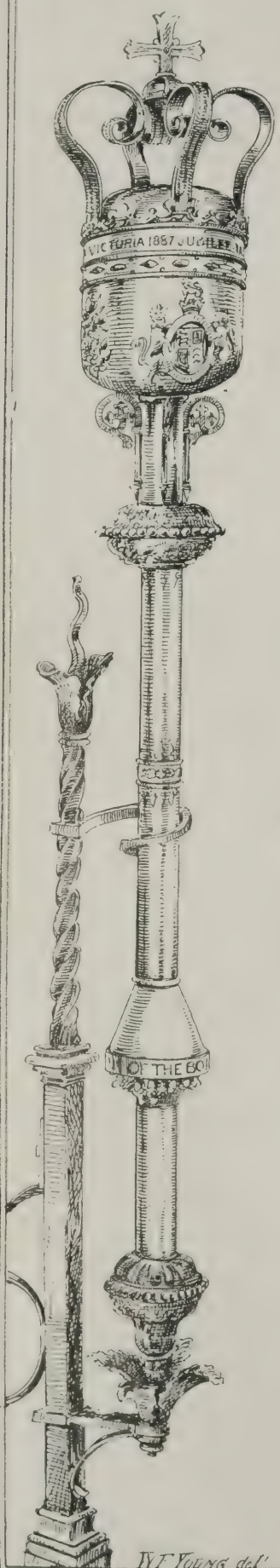
The town council of Wolverhampton have decided to raise the salary of the borough surveyor from £220 to £360 a year.

Barcelona has just provided itself with a monument of Christopher Columbus, who embarked from that port in April, 1493, after his return from the Western Hemisphere, to convey to the monarchs of the world the news of his achievement. The memorial consists of a terrace of steps facing the sea, with prow-shaped extensions at either end, and inclosed by balustrades. In the centre stands a statue of Columbus 20ft. in height. Don Cayetano Buiyas Monraba was the architect and Don Rafaelo Atché the sculptor.

Sir Michael Hicks-Beach, M.P., will open on Friday, December 2, the Redesdale Memorial Hall, which is being built in the market-place at Moreton-in-Marsh by Mr. A. B. Freeman-Mitford, C.B., at a cost of £10,000. We illustrated the building, which is being erected by Messrs. Peto Brothers, from designs by Messrs. Ernest George and Peto, in our issue of May 13th.

UNIVERSITY OF ILLINOIS

LOUTH BOROUGH MACE





ASCOT JUBILEE CUP



CUP FROM SALTAIRE EXHIBITION

BRIGHTON CORPORATION MACE



SKETCHES OF SILVERSMITHS WORK BY MESSRS HANCOCKS & MESSRS ELKINGTON

W. E. Young del.





"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

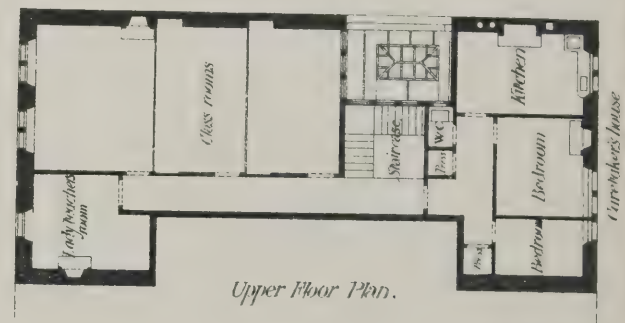
WINDOW · DESIGNED · FOR · NEWCASTLE · CATHEDRAL · BY · E · FRAMPTON.

NORTH LEITH PARISH CHURCH,

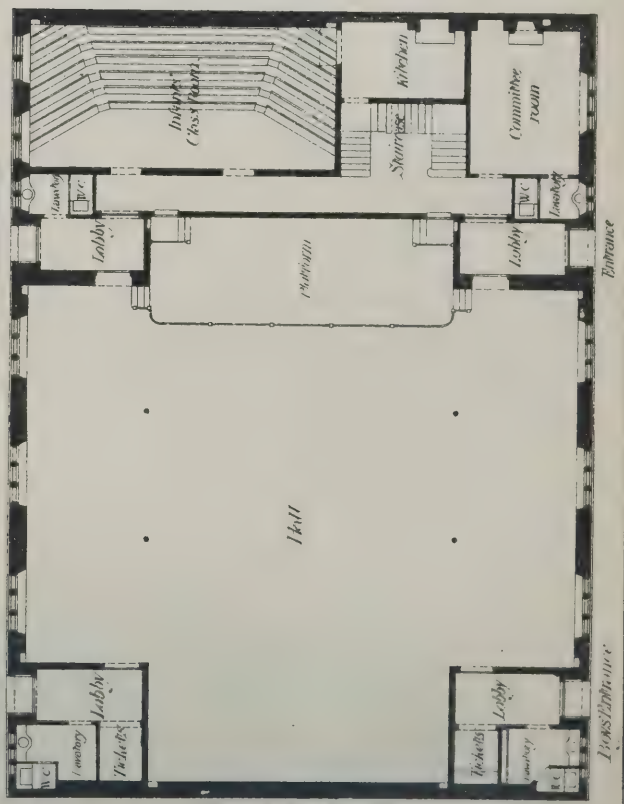
New Hall Etc.

Hippolyte J. Blanc Arch[t]





Upper Floor Plan.



Ground Floor Plan.

Photo-lithographed & Printed by Bedford Lemere & Co. 27 Queen Square W.C.





Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W C

WEST · KENSINGTON · CONGREGATIONAL · CHAPEL

J · CUBITT & J · M · BRYDON, ARCHTS

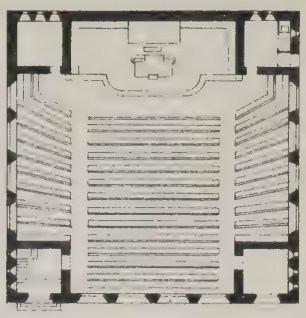

Bedroom
Bedroom
Bedroom
Kitchen
Living Room

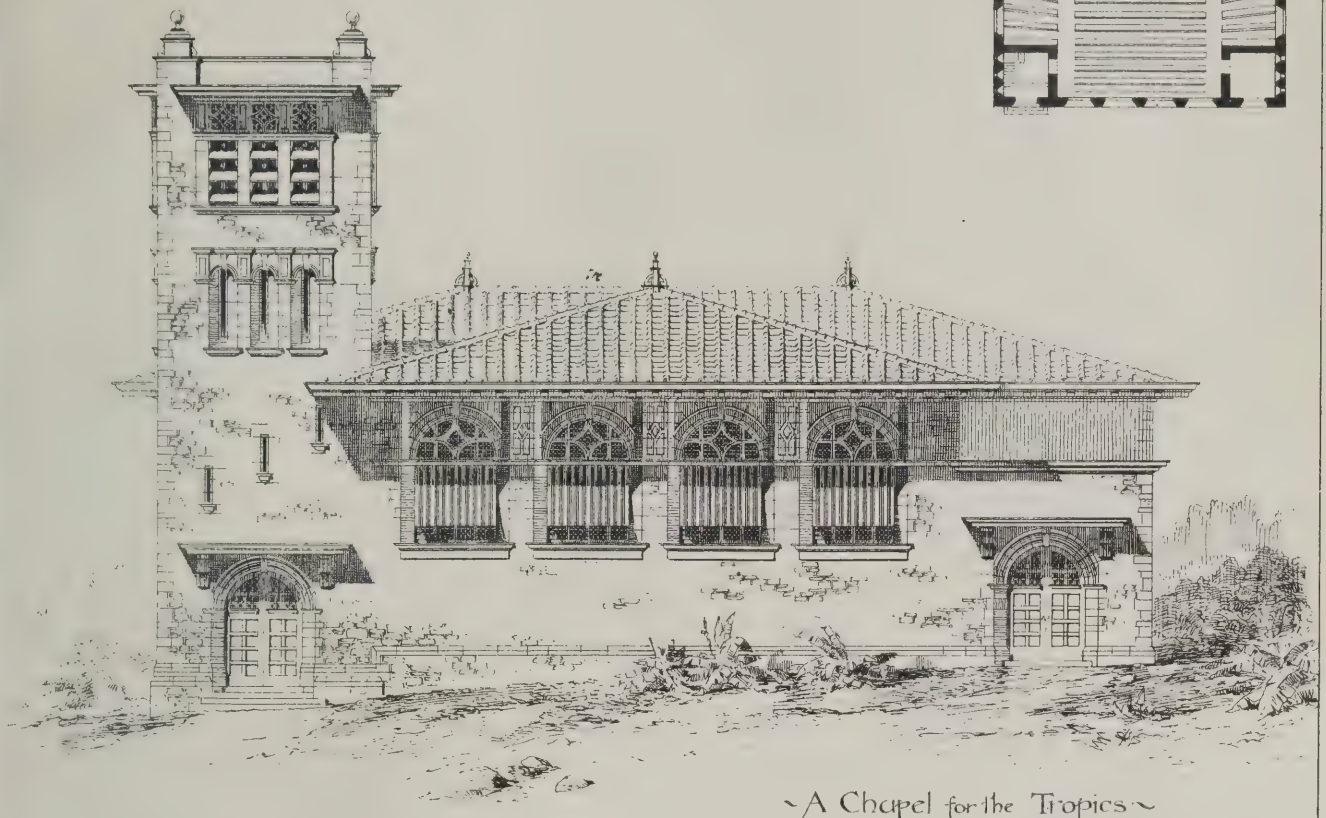
THE HOTEL DE VILLE, COMPIÉGNE.



"PHOTO-TINT," by James Akerman, 6, Queen Square London, W.C.

FROM A DRAWING BY ARNOLD B. MITCHELL, SOANE MEDALLIST.



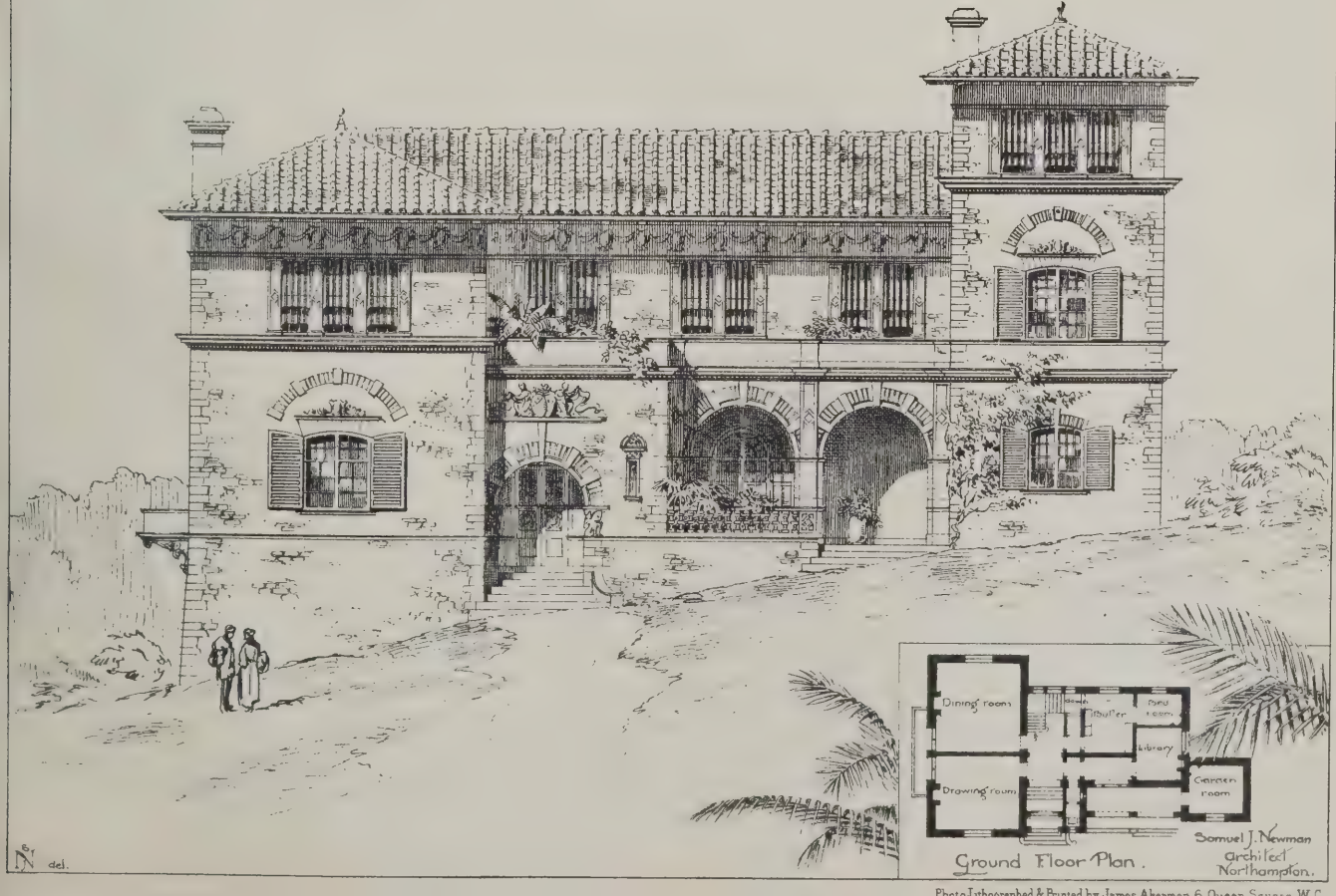


A Chapel for the Tropics.

S.J. Newman, Architect, Northampton.

SN del. 87.

A Mentone Villa.



Ground Floor Plan.

Samuel J. Newman
Architect
Northampton.

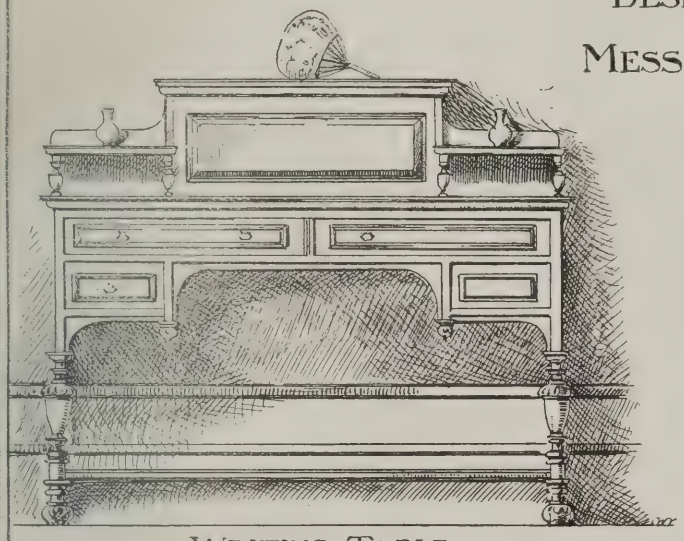
SN del.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

SKETCHES OF DECORATIVE FURNITURE

DESIGNED AND MADE BY

MESSRS HINDLEY & SONS



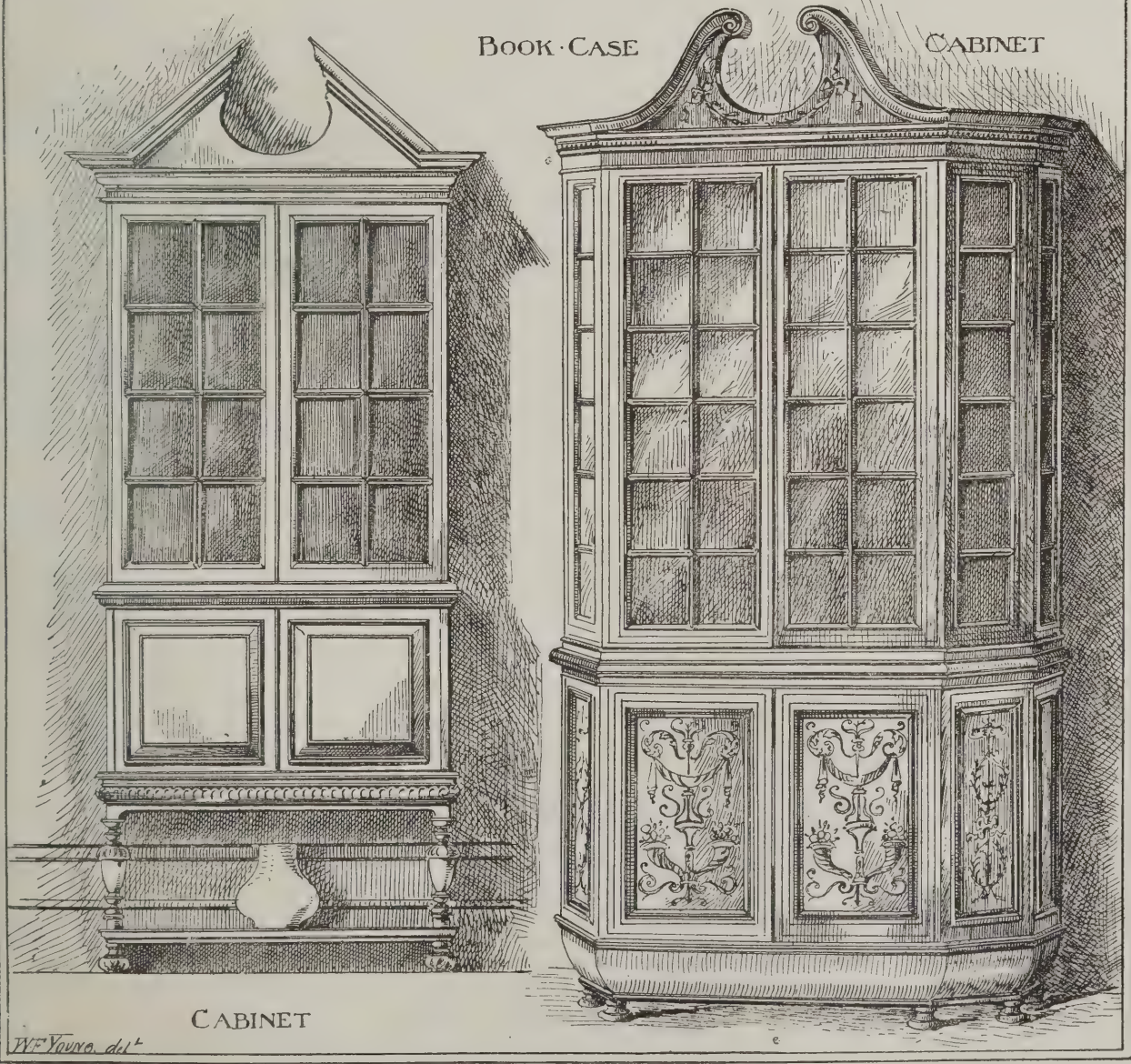
WRITING TABLE



HANGING SHELVES

BOOK CASE

CABINET



CABINET

W. F. Young. del.

WAYSIDE NOTES.

WHILST many devotees of the chase were being entertained at an old "hall" in Lincolnshire, some few days back, the demon that yearly devours so many of our ancient family mansions disturbed the revelries which one may conclude attended the return of those who may have followed the horn "on a (presumably) fine hunting morn." For old Irnham Hall has had a narrow escape from total destruction by fire. Happily, as I believe, the more elderly portions of the "fabrick" were saved. Still, we cannot afford to lose even Early Tudor work. Year by year our old baronial halls crumble away, or are destroyed by restoration, so-called; our manor-houses of whatever date, are reduced to ashes; and our Jacobean, Queen Anne, and Georgian buildings are gradually swallowed up by the growth of monstre-cities and finally ruthlessly pulled down to make way for the six-roomed cottages of Mr. —— well, of a gentleman whose name the reader may, peradventure, not be wholly incapable of guessing.

The entire north wing of Irnham Hall seems to have been destroyed by the flames. Chapel, library, nursery, dining and state rooms were, we read, well alight, and burning for some three hours before a "steamer" arrived, so it is to be feared that the destruction was of a very wholesale nature. Six hours of ravaging flames at a country mansion must surely have wrought great havoc. We read that the fire had evidently been smouldering some days previously, and that it originated through an oak joist near a chimney becoming over-heated.

Helas! How very many fires have originated in this manner; in spite, too, of the M. B. of W. regulations. But it would appear that we cannot sympathise with all who suffer loss from non-fireproof and non-smokeproof flues, since the carelessness of persons is at times astonishing. Some friends recently passing along a country lane observed smoke issuing from between the roof-tiles of a cottage by the road-side, and drew the attention of the occupier to the apparently alarming phenomenon. "Oh!" quoth this worthy, "It often does that" (!)

Mem. The architect will frequently come across cases where, in effecting alterations to old buildings, he has fondly hoped to obtain a bearing for a girder or beam of some sort only to find, to his exceeding chagrin, that an old flue has upset all his calculation, as, according to his plan, the timber would run into the flue. By the ordinary method of getting over this difficulty, he would use iron shoes of one kind or another. But a better method is, perhaps, to employ a slab of York stone with a hole the size of flue cut away in it. Pinned into the brickwork this forms a corbel support, infinitely superior to cast or wrought-iron shoes.

I see that the Metropolitan Board of Works will, in a Bill to be introduced into Parliament next Session, "ask for powers to inspect theatres, dancing and music-halls, and other places of public entertainment and resorts in the Metropolis; and to provide that they shall not be licensed for their intended purpose until a certificate has been obtained from the Board respecting the efficiency of their structural and other arrangements and appliances for the safety of the public, and for protection from fire." Other clauses as to further authority and power with regard to the houses and the public safety are asked for in this Bill. Whether this measure is exactly the thing required or not, it is certainly right that someone should have more authority over theatre lessees and others to prevent their greed of gain jeopardising the life of the play-goer.

On Monday night last the President of the Surveyors' Institution delivered his opening address. It appears that after three years from the present date no surveyor can join the institution without passing the examination imposed by its charter. At the present time some 15 per cent. of the whole of the members of the institution are such by voluntary examination.

In the course of the recent opening address at the Institution of Civil Engineers, the President put a very pertinent question to the meeting, and one which is interesting to the architect. "Where," said he, "would the works of past centuries have been now had they been of iron?" Durability, though not a recognised "lamp" of architecture, is yet a quality of the first importance. But no iron construction ever yet erected has this attribute.

Mem. In discussing the great iron question, it is useful, as I think, to ever bear in mind the first aphorism in the "Seven Lamps"—viz., that "architecture proposes an effect upon the human mind, not merely a service to the human frame."

The only effect that most architects' iron skeletons would seem to propose upon our minds, is that of a possible sudden collapse, and of fickle lightness and ephemeral nature. The President of the Institution of Civil Engineers evidently felt this, even as regards engineering works pure and simple. But more than this; he alluded elsewhere, with apparent regret, to the substitution in modern times of the flat-iron girder for "the graceful and time-honoured arch." Considering that this admission comes from the head and chief of the honourable and practical body of gentlemen in Great George-street, we need not be so quick to abuse the engineer for his want of sympathy in art matters.

I had observed, Sir, the query in the Intercommunication Column *re* "Early English Foliage," and I have also noticed the reply of your two correspondents. But it would appear to me that we are really little or no wiser now upon this matter than were they at the time when the late Sir Gilbert Scott wrote his "Personal and Professional Recollections"; for, as will be remembered, Sir Gilbert, in the pages of this work, relates how he made great efforts to discover the natural form of the peculiar typical Early English foliage in question. It appears that in the year 1853 or 1854 he delivered a lecture at the Architectural Museum on this subject; and he relates how he earnestly studied botany in the hope that it would assist him to discover the member of the vegetable kingdom that inspired the 13th-century carvers.

So fervently, indeed, did Sir Gilbert follow this "will-o'-the-wisp," that the subject troubled him in his dreams. "I remember," he says, "longing most earnestly to discover a leaf, from which one might suppose our Early English foliage to have been derived. The nearest I could find was an almost microscopic wall-fern, and certain varieties of the common parsley. One night I dreamed that I found the veritable plant. I can see it even now. It was a sere and yellow leaf, but with all the beauty of form which graces the capitals at Lincoln and at Lichfield. I was maddened with excitement and pleasure; but, while I was exulting and ready to exclaim 'Eureka! Eureka!' I awoke, and behold it was a dream."

For my part, I would humbly suggest that the living prototype of the peculiar foliage referred to cannot be traced to any one particular plant or vegetable growth; but that it may be looked upon rather as an embodiment of the abstract spirit of many natural forms—of innumerable wild plants—an abstraction of an abstraction; and that the foliage we now see is such as would come naturally to the sculptor to conceive who had wondered much in wood and dale, and had critically observed the wild plants that luxuriate on the mossy banks of forest glades and flowering hedge-rows. It is to be presumed that the old carver of the 13th century would migrate from city to city, and from village to village, as the necessity might be. And it will be allowed that he could not do so by "*train-de-luxe*," and that it is probable that the old craftsman "stumped" from place to place, and further, that in so doing he would often linger for hours together, in the thick woods that have long since been swept away. Amongst a wild profusion of plant-life he would infallibly draw many an inspiration direct from Nature, that would serve him in better stead than do our books and engravings serve our modern architectural sculptor.

There must be a world of difference in the articles produced on the one hand by the old habit of living and self-culture of the craftsman, and, on the other, by our modern school-of-art taught, and book and illustration-sodden art-workman. The former had nothing but nature as a guide, whilst the latter are dependent upon "examples," or they study nature at secondhand, where their more "primitive" forefathers went to the fountain-head. Our old sculptor would be compelled to draw his inspirations from common country-side plant-life. With every new journey he would replenish his mental storehouse with a harvest of beautiful forms, and in his conventional reproductions of simple plant life, he would day by day be nobly exalting the humble and the meek.

The Society of Architects is to be congratulated on the pleasant and prosperous commencement of its fourth year of existence in its new quarters at St. James's Hall. The rooms have been really well and economically furnished, and are cosy and comfortable. I only find fault with the carpet—it spoils all, and hinders sound; but it will wear out soon, and then the Council had better stain the boards or put down parquet or wood-block flooring. The address of the new President struck me as well thought out and instructive, though perhaps he laid a little too vigorously about the shoulders of that arch-culprit, the "art-architect." Glad to see the rapid increase recently in the Society's member-roll—nearly a hundred fresh members since last session. If the Society goes on like that, it may soon content itself with Registering its own members. Meanwhile I endorse the hearty wishes I heard the distinguished architect of the Brompton Oratory offer—albeit an Institute man—for its success. GOTH.

NOTES FROM EDINBURGH.

THE City Improvement Trust, constituted in 1867, has brought its labours to a satisfactory conclusion, financially and otherwise. The extent of their enterprise may be gathered from the final financial statement, which shows a twenty years' expenditure of very nearly £459,000, the receipts having exceeded this amount by about £1,160. Although improvement schemes have been almost constantly in operation since the old town became too small for the requirements of its growing population, the progress made during the last twenty years is greatly superior in every respect to that made in any similar period before. The growth of the city has been greater, and the character of the improvements of the period in question has had higher aims than meeting the necessary requirements of increasing population. Side by side with this, very much has been done for the embellishment and general amenity of the city. Private gardens have been opened to the public, with other grounds for recreation. The importance of retaining all that can be kept of the characteristic architecture of the old town has become a fixed principle. The old Classic mania having been exhausted, or, rather, having been found wanting in its adaptation to the ordinary street, and notably inferior to the older style, for a site consisting of hills and hollows, the successful completion of Cockburn-street by the Railway Access Company was the result. The public saw for the first time, and with delight, the old city architecture revived, in a grand procession of baronial castles from the new to the old town. Similar architecture followed here and there, as in Forrest-road, Leith-walk, &c., and this happy result was kept in view as a secondary aim of the Improvement Trust. In their extensive reconstructions in the old town the old Gothic of the town has been retained, and though generally less ornate than the designs of Cockburn-street, as being no longer homes of the civic and landed aristocracy, they form an enduring monument of the great care, and taste, and, skill with which the architects of the Trust, the late Messrs. Cousin and Sessels, had devoted themselves to the accomplishment of their task. Their greatest work in this line of operations was the conversion of St. Mary's Wynd into a wide thoroughfare now called St. Mary's-street. This, and its continuation to the north, known as Leith Wynd, divided the city from the Canongate, and was a good point to select for admitting air and light to the crowded land of tenements around. Leith Wynd is now a

thoroughfare with open space to Jeffrey-street, which starts from its connection with the High-street and winds westward to the North Bridge. The closes between this and the High-street have been very much curtailed and hundreds of unwholesome tenements swept away. Blackfriars Wynd, so called as the property, at least in part, of the Blackfriars Monastery beyond the Cowgate, has been widened by demolition of the houses on the east side, the west side being left untouched. This Wynd was the aristocratic quarter of the ancient town, clerical and lay, and in 1874 the Trust removed the house built by Archbishop Beaton and occupied by his son, the famous Cardinal. It was a good specimen of the fortified house of the period. The ground-floor chambers were vaulted, and had a quaint octagonal turret without any windows at the corner of the Cowgate; but the greater portion of the building had disappeared in the changes it had undergone after passing into other hands, and it showed nothing of architectural interest at all in keeping with the traditions of its history.

The operations of the Trust have also opened up a new street from Nicolson-square, Marshall-street, improving the small plot of garden ground and giving a much better aspect to the square.

Another principal part of their enterprise remains to be noticed in the new thoroughfare of Chambers-street, formed out of the demolition of North College-street and Argyle-square, and including access to the Cowgate, with the formation of Guthrie-street behind it, a line of improved dwellings for the working classes.

This part of the scheme has great architectural interest, as opening up to view the north side of the University, the proportions and designs of which may now be seen from the street, which is double the width of the ordinary thoroughfare. The buildings here are all of a highly ornate style, with somewhat ponderous Renaissance detail, and the old college looks severe and plain in the contrast. It might be of advantage to give it now some of the ornamental detail in stringcourses, &c., which the architect had not withheld from the side in South College-street.

Chambers-street is conspicuous by the palatial proportions of its shops at the east end and by the long frontage at the new Heriot-Watt College at the west. This latter is just finishing, and the doorway built by the Trust for the Watt School of Arts is being replaced by one more suitable for the larger building, which has had extensive wings added to either side.

This street connects the work of the Improvement Trust of 1867 with that of the preceding improvement scheme started about fifty years before it, and makes communication with the east and west of the new town complete. The improvements of the earlier scheme were mostly concerned with providing better means of communication within the city, and its principal work was the new road opened up from the west of the new town, round the Castle rock, and by George IV. Bridge to the meadows. It did not aim at or accomplish much in the way of reconstruction; but the lofty range of tenements between the Lacon Market and Victoria-street, with the Highland Society's buildings next the site of the new Free Library, were built by the architect of the Trust, the late Mr. P. Smith. These are in the Elizabethan style, of ornate character, and form an excellent adjunct to the old architecture of the High-street, with which they form no unpleasing contrast. The bridge erected by the Trust was originally intended to be kept clear of buildings on either side for three of its spans; but the demand for building sites has been too great, and when the new library is erected the street will be built closely up to the limits of the Cowgate and the single arch which spans it. Unfortunately, the buildings to the south of the bridge are all of the ungabled, commonplace street architecture of the modern town, and make a miserable finish to what had been so well begun, and what has been more lately carried out with excellent taste in the Scotch Gothic in Forrest-road.

The Trust have also done something for the improvement of the overcrowded spaces on the West Port by making a spacious thoroughfare of access at the head of it to Cambridge-street and improving Lady Lawson's Wynd. The old houses opposite King's stables, on the North side of the Grass Market, and which projected inconveniently, have been taken away, and the Robertson Memorial Buildings in the Scottish style, fill the vacant space, hitherto occupied by the inseemly and unsanitary erections.

The great object of the improvement scheme, however, apart from the formation of better thoroughfares, was sanitary, and it has done much to improve the localities where it has been in operation, if the statistics of mortality for the old town districts are to be relied on. The average rate of mortality for the city about 20 years ago was from 28 to 30 per 1,000, and is now from 18 to 20. The reduction of the rate is most perceptible in the returns from the old town, where the drainage improvements carried out in the north and south have no place to speak of in determination of results.

But the evil of overcrowded districts is not to be overcome by any one improvement scheme, and the sanitary labours of the Trust have been supplemented by private enterprise and in other ways. Then the new street, called St. Giles, swept away a number of insanitary dwellings, and as old houses are falling to decay they are generally replaced by dwellings in which the Guild Court have power to insist upon proper provision for the sanitary condition of the rooms and accessories.

The inauguration of the public baths is another factor in the same direction, and these have proved so popular that there is a talk of providing a similar institution for the populous districts in the west.

The 20 years of the Improvement Trust includes what will be long and well remembered as the school-building period, and though the Watt Institution for many years has given some technical instruction, with popular scientific lectures, it is only now that, as the Heriot-Watt College (its development), it can be said to provide a complete course of theoretical and practical study in commercial and industrial pursuits.

The commencement of the Free Library has been delayed, some legal difficulties as to the plans and site having emerged. It is another memorial of the period from which a new and better Edinburgh is expected to rise.

CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS AT CHICAGO.

IN the recent Convention of the American Institute of Architects held at Chicago several topics were discussed. The report of the Committee on Education was read. Mr. A. J. Bloor, who had charge of the school of architecture, gave a descriptive account of the courses pursued at the University of Illinois, to which we may refer. There are two courses of study now adopted. 1. The builder's course, composed of nine studies, intended for the benefit of builders and mechanics. 2. The architect's course, which requires four years of hard work. This course is now as follows:—First year: (1) Trigonometry, projection, drawing, shop practice, French; (2) analytical geometry, descriptive geometry, shop practice, French; (3) advanced algebra, graphical statics, shop practice, French. Second year: (1) Elements of wood construction, calculus, freehand drawing, and modelling; (2) elements of stone, brick, and metal construction, advanced analytical geometry, architectural drawing; (3) elements of sanitary construction, advanced calculus, water-colour sketching. Third year: (1) Architectural drawing, analytical mechanics, chemistry; (2) history of architecture, resistance of materials; (3) history of architecture, advanced descriptive chemistry, physics. Fourth year: (1) Æsthetics of architecture, perspective, history of civilisation; (2) Architectural designing, heating and ventilation, constitutional history; (3) architectural designing, estimates, agreements, specifications, political economy.

Mr. Adler read a paper on "The Paramount Requirements of Large Theatres." Referring to the means of ingress and egress, he said, "No allowance less than 3ft. for every two hundred persons in determining the width of aisles, doors, and stairways should be considered. A large number of narrow aisles is to be preferred to a small number of wide ones. Aisles should lead as directly as possible to doors. The corridors and lobbies should be of sufficient size to hold more than one-half o the audience. The stairways should hav frequent landings, and the exits should be s disposed as to tend to disperse the audience a rapidly as possible." Mr. M. E. Bell read paper on "The Paramount Requirements of National Building for Custom House, Judicial and Postal Purposes"; Mr. W. W. Boyington one on "Differences Between the Methods o Architectural Practice Now and Fifty Year Ago"; Mr. L. H. Sullivan, a paper on "Oper Houses"; and another by Mr. Wilson "O Where the Line of Demarcation Between En gineering and Architectural Practice is to b Found."

METROPOLITAN RAILWAY BRIDGES.

RECENTLY, renewed complaints have been made about the percolation of water through the brick arches and flat girder soffits of the bridges crossing streets in the metropolis. The other day reference was made to the subject in the House of Commons. Wherever these bridges exist much inconvenience is experienced by those who have to pass under them, owing to the constant dripping of water which finds its way through them during rainy weather. We called attention to this subject some years ago, and we believe something was done to mitigate the nuisance in certain quarters. There is much, however, remaining to be done to render these arches and vaults weatherproof and dry. Scores of vaults forming the viaducts of the South-Eastern, Chatham and Dover, and other railways are let at good rents for workshops, stores, and shops, but even some of these are liable to the same inconvenience. We public at any rate have a right to be protected from the drippings from the bridges over the pathways and roads; but we suppose the Metropolitan Board of Works are powerless to interfere. These railway bridges are by no means ornaments to the localities in which they occur, nor are they beneficial to houses near them. They invariably deteriorate the property. The noise and constant rattle and roar of the railway traffic, and the darkening of the thoroughfares, are serious hindrances enough without the dampness and rotten roadways which are found beneath these bridges.

There is greater reason then why the public should be protected from the nuisance of water coming through, and the Metropolitan Board of Works appears to be the right authority to enforce certain conditions in these structures over public thoroughfares. We can point to several such arches near Loughborough Junction, at Norwood, and elsewhere. The construction of these bridges is faulty. Various modes of covering the flat girder bridges are resorted to. Sometimes the spaces between the cross girders have iron plates like those seen under the bridge at Charing-cross carrying the South-Eastern line over the Embankment. At other places we find planking is used to carry the ballast, which get rotten and quickly let through the water. Of these soffits, the channelled or Lindsay's deck plating affords the best security, especially when the channels are filled up with concrete and asphalted. Generally over the footways we meet with an expedient for carrying off any water that comes through in the shape of plates of corrugated iron, which are sloped to the abutments, and fall into a gutter; but experience has shown what very temporary remedies these are at the best. Their unpleasant rattle as a train passes over is well known by the London pedestrian.

The brick arch or vault is equally subject to percolation. Here the fault lies with the "backing" and construction. If it was properly filled up over the piers with concrete, on the spandrels, and a drain carried through the pier from the lowest point of the backing, the arch would be properly drained. But the imperfect construction and the stoppage of the drain-pipes causes the spandrels to become saturated after a rainfall, and the water to find its way through the mortar joints and brick rings of the arch. The only proper way to prevent percolation of moisture is to shape the backings to proper outlets, and thoroughly cover the surface with the best asphalte, say the "Seysell" (Claridge's). One or two good layers of ¾in. asphalte over the crown, sloping

down to the invert curve over the piers, and carried up the spandrel walls of bridge, would effectively prevent the percolation of water through the brickwork. This precautionary measure ought to be made compulsory upon all railway bridge contractors. Every vault through a town, and especially those over the public streets, should be so treated. The flat girder bridge above the soffit should form a perfect tray of asphalte, of course draining to proper outlets. These precautions are not likely to be carried out till the public call attention to them, or till those who have vested interests in the neighbourhood of these arches complain. The Board also notify their intention to ask for leave to bring in a Bill empowering them to make a new tunnel instead of the one authorised by the Thames Tunnel (Blackwall) Act of 1887. It is proposed to construct the new tunnel on the western side of the one authorised by the Act of last Session.

ST. CUTHBERT'S CHURCH, KENSINGTON.

THE Bishop of London has appointed to-day at 8 a.m. for the consecration of this important new church, which, with its adjoining clergyhouse, has been erected from the designs of Mr. H. Roumieu Gough, of Carlton-chambers. The building, which provides accommodation for 950 worshippers, consists of chancel 28ft. 6in. by 42ft., nave 28ft. 6in. by 87ft., north and south aisles 12ft. 6in. wide, morning chapel 16ft. 6in. by 42ft.; sacristy and organ-chamber on the ground floor, and large vestries for clergy and choir in the crypt, which is formed under the whole of the east end of the church, and which contains also a room for public meetings or Sunday school-purposes 28ft. 6in. by 40ft., and a large mortuary chapel. The style of the building is Early Decorated, the facings being of red brickwork, and the dressings, both externally and internally, of Corsham stone from the quarries of Messrs. Randall and Saunders. The contractors for the works were Messrs. S. Belham and Co., of Buckingham Palace-road. The most noticeable features of the interior are the east front and the flêche. The former is remarkable as having no window openings; the gable end rises to a height of 75ft., and is flanked on each side with octangular stair turrets leading to the parapet gutters. Between these turrets is a lofty and boldly-moulded arch which incloses two tiers of niches for life-size statuary. The flêche, which contains a sanctus bell from Messrs. Taylor's foundry at Loughborough, is a tall and graceful feature, having a height of 70ft. above the main roof. The spire, with its numerous crockets, finials, gurgoyles, &c., is covered with copper, and this was intrusted by the contractors to Messrs. Ewart and Son. At for the west end of the nave is a bell gable for three bells, one only being at present provided. The interior of the church has an imposing effect, owing partly to its well-proportioned arcades of seven bays on each side, five being in the nave and two in the chancel. These are surmounted by a lofty clerestory, and the whole is covered with a barrel vault with moulded ribs; but this greatly needs decorating. Certainly the most striking feature of all on entering the building is the lavish use of polished Devonshire marble in the clustered columns and responds supporting the arcades, which, together with their richly moulded caps and bases, were supplied by Messrs. J. and E. Goad, of Plymouth. The detached shafts are all monoliths of rare beauty, and are the largest ever sent from these celebrated quarries. One would suppose that these alone would cost more than many a parish church; but we are informed by Mr. Gough that had he used Portland stone instead the saving would have been far below £1,000. The polished marble steps in the chapel, and the columns for the pulpit and sedilia, are also from Messrs. Goad's works. The heating is by Messrs. Musgrave's slow-combustion air warmer. Some very beautiful stained-glass windows are provided in the baptistery, designed by Mr. Kemp, and others are to be put in the morning chapel at once. Messrs. Tomes and Wimpey were the sub-contractors for the stone work; and all the elaborated and deeply undercut mouldings are well executed. The carving throughout is very admirable. This was intrusted to the Baron Felix de Sziemanowicz, of Hurley-road, Kennington, who also has carried out the Caen stone pulpit, and has in hand the sedilia, piscina, &c. Mr. Cassé acted as foreman from the commencement of the works in 1884 until his removal to the Aberystwith College a few months ago, since which time Mr. Bourne has proved an able substitute.

Mr. Gough's new church of St. Lawrence at Catford Bridge is to be consecrated by the Bishop of Rochester to-morrow (Saturday); but we reserve our description of the building till next week.

BOOKS RECEIVED.

Handbook for Steam Users. By M. POWIS BALE. (London: Longmans, Green, and Co.) This useful little work, published at half-a-crown, contains succinctly arranged rules for engine-drivers and boiler attendants, also notes on steam-engines and boiler management, and steam-boiler explosions, with hints on how to prevent them. The work is an expansion of the author's "Chart of Rules for Engine-Drivers," and contains in a small space much reliable information.——*First Aid to the Injured—The Ambulance Pupil* (London: Crosby Lockwood and Co.) is a pocket handbook giving, in a concise form, what should be done in the case of accidents by non-professional persons before the arrival, or in the absence, of a medical man.——*Transactions of the St. Paul's Ecclesiological Society.* Vol. II. Part II. (London: Alabaster, Passmore, and Sons.) The new volume of these *Transactions* contains the full text of the papers read before the S.P.E.S. last session, including Mr. B. Edward Ferrey's valuable lecture on "Symbolism in Ecclesiology"; an account by the Rev. C. L. Acland of "The Most Remote Church in the British Islands," the ruins of a Celtic church on the Seal Skerry, beyond Rona, and nearly 50 miles north-west of the Island of Lewis; "An Architect's Views on Modern Church Building," by Mr. H. Roumieu Gough; "English Mediæval Chalices and Patens," by Mr. W. H. St. John Hope, with many illustrations; "The Ecclesiology of the Roman Catacombs," by Mr. Charles Browne; and "Some Little Known Churches near London," by Mr. W. Bolton. Many of these lectures were reported at the time of delivery in our columns. Among the illustrations are a new plan of the Charterhouse, London, on a scale of 44ft. to 1in., by Mr. R. H. Carpenter, redrawn on stone by Mr. Thos. Garratt, and the restored apse of St. Bartholomew's, Smithfield.——In the *Architectural Association Notes* for November, the Editor, Mr. Herbert D. Appleton, deals with the subject of the proposed affiliation of Provincial Associations with that body, remarking that among the advantages it would afford the branches would be (1) greatly increased facilities for obtaining technical books by the use of the lending library; (2) the formation of classes for study in connection with the London classes; and (3) great increase in the stability of the Provincial Associations. A sub-committee of the London A. A. is now engaged in framing rules for the affiliation of branches. Other features of the *Notes* are illustrated accounts of a town in Calvados and the A. A. Excursion to Italy by Messrs. R. A. Rix and Ernest Mallet, and an account by Mr. R. Phené Spiers' of the way in which he and his companions, the Messrs. Goddard, of Leicester, were followed and questioned by officials at every town and village during a recent sketching tour in France under suspicion of being German spies, and Mr. W. M. Fawcett contributes some notes on "Architecture on the Norfolk Broads."——*Textbook of Projectional Solid Geometry.* By W. E. CROWTHER, Science and Art Master. (Manchester: John Heywood). This appears to be an improved textbook or system of learning plane and solid geometry. The author—judiciously, we think—has given precedence to solid geometry, and so has called out the imaginative powers of the student before he is taxed with the subject of plane geometry. To the student of architecture especially, and all to whom the exercise of the constructive imagination is essential, solid geometry is one of the best preparations. As the author says, it is much easier for the student to pass from solid geometry to plane than from plane to solid. The author has selected the problems with an intelligent regard to the principles involved in their construction. For the elementary stage of the examination of the Science and Art Department, Mr. Crowther's little book will give all that is necessary; the diagrams are well engraved, and the examples concisely worked out. A section on plane and arithmetical geometry follows.——In a pamphlet entitled *Strata Florida Abbey*, Mr. STEPHEN W. WILLIAMS, F.R.I.B.A., has reprinted from Vol. IV. of the "Archæologia Cambriensis," his report on the excavations made under his supervision this spring on the site of this abbey. The ground-plan outlines and general dimensions of the church were ascertained during the work, and it was found that Strata Florida was larger than any other Welsh cathedral, abbey, or church, with the exception of Abbey Cwmhir, the measurements being a total length of 213ft., of which the nave constituted 131ft. 6in.; breadth across nave and aisles, 61ft.; ditto across the transepts, 117ft. 3in. by 28ft. deep; while the choir was 52ft. 6in. long by 28ft. across. Of the present building, the only portions of walling above ground when the excavations were commenced were part of the west front and the north-west angle of north transept. The abbey, Mr. Williams shows, was founded by Rhys ap Gruffydd, Prince of South Wales, and was built between 1150 and 1203. Four kinds of stone were used in the work, which was, as at St. David's Cathedral, executed in alternate bands of coloured stone, and the plan and general design bear a striking resemblance to the portion of that cathedral built by Bishop de Leila after 1176. The excavations have yielded some fragments of carved work and glazed tiles. A ground plan of the abbey and a reproduction of Buck's view of the ruined west front as it appeared in 1741 accompany the report.

CHIPS.

At the meeting to-day (Friday) of the Metropolitan Board of Works, the Works Committee will recommend the board to contribute £1,000 per acre towards the purchase of Carron House, in South Lambeth-road, and of Raleigh House, Brixton Hill, as public pleasure grounds. To this Mr. F. H. Fowler will move as an amendment that the board contribute £1,500 on condition that the Lambeth Vestry contribute a like amount.

The Royal Commission on Irish Public Works has concluded taking evidence on the subjects of fisheries, harbours, and railways, and will proceed to the preparation of a report dealing with those subjects.

The bells of the parish church of Elham, East Kent, were rung on Monday after 12 years' silence. The spire in the tower, which was considered dangerous, has been entirely rebuilt by Messrs. Warners and Son, of London. Mr. Joseph Clarke, F.S.A., of London, was the architect, and the outlay was £750.

A large clock with three dials, each 4ft. 6in. across, has just been completed at Bladon Church, near Blenheim, Oxfordshire, by John Smith, Midland Clock Works, Derby. It was started by the rector and churchwardens on the 10th inst.

A grant not to exceed £150 has been made by the Senate of Cambridge University from the Worts Travelling Scholars' Fund to Mr. H. B. Smith, B.A., of Trinity College, for the purpose of archæological research in Cyprus, on condition that the objects obtained by means of this expenditure become the property of the University, and that Mr. Smith furnish a report on the results of his researches to be published.

The Dowager Lady Penrhyn has placed in the church of St. Tegai, at Llandegai, a five-light east window, representing the Ascension, in memory of her husband; while Lord and Lady Penrhyn have presented a reredos in memory of the late nobleman. The subject of the sculptured panel is the Resurrection, treated after the manner of Fra Angelico. The walls of the chancel are to be treated with mosaic subjects similar to those in Chester Cathedral.

A large clock and chimes have just been erected in the parish-church of Hope, in the Peak of Derby. It strikes the hours upon a large bell, and chimes the Westminster quarters upon four bells. It is fitted with all the latest improvements. The work has been carried out by Messrs. John Smith and Sons, Midland Clock Works, Derby.

The inaugural meeting of the winter session of the Architectural Section of the Glasgow Philosophical Society, was held on Monday night, when an introductory address was given by the president, Mr. James Thomson, F.R.I.B.A., on "The Architecture of Glasgow during the last Fifty Years."

Building Intelligence.

BRISTOL.—On Wednesday evening the ex-Mayor of Bristol, Sir George Edwards, laid the top stone of the tower of St. Agnes' Church. The tower was illuminated with the electric light. The church was consecrated in March, 1886. After an interval of fifteen months the tender of Mr. A. J. Beavan to complete the tower for £1,720 was accepted, and the work was commenced early in June. The height of the tower to cornice is 94ft., and to top of turret 130ft.; the width is 20ft. The octagonal turret, which is 36ft. in height from the cornice, is richly carved. At the angles are crockets and finials; pinnacles, 18ft. in height, rise from the other three corners of the tower. The tower is constructed of tinted Pennant stone from Fishponds, with dressings, battlement, and turret of Box-ground stone. Mr. W. Wood Bethel, London, is the architect; the carving was executed by Messrs. Davey and Bushell, Bristol; and Mr. G. Downs has acted as clerk of the works. The total cost of the church, including fittings and site, has been £9,520.

CHESTER.—A consistory court was held at Chester Cathedral on Friday week. The vicar and wardens of the parish church of Waverton were granted a faculty to take down and rebuild the present north wall of the church, to erect a new chancel screen, to put in a new heating apparatus, and generally to repair and restore the church. The estimated cost was £600.—The vicar and wardens of St. Paul's, Macclesfield, applied for a faculty to remove the organ from its present position to the east end of north aisle, to re-arrange seatings, and erect choir stalls near the organ, at a cost of £120, defrayed by voluntary contributions. The faculty was decreed.—The vicar and wardens of St. Mary's, Liscard, applied for a faculty for the erection of a peal of eight bells in the tower of the church, for the erection of an iron screen across the tower arch, and the expense (about £600) to be borne by Mrs. Brooks. The faculty was decreed.

HUCKNAL TORKARD.—The Duke of Portland laid on Monday last the memorial stone of the new chancel and north and south transepts which are being added to the parish church of Hucknal Torkard, Notts. Mr. R. C. Clarke, of Nottingham, is the architect, and Messrs. Fish and Son, of that town, have taken the contract at £3,734. Some opposition has been raised to the scheme on the ground that it might interfere with Byron's tomb, but it is stated that this will not be disturbed, and the block of marble sent for the purpose by the King of Greece, and embellished with a laurel wreath wrought in brass by Mr. Richard Belt, which marks the poet's grave, as well as the tablet to his memory, and the mural monument in memory of his daughter, Lady Lovelace, will, after the restoration, occupy the same positions relatively to the grave as they now do.

MANCHESTER.—A consistory court was held on Friday week. A faculty was granted to the wardens of Holy Trinity, South Shore, Blackpool, to allow them to take down the east end of the church, including the transepts and a portion of the nave and chancel, for the purpose of extension. The estimated cost of the alterations was £4,800, and the accommodation will be increased by 300 seats.—A faculty was also decreed to the curate-in-charge and churchwardens of St. Michael's, Flixton, to enable them to enlarge the burial ground, and to rebuild or restore the church tower, which is unsafe, from the present belfry. The cost of the latter work will be about £1,600, and Mr. W. S. Crowther, of Manchester, is the architect.

ST. HELIER'S, JERSEY.—The church of St. Thomas, recently erected by the French Fathers Oblates of Mary Immaculate, was solemnly opened on Sunday week. The edifice is not yet complete, but is sufficiently advanced to be used. The church, which seats 2,000 persons, occupies a site adjoining the parish schools of the Christian Brothers. The style is French Pointed, of the 13th century. The ground plan comprises a nave with side aisles and two transepts, forming a Latin cross with the chancel, which has two side chapels. There is also a sacristy on either side of the chancel. Behind the high altar will be placed a group of sculpture representing the Apparition of the Sacred Heart to the Blessed Margaret Mary Alacoque. The tower of the church is placed at the east end, and exactly in the axis of the building. On either side are two small chapels, one of which will serve as the baptistery, while the other will contain a representation of the Grotto of Our Lady of Lourdes. Over the principal entrance there is erected a tribune, intended to hold the organ and extra choristers. The arcades of the nave and choir are supported on either side by nine clustered columns of Caen stone, each surmounted by a carved capital. The height of the nave is 60ft. from floor to roof; of the side aisles 30ft. The vaulting of the roofs in the nave, transept, and principal chapels thereof is of stone with moulded ribs. The walls are strengthened interiorly with buttresses, which form compartments, in which are placed the confessionals. The entire height of tower and spire will be 196ft. The altar of the Lady chapel is already in position, and is of white, slightly veined marble. The pulpit, the benches, and the confessionals are of dark oak, carved and varnished. The windows will be filled with stained glass. The architect is M. Alfred Frangeul, of St. Malo, who has already carried out in Jersey the Convent of the Dames de Saint André, the Church of St. Matthew, situate in the outlying parish of St. Laurent, and a Convent of the same order adjoining St. Matthew's.

WAINFLEET, ALL SAINTS, LINCOLNSHIRE.—A new chancel, with organ-chamber and vestry, have been erected here, having walls faced with white bricks, with Bath-stone dressings. The old east window and two side windows from the cruciform church, pulled down in 1809, have been refixed. A new chancel arch of bold Perpendicular design has been built; also arches to aisle, and organ-chamber. The roof of pitch pine, is divided into three sections by moulded principals springing from carved corbels. The floor is of Wilkinson's granitic specular paving and white Mansfield steps; the stalls of pitch pine, with solid ends and moulded framing. The expenditure thus far is £850, but it is contemplated to reseat main edifice at a cost of £300. The carving was executed by Mr. S. Allen, of Holloway, London. The work has been carried out by Mr. John Holmes, of Wainfleet, from the plans, and under the superintendence of, Mr. J. B. Corby, architect, of Stamford.

WEDNESBURY.—The Bagnall memorial chapel and four new vestries, recently added to St. James's Church, Wednesbury, were dedicated on Saturday. The new chapel is on the north side of the chancel, with which it is connected by an arcade of three arches. It is fitted up with an altar and piscina, and above the altar hangs a copy of Rubens's "Descent from the Cross," the gift of Mrs. J. N. Bagnall, below a rose window. The chapel is 33ft. long by 21ft. wide, and will seat 100 worshippers, raising the total accommodation afforded by the church to 835. The vestries are ranged round the east and south sides of chancel, and comprise churchwardens' vestry, 14ft. by 9ft.; priests' vestry, 16ft. by 9ft.; choir and guild's vestry, 46ft. by 9ft.; and sisters' vestry, 12ft. by 9ft. The exterior is faced with ashlar stonework from Codsall quarries. The architects are Messrs. Horton and Scott, Wednesbury, and the builders Messrs. B. Clarke and Co., Birmingham; and a new heating apparatus has been inserted. The cost has been about £1,300.

WINCHESTER.—The restoration of the rich upper portion of the altar screen at Winchester is now completely finished. Since the contract works carried out by Messrs. Trask were brought to an end about three months ago, the Dean and Chapter have carried on the restoration in their own yard. In these three months the whole of the cresting of the two wings has been made good, involving the fitting in of more than sixty pieces of carved stone; and eighty-four pinnacles and gable ends, richly carved and crocketed, have taken the place of the plaster finishing which had long done duty for stone. The whole has also been cleansed, and the masons are now engaged in fixing the canopies and pedestals for the side niches, destined to carry the smaller statues. These, which will entirely change the appearance of the side splays, are twenty-six in number. It is believed that the whole of the stonework, if means a found to carry on the work, will be complet before Midsummer next. The Cathedral Cor mittee has recommended to the Dean a Chapter that the statues in the "Jacob M morial" portion should be all wrought by M Nicholls, of Wincott-street, London.

COMPETITIONS.

LUDLOW.—For the proposed market-hall, th town council recently received 21 sets of plan From these the committee, assisted by M Thompson, of Hereford, selected and recom mended the award of the first premium of £2 to that numbered 13 by Mr. Straight; th second, of £15, to Mr. Thomas M. Lockwood, o Chester; and the third, of £10, to Mr. Price The town council has adopted the report.

MAIDSTONE ASYLUM.—The final stage in th long-pending competition for the new boroug asylum for Maidstone, proposed to be erecte on Abbeygate Farm, East Farleigh, has now been reached. It will be remembered that in May last Mr. H. Saxon Snell, F.R.I.B.A., the assessor to the Maidstone magistrates, reported that of the 48 designs sent in, the first prize should be awarded to "No. 31," although, he added, "I am bound to say it is much more expensive than the other designs." "No. 31," it has since been ascertained, was by Mr. Edward W. Stephens, of Maidstone. "No. 33," by Mr. E. B. Oliver, Guildford-street, W.C., was placed second; and "No. 24," by Messrs. Coulthurst and Booty, of Derby, third. Mr. Snell was then asked by the magistrates to report upon the plans estimated to cost £30,000 (nine in number); but he pointed out that this would be unfair, as no distinct limit of cost was stated. It was complained by the magistrates that some of the instructions to architects had been infringed by some competitors; but Mr. Snell replied that he had already decided that the competitors had done right in obeying the spirit rather than the letter of the regulations. Subsequently to the return of the rejected designs and the announcement of the name of the successful competitor, the magistrates received numerous letters from competitors complaining that Mr. Stephens had not kept his buildings within the part of the site marked red, and decided to invite the competitors to return their designs for a re-examination. Thirty-four of the forty-two competitors complied, and the designs were again scrutinised by the committee, and afterwards, by the assessor, who found that only two of the thirty-four had substantially kept the buildings and airing-yards within the red portion of site; four others had kept the main buildings only within the red space; in the other twenty-eight plans the buildings are not within the space. Further, Mr. Snell found that not one of the competitors had strictly complied with all the regulations. The magistrates have, therefore, adopted Mr. Snell's recommendation, and have requested Mr. Stephens to report how his design can be much lessened in cost by the reduction of some superfluous accommodation. All the other plans are to be sent back, carriage paid, and with an expression of thanks, and accompanied by a copy of Mr. Snell's three reports.

At a meeting of the St. Paul's Ecclesiological Society, held on Wednesday evening at the Chapter House, St. Paul's, a paper was read by Major Alfred Heales, F.S.A., on "The Ecclesiology of Gothland." The lecture treated upon the archaic characteristics of and peculiarities of the churches of this little-known island, and was illustrated by numerous photographs, specially taken for Major Heales, and by rubbings of brasses. Remarks were afterwards made by Mr. Charles Browne, the chairman, Dr. J. S. Phené, who accompanied Major Heales in his visits to Gothland, Mr. G. H. Birch, and others.

It is stated that a site is about to be acquired in the interest of some of the seceders from the Grosvenor Gallery for the erection of a new picture gallery, of which Messrs. Comyns Carr and C. Hallé will have the management, and in which the original Grosvenor traditions will be as far as possible kept up. If the negotiation succeeds, the new gallery will be completed in time for the spring exhibition season.

Mr. E. Thorrold, of Stockton, was elected on Tuesday surveyor to the Redditch local board at a salary of £150 a year.

Engineering Notes.

Manchester Ship Canal.—The first sod of this undertaking was cut by Lord Egerton of Tatton at Eastham Ferry on Friday. The canal will be 26ft. deep, and will have a minimum width of 120ft. The only section now in progress is that from the outlet into the Mersey at Eastham to Ellesmere Port, some 4½ miles inland. The lower portion of the works, which are entirely in Cheshire, are being undertaken first in order that the canal may be worked as portions are finished. Mr. T. A. Walker, of London and Manchester, the contractor, has divided the canal works into nine sections of 4½ miles each, and on the Eastham section over 2,000 men will presently be fully employed. Taking this section as an illustration, the canal will require for the next four years the services of 20,000 persons. Mr. Walker's contract for the canal is six millions. Mr. Leader Williams is the chief engineer of the company, Mr. J. Abernethy the consulting engineer, and Mr. W. Hunter, the assistant engineer. Mr. Walker has brought together an immense plant, including, on the present section, fifteen locomotives, numerous steam excavators and cranes, and a daily increasing supply of timber, steel rails, and waggons. For the last-named requisites the Ashbury Railway Carriage Co., Openshaw, Manchester, have contracted to deliver 100 waggons each week till May next. Mr. Walker is locally represented by Mr. Topham, of Manchester, and by Mr. Manisty, the district agent for the first section.

The Forth Bridge.—During the past two months satisfactory progress has been made at this bridge. With the stoppage of the greater part of the night work, however, the same rapidity will not be observed during the winter months. The pick of the men engaged on the night shift have been retained for day work; but about 500 men have been dismissed, and the total number of persons now employed is a little over 3,500. The riveting of the top members between the vertical columns on either side of the Forth has been completed, and already 60ft. of work beyond this has been accomplished. Steam and hydraulic cranes are being placed in position on the top members, for the purpose of raising material from the bottom, a distance of 360 or 370ft. These cranes are moveable, and will be slid down as the work proceeds on the slope. The superstructure of the vertical columns on the three piers has been finished, the riveting having been completed a few days ago. Messrs. Thomas Aimers and Sons, engineers and moulders, Galashiels, have been turning out some heavy castings for the bridge works, ranging from 7 to 13 tons.

CHIPS.

A Congregational school, Italian in style, has just been opened at Wibsey, near Bradford. The cost was £2,400, and the architect was Mr. S. Robinson, of Bradford.

A new theatre, seated for 1,200 people, has just been completed at Crewe from plans by Mr. Alfred Darbyshire, of Manchester.

The new town hall at Stourbridge presented by private donors at a cost of £5,000, was formally opened on Monday. It has been erected from designs of Mr. Thomas Robinson, of Stourbridge, selected in competition, by Mr. John Guest, contractor. It is Renaissance in style, 76ft. by 46ft., and 38ft. high, and is built with red bricks and dark red terracotta dressings, both supplied by Messrs. Joseph King and Co., of Stourbridge. In unison with the town hall, and also from Mr. Robinson's design, the Improvement Commissioners are erecting town offices, fire-brigade station, and corn exchange, at a cost of £2,400, and in the centre of the whole block of buildings, a tower is being erected 100ft. high.

Irnham Hall, near Grantham, Lincolnshire, was on Saturday evening destroyed by fire, the damage exceeding £13,000. The mansion was erected about 1510, and was a fine example of the Tudor style. Irnham was one of the fifteen manors given by William the Conqueror to Ralph Paganet.

Mr. John Paterson, the newly-elected Provost of St. Andrews, N.B., has offered to construct an esplanade at the Links at his own cost. The scheme includes an addition of nearly three acres to the Links protected by a concrete sea-wall, and will probably cost the donor about £1,200.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham and Midland Institute.—Professor P. Gardiner, Litt.D., lectured before this Institute on Monday on "Some Early Athenian Vase Paintings." The lecturer said that the early art of Athens differed from the art of Mediæval Italy and that of modern Japan, in that it was not derived from elsewhere, and was of greater truthfulness and promise. Art had had many nurseries, but only one mother, and that mother was the land of Homer, of Æschylus, and of Phidias. We had no Greek paintings which gave us a just idea of what Athenian pictures were at their best, and in particular there was a scarcity of early examples. We could, however, glean some idea of the painter's art in the 5th century from a study of the coloured drawings which some artists of the time executed on terracotta vases placed in the tombs of the dead. They were executed by Polygnotos, the reputed master of Phidias, by Euphroneus, and others, and extended over a period of about 100 years, beginning in 480 B.C. After the date of 400 B.C. the art of vase-painting, in the opinion of archæologists, declined. The drawing became freer, the subjects more varied, the groups more complicated, and the perspective more manifest; but the clearness, brightness, and severity which marked the earliest paintings disappeared, and with them the care and finish of execution.

Birmingham Architectural Association.—The first ordinary meeting of the current session was held in the library at Queen's College on Tuesday evening. Mr. W. Doubleday, vice-president, took the chair. Eleven gentlemen were nominated for membership. A paper was read by Mr. J. W. Bradley, B.A. (Lond.), entitled, "A Gossip about Old MSS." The lecture was illustrated by many fine examples from illuminated manuscripts. A vote of thanks, proposed by Mr. Doubleday, and supported by Mr. W. H. Bidlake and Mr. Victor Scruton (hon. sec.), was unanimously accorded to Mr. Bradley for his very erudite analysis of this once famous art.

Edinburgh Architectural Association.—The opening meeting of the association was held on Thursday, the 10th inst., in the new Architectural Hall of the Association, 42, George-street, Edinburgh. Mr. Hippolyte J. Blanc, the president, delivered the opening address, the subject being the "Architectural Student," with reference to his professional training. He reviewed the position of the architectural student at a time previous to fifty years ago—when his training was practical, but when, with more leisure for master and pupil to come into relation with each other than in the present, the school was a good one, as evidenced by works of which that city could claim many examples. He contrasted with this the position of the student of the present day, who had many advantages that the student of fifty years ago did not have. The literature of the profession had been greatly increased and cheapened. It was during the last fifty years that the text-books on the theory and practice of architecture had been published; and in addition almost all the works on sanitary science, materials, and construction had been published since 1870. Further, the architectural societies had come into existence within the past fifty years to improve the means at the command of the student. At the same time more was required of the architect of to-day than had been in the past. The whole circle of sciences were of use to him, while with all his advantages there was no systematised course of study available for him, and the president, accordingly, urged the necessity for a well-directed course of study on the part of the student, concurrent office practice, and University recognition. There were schemes of instruction in London, but they wanted academic combination and organisation, and in that city he enumerated valuable aids to the training of the architect in the Museum of Science and Art, the Fine Art Chair at the University, the School of Design, and the Heriot-Watt College. It was imperative, however, that something more should be done for the student, and he threw out in this connection a suggestion as to a Scottish Institution of Architects. In Great Britain they were far short of the liberal system of the French schools, and he raised a question as to whether the Royal Scottish Academy might not be approached to give lectures or otherwise, that the services of some eminent architect or artist might be secured for that purpose. He urged too, in closing, that much might be done if the Edinburgh University were to grant a degree in architectural science. At the close Mrs. Blanc presented the prizes won in the classes conducted under the auspices of the association. Professor Baldwin Brown, in moving a vote of thanks to the president, said that, speaking with authority, he felt quite sure that the Senate of the University would be only too anxious to further in every way a movement in which they would so heartily sympathise. Mr. D. W. Stevenson, R.S.A., supported the chairman's suggestion as to a Scottish Institute. As regarded the proposal that the Royal Scottish Academy should meet the needs of the association, he pointed out that the academy had its own claims to meet, but he suggested that they might ask. In that way they would get something sooner than if they did not ask at all.

Royal Scottish Academy.—The annual meeting of this Academy was held at Edinburgh on the 9th inst., the president, Sir W. F. Douglas, in the chair. The council for the ensuing year were elected as follows:—Sir Wm. Fettes Douglas, president and trustee; D. W. Stevenson, Waller H. Paton, John Hutchison, Otto T. Leyde, W. F. Vallance, Robert Herdman; George Hay, secretary and trustee; John Hutchison, treasurer and trustee; William M'Taggart, trustee; Robert Herdman and Robert Gibb, auditors; Otto T. Leyde, librarian; W. F. Vallance and D. W. Stevenson, curators of library; Otto T. Leyde, Robert Gibb, W. D. M'Kay, and J. Lawton Wingate, visitors of the Life Academy; and Clark Stanton, curator of Life School. The annual report, which was submitted, gave a *résumé* of the year's proceedings. The librarian and curators reported the addition of a number of art books and prints to the library. The visitors of the Life School reported its continued prosperity. The average daily attendance was nearly 35, as against 26 ten years ago. A very marked improvement was noted in the studies in colour during the past session, although (especially in the drawings) in regard to the purity of outline there was still much to be desired. The council awarded the prizes as follows:—The Chalmers Bursary, John Briggs and W. Marshall Brown, equal; for the best drawing from the life, David Noble; for the second best, Alexander Hay; the Keith prize, for the best work of a student in this year's Exhibition, Duddingston Herdman and William Fraser, equal; Maclaine Watters medal and extra prize, W. Milne; the Stuart prize, G. Denholm Armour.

Sheffield Society of Architects and Surveyors.—The inaugural meeting of the newly-formed Sheffield Society of Architects and Surveyors was held on Tuesday evening at the Montgomery Hall, and was a very successful gathering. More than fifty Fellows and Associates were present. The walls of the hall were hung with oil and water-colour drawings, engravings, and photographs, lent by members of the society, and most of them possessing interest from an architectural point of view. In the ante-room were a number of oil and water-colour drawings, amongst them a pair of charming water-colours, by Dodgson—one of "London Fog," and the other "A Rainy Day in Spring," which were lent by the president, together with a view of "Chichester Cathedral." Drawings were lent by Mr. J. B. Mitchell-Withers, Mr. C. Hadfield, Mr. Fred Fowler, vice-president, and Mr. E. Holmes. The president, Mr. T. J. Flockton, delivered an address, in which he said that when, at the suggestion of Mr. Hadfield and Mr. Mitchell-Withers, he called a meeting to consider the formation of the society, he hardly expected that at their first meeting they would have as many as 73 members and associates. He went on to consider what were the objects of the society, and how they were to be attained. The objects were the advancement of the profession, promoting and facilitating the acquisition of knowledge in the various arts and sciences connected therewith, the education of the junior members, and the consideration of questions of professional practice. These

objects it was hoped to attain by social, friendly, and unrestrained intercourse at meetings like the present and the friendly discussion of matters affecting the profession, by monthly meetings, for the hearing of papers and lectures, with discussions; by the formation of classes among the associates and students in the subjects of design, construction, the history of architecture, &c.; by assisting in the preparation of candidates for examination by the leading societies; by communication and exchange of opinion with the Royal Institute of British Architects, the Surveyors' Institute, and other kindred societies, and the receipt of their papers, and by the ultimate formation of a library. Mr. C. Hadfield proposed, Mr. Mitchell-Withers seconded, and Mr. R. Davidson supported, a vote of thanks to the president for his address, which was cordially adopted. The secretary announced that the library of the school of art (the use of the council room at which they had secured for their meetings) would be open to members for reference every Tuesday evening during the session from 7 to 9. He also read the syllabus of meetings, pointing out that the council had given the important question of Registration the first consideration. Papers would be read on Dec. 13th by Mr. J. Wreghitt Connon, F.R.I.B.A., on "Registration." Jan. 10th, 1888, Mr. J. Murgatroyd, F.R.I.B.A., on "The Value of 'Association' and 'Federation.'" Feb. 14th, Mr. C. Hadfield, F.R.I.B.A., on "Interest in Architectural Design," and March 10th, Professor T. Roger Smith, F.R.I.B.A. (of London University) on "Architectural Education."

THE SURVEYORS' INSTITUTION.—The twentieth session of this Institution was opened on Monday evening with an address from the president, Mr. W. J. Beadel, M.P. After congratulating the members on the growth of the Institution during the twenty years since its establishment—the number on the roll being now between 1,300 and 1,400—the president reviewed the vast public improvements effected during the last half-century (in all of which the surveyor had borne an important part), illustrating this by the fact that in 1837 the total capital invested in railways was forty-three and a half millions, whereas the capital now invested exceeds eight hundred millions. The surveyor during these fifty years had also been extensively employed in connection with the commutation of tithes, the enclosure of commons, and in the purchase or sale of every description of landed and house property, as well as in public improvements, such as the freeing of the metropolitan bridges, the acquisition of Epping Forest, Finsbury Park, Burnham Beeches, and other open spaces, and in the rating of every description of property throughout the country. After quoting figures to show the enormous increase of the value of land and house property in London, he proceeded to contrast it with the deterioration in the value of agricultural land in recent years. The president reminded many of the profession that after three years from the present date no surveyor can join the Institution without passing the examinations imposed by the Charter of Incorporation, and that some progress has already been made in this direction, 345 candidates having already passed these examinations in the voluntary form, the members by examination now representing 15 per cent. of the whole professional membership of the Institution.

The Marquis of Breadalbane unveiled at Aberfeldy, Perthshire, on Saturday, a memorial cairn erected in recognition of the services of the 42nd Highlanders (Black Watch). The memorial rises to a height of 30ft., and is surmounted by a statue, 10ft. high, of a soldier in the original costume of the Black Watch, while beneath, on the chief front, is a life-sized figure in the present costume of the 42nd Regiment, inscribing on the pedestal the names of the battles which the regiment bear on their colours. Mr. W. Birnie Rhind, of Edinburgh, was the sculptor of the memorial, which was illustrated in the BUILDING NEWS for June 24 of the present year.

Messrs. Campbell, Smith, and Co., who decorated the Lyceum Theatre, have been intrusted with the whole of the decorative work at the Empire Palace, which is to be of the most gorgeous description, and is being done under the superintendence of Messrs. Romaine Walker and Tanner, architects, who designed the decoration of the Gaiety Theatre some years ago.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., and LI. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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RECEIVED.—C. K. and Co.—J. W. and Son.—W. R. and Co.—W. D.—G. L. W.—J. and J.—F. and F.—L. P. Co.—B. of W. B.—H. B. and T. Co.—C. C.—B. S. and R.—J. B. P.

THE "BUILDING NEWS" DESIGNING CLUB. (In reply to numerous inquirers, we cannot undertake to send the rules of the club by post, or to answer individual inquiries. The rules were published in the "B. N." of Nov. 4, and intending competitors must get that number.)

Correspondence.

SEVILLE CATHEDRAL.

To the Editor of the BUILDING NEWS.

SIR,—It is a somewhat hard task to reply to Mr. Carpenter's letter published in your last issue in reference to my drawing of the above. I cannot understand—well, so *clever* (?), yet so ungenerous and in many cases untruthful, an attack on my work. Mr. Carpenter has unfairly assumed to suit his own purpose all that he has written about.

I am fully aware that by permitting a drawing to be published in the BUILDING NEWS I am calling forth criticism from all quarters of the profession, and must accept them, both kind and cruel; therefore, I cannot quarrel with Mr. Carpenter for finding fault with my style of delineation as not being consistent with his own (whatever it may be). *Unfortunately*, we are not all such clever draughtsmen as Mr. Carpenter.

I must, however, now apologise to your readers for inflicting a view so *unrepresentative*, according to Mr. Carpenter's idea, of so architecturally beautiful an interior. My only excuse must be that I supposed it might interest those unacquainted with it. I may in all fairness add I do not think it misleading in any sense; yet I do not ask you to accept it as doing justice to such noble work, or even giving an idea of its magnificence, as I have seen it; I would leave this to clever men.

Mr. Carpenter next states that my drawing is "an *adaptation* (we will not say a *copy*)" of Laurent's photograph. This statement I deny *in toto*. I have never seen (to my knowledge) a photograph showing this exact view, though there are several very similar. I did once possess a woodcut (unfortunately I have mislaid or lost it) which may have been taken from the photograph referred to. Mr. Carpenter also states that my view is exactly the same size as Laurent's photograph. This is untrue. Laurent's photos. measure 13¼in. by 10in., the BUILDING NEWS plate 15in. by 10½in., whereas my drawing is 18in. by 12½in.

With reference to sketching in the cathedral I fortunately spent some time in Seville studying and making drawings of its many charming buildings. I made some half-dozen sketches in the cathedral, of which this is one; it is true it was never finished even in pencil, and I had to make the best of it afterwards by the help of a print and photographs. My drawing was made about five years ago, and at that time I had never heard of any rule to prevent sketching in the building, nor was I ever interfered with.

The side chapel referred to as being a blank wall was at the time of my visit just as it is shown, being undergoing restoration and stripped of all embellishments.

I think, Sir, I have answered all the accusations of Mr. Carpenter that may be necessary from my point; the rest of his letter may be treated with contempt, composed as it is of ungenerous and sarcastic statements, which I accept as criticisms and suggestions, and for which I thank him and shall endeavour in my *next work* to act upon.

I feel highly flattered that so great an authority *and critic* as Mr. Carpenter should have given so much valuable time in writing so long and severe a letter on the work of one of the younger members of our noble profession who, at the time the drawing was made, was simply a student who worked for the love of the thing, and did his best to produce honest work in his own style.—I am, &c.,

GILBERT S. DOUGHTY.

14, Fletcher Gate, Nottingham, Nov. 9.

SWINDON INFECTIOUS HOSPITAL COMPETITION.

SIR,—A dozen tenders have been received by the Swindon Local Board for carrying out the selected design for the above.

The most stringent condition in this competition was that the cost should not exceed £1,300. The highest tender received was £3,311, and the lowest £2,351.

It would be interesting to watch the surgical operation necessary to fit this design within the limits of the competition, and if, when so mutilated, the design be then adopted, would this be fair and just to the other competitors, who thought that the conditions laid down were really intended to be adhered to?

In common fairness, is there any need for hesitation as to what course should be taken by those who issued the instructions?—I am, &c.,

A NON-COMPETITOR.

THE FUTURE OF THE ARCHITECT, AND "THE ARCHITECT OF THE FUTURE."

SIR,—"M. M.," in your issue of the 4th inst., has imagined, as many others have, that in speaking of works carried out by the builder without the aid of an architect, I referred to "small repairs and alterations." It will surprise them, perhaps, to learn that I am speaking of works (within my knowledge) ranging from £4,000 to £100,000! The writer of "Wayside Notes," in your last issue, has also misapprehended the tenor of my remarks. I know very many builders—very respectable men they are—and certainly I do not blame them for getting rid of their (in many instances) bugbears, in the shape of architects; but I blame the architect for permitting such a state of things to be possible; I blame him for allowing "fine-art architect" to be construed into "pretty sketchist and no more." I blame him for allowing specialists of all kinds—specialists in construction, specialists in decoration, and, lastly, specialists in sanitation, to ease him of his proper functions, and, in course of time, as the latter has, and as the former will, ease him altogether of his *raison d'être*. The architect should, even if he avails himself of the specialist, be his master, and not allow the positions to be reversed. I

know we are all human, and I know how nice it is to be thus helped in our work without any corresponding reduction of pay; but depend upon it, Sir, the architect of the future will suffer for all this.

Mr. Charles R. Guy Hall, in speaking in last week's BUILDING NEWS upon "Professors of Sanitation," said that the "principles of house sanitation or drainage are both few and simple." He is perfectly correct, and I hope his words will be well borne in mind by young architects, and perhaps old architects, who have allowed the cant of the "sanitary expert" to frighten them away from a part of their legitimate business.

A few days' work at "sanitation," as it is called, will enable any ordinarily cultivated young man to grasp and to master all that is involved in the many lectures of the "Professor," who, for purposes easily understood, wraps up in mystery that which is as clear as daylight.

I hope that Mr. Arthur Cates, and those who are working with him in the cause of technical education, will impress upon every candidate the necessity of mastering this easy branch of their business. Let every young architect make himself thoroughly independent of every expert who now trenches so closely upon his heels. We shall then hear less of these intruders. The public will gradually recognise that the architect is complete *master of the works*, and then perhaps the future of the architect will not be quite so gloomy as I have ventured to predict.—I am, &c.,

7, Duke-street, Adelphi, WM. WOODWARD.
Nov. 15.

AN OBSCURE ARCHITECTURAL RELIC IN DONCASTER.

SIR,—It may not be known to the majority of your readers, as it was only revealed to me by accident, although a frequent visitor to Doncaster, that an architectural relic of considerable interest exists in this old sporting centre.

Mr. John Elinis, merchant, of Doncaster, is the owner of some property on the east side of French Gate, the back of which abuts on the ground of St. George's Church, one of the most successful works of the late Sir Gilbert Scott, R.A. The front portion of this property is a plain three-story residence erected in the last century; but the rear portion is much older, and is evidently a remnant of some important building that formerly occupied the site of the street frontage. This old property is a low two-storied building of massy stone walls; the windows are square-headed, with moulded oak frames and mullions, which afford the only architectural character of the exterior. The ground floor is converted into four cottage dwellings, two only of which have chambers on the first floor, one at least of which has an old moulded ceiling in plaster arranged in a geometrical design. The greater part of the first floor consists of what in old times was considered a large or grand room, now used as the church mission room. Here is a very fine plaster ceiling of geometric design, enriched with the Tudor rose, the *fleur de lis*, and quaint ornaments. The centrepiece is a coat of arms, the emblazonment of which is perfect, although, like the rest of the work coated with generations of whitewash. A fine cornice, with enriched frieze and brackets, runs along the north side and the east end. That of the south side has fallen into decay, whilst that of the west end has been destroyed by the building of a wall, which has encroached about 2ft. upon the old ceiling.

The whole of the work is bold and massive, and although one which might reasonably be called Elizabethan, bears evidence of an earlier date—viz., that of King Henry VIII. In the rear of this building are other stone erections of considerable age, said to be part of the old priory of Doncaster. These have also been converted into cottages, and underneath the adjoining southern block of property is said to be a cellar or crypt of considerable interest.

The position of this fine old room strongly implies that it has been part of a domestic building of considerable importance converted from, or erected on the site of, the old priory, and the arms preserved are no doubt those of the first lay owner after the property had passed out of the hands of the Crown, into which it would fall upon the suppression of the lesser monasteries.

I have no doubt something is known of this fine example of old work in real architectural circles, and that it is mentioned in the history of the town; but, nevertheless, it is not so generally known as it deserves to be. Being a work well worth visiting, and one within easy access of artists on sketching tours, I may be excused for furnishing this hurried note thereon.—I am, &c.,

Scarborough, Nov. 14. W. STEVENSON.

SANITARY ASSOCIATIONS AND HOUSE DRAINAGE.

SIR,—House drainage is a question in which I have for many years taken much interest, though I must own that I carefully eschew any connection with patents, and, further, I consider a patentee a dangerous person to employ, as he naturally leans to his own nostrum, even though in his heart of hearts he may know it is not the best. I had some experience of this when inspecting some large house drainage works carried out by Mr. Roger Field, C.E., where his patent trap was, in my opinion, used in season and out of season.

Many years ago Mr. Norman Shaw commenced a crusade against the system of traps which Mr. Buchan advocates and Mr. Roger Field practises, and I would advise their followers to refer to his reasons, as published in your paper, for adopting only one disconnecting-trap at the connection to main drain or cesspool, and also to carefully consider the contents of the paper recently read at Bolton by Mr. Honeyman, of Glasgow.

My objection to sanitary associations has hitherto been on account of their inspectors advising what I consider useless and worse than useless, disconnecting traps and ventilating or "blow-off" pipes, dividing the drains up into what Mr. Buchan calls the "sectional system," and at the same time overlooking structural defects; for in one instance I found one of these inspectors had passed a "bell trap" to a sink as sufficient trap between the drain and the basement of a large block of offices. I am therefore delighted that they are waking up to the knowledge that traps are, after all, merely a means of collecting solid matter, which, as Mr. Norman Shaw stated, gives out sewer gas as soon as the flushing drain ceases through the house being unoccupied. This "sectional system" appears to me to be a makeshift to patch up badly laid drains, and often costs more than remodelling, at the expense of the risk from bringing sewer gas close to the house, and depending on traps and ventilating pipes alone to prevent it doing mischief. In my opinion the objections to the system are: 1st, that it prevents thorough and proper cleansing of the drains by water and passing rods and brushes through, and, on the other hand, forms so many obstructions which hold a certain amount of solid matter, and might therefore be termed a continuous series of cesspits.

2nd. It prevents thorough flushing of the drains with air, and I am willing to follow Mr. Norman Shaw, Mr. Honeyman, and many others in believing that flushing with air is the way to render drains harmless as well as without smell. I also fancy everyone who has had experience in trusting to traps keeping out gas when there is a pressure of air upon the water seal will agree with me that they are useless; and it is also a question with me as to whether the gas cannot be absorbed by and conveyed through the water seal. Recently, when using the peppermint test, the smell clearly travelled through a good lead trap, and the last time I adopted the trapped or "sectional" system, the trap next the cesspool—a Buchan's—was forced by the pressure of air from the overflow, which passed up the drain as if nothing interposed.

In conclusion, I would point out that in his letter in your issue of the 28th October, Mr. Buchan does not say anything respecting "Clerk of the Works'" proposal to adopt the vicious practice of ventilating the drains by means of rainwater-pipes; vicious because when there is heavy rain there is a down instead of an up current, and in frosty weather the ventilator becomes closed with ice. This once very common practice has caused the sacrifice of many valuable lives, and I am surprised to see it suggested by one who professes to have had experience in sanitary work.—I am, &c.,

JOHN W. ALEXANDER,
Diocesan Surveyor for York,
Middlesbrough, Nov. 9.

THE FIRE AT WAYGOOD'S.

SIR,—As many of our friends have understood from the account in Saturday's papers of the fire which occurred here on Friday evening last, that the whole of our premises have been destroyed, we have much pleasure in informing you that the injury was confined to our carpenters' and pattern makers' shops. The main portions of our factory, including our machine shops, lift-fitting shops, and general offices, are practically unhurt, and though we may have to ask the indulgence of our friends for a slight delay in executing orders, as our drawing office has been injured by fire and water, we have made arrangements to accommodate the departments affected, and shall be able to resume work as usual in a day or two.—We are, &c.,

R. WAYGOOD AND CO.
Falmouth-road, Great Dover-street,
London, S.E., Nov. 14.

Intercommunication.

QUESTIONS.

[9463.]—**Leaky Bath.**—I have lately had a bath built of glazed enamelled bricks set in cement and grouted about 1in. at back of bricks, also in cement; bottom of bath is laid with enamelled tiles; bath leaks very much. Could someone inform me what material it would be best to point brickwork with? Would white-lead putty be good? At present the pointing is of Parian cement, which is falling out.—B. P. G.

[9464.]—**Tiles in First Floor.**—What is the best method of laying tiles on the first floor of a building? Is there any objection to laying them on top of wood floors, and if so, how can the difficulty be overcome?—CONSTRUCTION.

[9465.]—**Drawn Lead Piping.**—Some time back I saw an account of some manufacturer of lead piping having succeeded in perfecting a machine for turning out drawn lead piping, circular inside and square outside. Can any reader give me information on the subject?—C. B. YOUNG.

[9466.]—**Early Churches.**—Can anyone inform me whether plans of Kempley Church, Gloucestershire, and Adel Church, Yorkshire, have been published? I shall be glad to know of any instances of aisles before the 12th century.—STUDENT.

[9467.]—**Stone Beams.**—Mr. Lawrence Harvey's illustration of the strength of stone used as beams is borne out by all laminated structures of wood, in which the beams or ribs are composed of vertical laminæ or boards. Brick beams are made with bricks and vertical slices or "flitches" of the bituminous rock composition, which add immensely to their strength. The principle is certainly one that ought to be remembered in introducing stone lintels. I should like to hear of any samples.—G. H. G.

[9468.]—**Whitewash.**—Would any reader kindly give me a recipe for removing whitewash from outside stone walls?—EXON.

[9469.]—**Fink and Bollman Trusses.**—Will any reader explain these forms of trusses, and how the stresses are obtained. Which is the best introduction to these questions?—HYPO.

[9470.]—**Gas-Lighting for Draughtsmen.**—I find the ordinary flickering gas-burners ruinous to the eyesight in drawing. Can anyone inform me how I can obtain a good steady light? I believe there are oil and gas-lamps that can be used. If so, I should be thankful to obtain information, and I am sure half those who have to work late on drawings will be glad, too.—DRAUGHTSMAN.

[9471.]—**Music Hall.**—I will feel much obliged by one or more of your correspondents kindly informing me as to where I can get detailed information or particulars regarding the construction of a high-class music-hall or concert-room capable of accommodating 2,500 persons. Particulars of any architectural works specially treating of the construction of such buildings would also be gladly received.—CARMEN.

[9472.]—**Commissions.**—Is there any well-founded reason why an architect should not pay commission to a gentleman introducing a client who brings good work, the said client being totally unknown to the architect prior to such introduction, and the gentleman introducing him having no other interest in the transaction except as a friend of the client? Would it be a breach of professional etiquette to pay such commission? Sensible argument for or against such a course would probably be of service to many a—YOUNG ARCHITECT.

[We should hardly think this question worth inserting, but for some ugly facts within our own knowledge. Some architects nowadays even take commission on advertisements inserted on behalf of their clients.—ED. B.N.]

REPLIES.

[9443.]—**Perpendicular Style.**—The "Perpendicular" is the name for that phase of English Gothic which was in vogue from the close of the 14th century until the 16th century. It is peculiarly English, and its more notable features are the depressed and four-centred arches, fan-vaulting, transomed windows, with panelled tracery, wide and shallow mouldings, and other distinctions too numerous to particularise here. Of the "architects" (I believe the name architect was not used until Elizabeth's reign) who flourished at this period may be

mentioned William Colchester, master mason at Westminster Abbey; Richard de Cracall, who contracted to build Catterick Church, Yorkshire; William Horwode; William Orcheyerd, Jennings or Jeynings, master mason at St. George's Chapel, Windsor; Norton, who restored St. Mary's, Redcliff, after the fall of the spire in 1446; John Dryell, surveyor of All Souls', Oxford; Roger Keyes, Richard Beauchamp, John Kendall, John Ashfield, Reginald Ely, and John Wubrich, surveyors of King's College Chapel, at Cambridge. The names of William of Wykeham, John of Wheathamsted at St. Alban's, and others are too well known to need further mention. Of the buildings in this style in and near London, "City Pupil" will find much to interest him in the churches of Great St. Helen's, Bishopsgate-street; All Hallow's, Barking (near the Tower); St. Olave's, Hart-street; St. Margaret's, Westminster, rebuilt in modern times; the beautiful choir of St. Saviour's, Southwark, the reredos of which is "Perpendicular"; the parish church of Chiswick, restored by J. L. Pearson, R.A.; Beddington Church, Surrey; and the parish church of Croydon, which was rebuilt after the fire in 1867 by Sir Gilbert Scott. The details of the nave of Westminster Abbey are "Perpendicular," though the general design of the earlier portion has been followed throughout. There is also some good work remaining in the parish churches of Enfield and Edmonton, and as late specimens of the Style none are so fine as the chapels of Henry VII. at Westminster; St. George's, Windsor; and of King's College, at Cambridge. Of secular buildings, the halls of Westminster, Guildhall, Eltham, Hampton Court, and the palaces of Croydon and Lambeth, the library roof of which was remodelled by Sir C. Wren on the old lines, are fine examples. There is also some interesting work at the Charter House and the hall of the Merchant Taylors' Company. At a greater distance from London than those I have named, the splendid churches of Norfolk, Suffolk, and Essex form a complete series, and the university towns of Oxford and Cambridge are full of most interesting examples.—A. C. W.

[9450.]—**Masonry and Stonecutting.**—I am very pleased to see, by the discussions to which the published text of my first lesson has given rise, that the subject of my lessons interests the readers of the BUILDING NEWS. In answer to the strictures of Mr. John Powell, I beg to say that the word "voussoir" is as English as extrados and intrados; it is used in Gwilt's "Encyclopædia," and in Dobson's "Rudimentary Treatise of Masonry and Stonecutting." The words "voussoir" and "arch stone" are not equivalents: voussoir applies to the stones which form the surface of any vault, whatever its shape may be; whereas arch stone applies only to arches. I am glad that Mr. Powell has mentioned his objections to some parts of my lesson, and will be thankful for all criticisms, suggestions, and observations, which will enable me to perfect my text. As it occurs, the method objected to by Mr. Powell is the one taught at the Ecole des Beaux Arts, whereas the other one, which Mr. Powell approves, is my own. At all events, whatever the deficiencies of the published text of my lessons may be, they do not in the least affect the efficiency of my lessons at the Guilds Institute. There, all the elaborate explanations required in a text-book fall away, for I simply explain the processes of stonecutting by *practically* working one stone in the presence of four or five pupils, who in their turn teach the others. This is how I have managed last winter to make twenty-eight members of the Architectural Association produce, in seven lessons, models of raking walls, straight arches, penetrations of vaults, and cupolas; which must appear to those who know anything about scientific masonry a very remarkable feat.—LAWRENCE HARVEY, Teacher of Scientific Masonry, City and Guilds of London Institute.

[9456.]—**Crushing Weight of Stone.**—Average crushing load:—Portland, 4,000lb. per square inch; Bramley Fall, 6,050lb. per square inch; York, 5,700lb. per square inch; Aberdeen granite, 10,900lb. per square inch; Cornish granite, 6,300lb. per square inch (Molesworth).—NO SIG.

[9456.]—**Crushing Weight of Stones.**—According to the South Kensington "Notes on Building Construction" the crushing weight for various stones is as follows:—

	Crushing weight per square inch in tons.	Size of cube. in. in.
Portland	1·66	2 × 1
"	2·03	1½ × 1
"	1·5	2 × 1
"	1·17	1 × 1
"	1·74	2 × 1
Bramley Fall	2·7	1½ × 1
"	2·5	1 × 1
York (paving)	2·56	1½ × 1
"	4·38	2 × 1
Bath (Box)	0·66	2 × 1
"	0·54	1 × 1
Aberdeen } Granite (blue) }	4·87	1½ × 1
	3·47	1 × 1
Cornish granite	2·84	1½ × 1

—A. C. W.

[9456.]—**Crushing Weight of Stones.**—Consult Hurst's handbook or any treatise on materials.—G. H. G.

[9459.]—**Concrete Roofs.**—A roof of 3in. thick of Portland cement concrete made of 1 of cement, 4 broken brick ballast (inch mesh), and well beaten, may be used. The concrete should be covered with the best asphalte.—G. H. G.

[9461.]—**Picture and Chimney.**—A piece of felt placed over the chimney breast behind the picture.—G. H. G.

[9462.]—**Stopping Wood Joints.**—I should say a mixture of sawdust and glue would be the best stopping for a wood-block floor, though another and better patented composition is used—that used in the wood-block paving of Lowe.—G. H. G.

A new Conservative Club in Cannon-street, Louth, was formally opened on Tuesday week. It has been built from designs by Mr. James Fowler, F.R.I.B.A., the ex-mayor of the town, and the contractors were Messrs. Harrison Brothers and Messrs. Clarke and Son.

Our Office Table.

IT will be remembered that, at a special meeting of the Hellenic Society, held at Burlington House on July 2nd, 1886, for the purpose of discussing the antiquity of the remains discovered by Dr. Schliemann at Tiryns and Mycenæ, Mr. F. C. Penrose referred to several features of the masonry of the palace at Tiryns and the tombs of Mycenæ, which seemed to him during an inspection in the previous April to militate against the prehistoric character of all but the outer walls of Tiryns. Among these were the small size of many of the stones, the marks of saw-cuts and of tubular metal drills, and the interspersion of kiln-burnt bricks. In reply, Dr. Schliemann stated that similar features were to be found in the undoubtedly early ruins on the islands of Hæra and Samos, and in Cephalonia, Eleusis, Orchomenos, and the Acropolis at Athens. Dr. Dörpfeld urged that similar treatment of walls was to be seen at Troy and in Egypt, and challenged Mr. Penrose to visit the sites in his company, when he would undertake to dispel by examination all doubts as to the age. Mr. Penrose has accepted this invitation, and as a result of a late visit to these cities with Dr. Dörpfeld, concedes all the points in dispute. All the suspicious features are, he says, capable of explanation, and, both at Tiryns and Mycenæ, the parallel antiquity of Dr. Schliemann's discoveries and the great Pelasgic works is established. This conclusively disposes of Dr. Stilman's wonderful theory of the Byzantine character of Dr. Schliemann's finds.

MESSRS. BEMROSE AND SONS, of Derby, have patented an Indian-ink stand for the use of architects and draughtsmen. The chief advantages claimed for the invention are that by its use the ink is not exposed to the air, as necessarily is the case when cabinet saucers and ink-slabs are in use, and that, therefore, a saving of time, trouble, and material is effected in not having so frequently to prepare fresh supplies of ink. The ink certainly is kept free from dust, and the stand is exempt from the danger of spoiling a drawing by being upset. In experience, one knows that freshly-made Indian ink is less liable to run, and that stale ink, however good the article may be, always runs more or less when washed over with colour, especially if gall be mixed with it. No liquid ink yet introduced is practically as useful to the architect as good stick ink, nor flows so freely from the pen. Some are indelible enough, and answer well for cloth tracings and details where thick lines are necessary, but for ordinary plans first-rate Chinese stick ink has no equal. It must, however, be used fresh, and from a perfectly clean stand. One difficulty which the "Climax" inkstand presents is due to the likelihood of its not being thoroughly cleansed, especially round the washer or indiarubber sucker in the upper part of the vessel. Another objection is the necessity of using both hands every time a dip of ink is required, one to press down the "nozzle" to cause the ink to rise, and one to hold the pen. The metal surface of the dipping well would soon spoil the pen if the "nozzle" were forced down by pressing the pen into it. A considerable quantity of ink also has to be mixed, or the stand will not properly work. If the bottom of the reservoir were dished towards the centre so as to bring the ink, however small its quantity, towards the mouth of the sucker, this would be obviated. The invention, notwithstanding, is clever, and the article is admirably made in gunmetal, steel bronzed.

THE Council of the Society of Arts has awarded the following among other medals for papers read during the last session:—To William P. Marshall, for his paper on "Railway Brakes"; to Dr. Percy Frankland, for his paper on "The Living Organisms of the Air: the Effect of Place and Climate on their Prevalence"; to A. Reckenzaun, for his paper on "Electric Locomotion"; to Mrs. Ernest Hart, for her paper on "Cottage Industries in Ireland"; to T. Armstrong, for his paper on "The Present Condition of Applied Art in England, and the Education of the Art Workman"; to J. Starkie Gardner, for his paper on "Wrought Ironwork"; to Walter Crane, for his paper on "The Importance of Applied Arts, and their Relation to Common Life"; and to Allan Ransome, for his paper on "Colonial Woods."

LORD MAGHERAMORNE was on Friday re-elected Chairman of the Metropolitan Board of Works for the eighteenth year. In reviewing the work of the board for the past year, he mentioned that the purification of the sewage, the construction of the Blackwall tunnel, and other works in hand were progressing satisfactorily. With regard to open spaces, the number of acres under the charge of the board in 1886 was 1,000, in 1887 it was 2,456, and next year he hoped, with the addition of Parliament-hill, it would be 2,774. At the same meeting the board finally disposed of the case of Mr. T. J. Robertson, of the Superintending Architect's Department, who was censured in July for improper conduct in connection with the sale of the site of the Pavilion to Mr. Villiers. A motion to discharge him was defeated by twenty-two to nineteen. A resolution endorsing and repeating the censure of July was carried by a large majority.

THE Hamburg *Börsen Zeitung*, in discussing the question frequently raised of late, whether the present upward movement in the price of Portland cement in Germany is transient, or whether the prospect for the ensuing year is favourable, says:—"Significant indications are given by the result of the public competition which took place in Posen on the 2nd of this month for the large quantity of 85,000 normal tons. This cement was ordered for use on the Royal fortifications, and is deliverable in the period from now to June, 1889. The tenders submitted by ten manufacturers are, on the average, after allowing for transport charges, 13 per cent. higher than those of June 2 obtained by the same department for 18,000 normal tons. Especially significant is the fact that the lowest tenders of November 2 are about 23 per cent. above the lowest of June 2."

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. "Building and Decorative Stones of Egypt," by W. Brindley, F.R.M.S. 8 p.m.
Royal Academy. Lecture No. 3 on "Anatomy," by J. Marshall, F.R.S.

TUESDAY.—Institution of Civil Engineers. "Accidents in Mines," by Sir F. A. Abel, F.R.S. 8 p.m.
Glasgow Architectural Association. "The Monastic Orders and Buildings of Scotland," by G. Washington Browne, of Edinburgh.

WEDNESDAY.—Society of Arts. "The Mercurial Air-Pump," by Prof. S. P. Thompson. 8 p.m.

THURSDAY.—Royal Academy. Lecture No. 4, on "Anatomy," by J. Marshall, F.R.S. 8 p.m.

LEGAL INTELLIGENCE.

IN RE CHARLES GRIBBLE.—The bankrupt who had traded at Vauxhall-cross, South Lambeth-road, as an importer of doors, mouldings, and trellis work, applied to Mr. Registrar B. Brougham on Thursday, the 11th inst., for an order of discharge. The receiving order was made on June 9 last, the liabilities amounting to £5,153, and the trustee reported on November 5 that the assets had realised £2,299. The bankrupt was formerly manager to Messrs. Esdaile and Co., timber merchants, to whom the business previously belonged, and on February 1, 1882, having no capital of his own, he agreed to purchase the stock in trade for £2,811. Esdaile and Co. continued to supply him with goods, against which, and the purchase money, they drew bills, resulting in a claim against the estate by the trustee of Esdaile and Co., who failed in January last, for £2,364. The bankrupt stated that Mr. A. W. Peaty, a member of the firm of Esdaile and Co., joined him in partnership, bringing in £1,000, upon which he was to receive interest and two-thirds of the profits. The bankrupt attributed his failure to that of Esdaile and Co., who were his largest creditors, and who were under agreement to renew bills. The Official Receiver reported that the bankrupt had kept proper books, and that he was not aware of any evidence tending to establish any statutory offence. Mr. Registrar Brougham granted an immediate order of discharge.

The east window of All Saints' Church, Blackburn, has just been filled with stained glass. The window is in the Decorated style, and the subject illustrated is Rev. v. 9. The artist is Mr. Swaine Bourne, of Birmingham, who has also just executed a four-light window for Christ Church, Blackburn.

Mr. Holl's portrait of Mr. John Bright was formally hung on Friday in the gallery of the Reform Club at the top of the staircase.

THE BUILDING NEWS
AND ENGINEERING JOURNAL.
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FRIDAY, NOVEMBER 25, 1887.

SURVEYORS TO LOCAL AUTHORITIES AND THEIR PERQUISITES.

A CASE of considerable moment to the profession, those especially who hold surveyorships under corporations and improvement commissioners, has just been decided before Mr. Justice Mathew and a special jury. It was an action brought by a ratepayer of Ramsgate, Mr. Whitely, to recover the sum of £500 by way of penalties from the defendant, Mr. Barley, borough surveyor, who, it was alleged was liable for certain breaches of the provisions of the Public Health Act, 1875. He pleaded not guilty, and denied the allegations that he had received payments in respect of various contracts other than salary or allowances. The defendant had been appointed surveyor by the Improvement Commissioners of Ramsgate, under the Public Health Act, at a salary of £200 a year, increasing £20 a year till a maximum of £300 was reached. The Borough, incorporated by charter in 1884, still continued the defendant as surveyor. The plaintiff's allegations were briefly these: That the surveyor in his capacity became "concerned and interested" in various contracts made with the local authorities for the purpose of carrying out the Public Health Act provisions; that he had exacted and accepted certain fees and rewards in connection with various contracts for the improvement of the streets and roads, and in connection with the drainage scheme of the town. Under the first class, a large number of contracts had been entered into involving considerable expenditure. The surveyor was distinctly charged with having made an arrangement with the Corporation to carry out the different schemes and prepare quantities, and in his capacity as surveyor had exacted and accepted 2½ per cent. on every contract for streets, and a commission of £750 upon the drainage improvement, in addition to 1½ per cent. upon the quantities therein. The plaintiff based his case upon section 193 of the Public Health Act, which runs: "Officers or servants appointed or employed under this Act by the local authority shall not be concerned or interested in any bargain or contract made with such authority for any of the purposes of this Act. . . . If any such officer is so concerned, or under colour of his office accepts or exacts any fee or reward whatsoever other than his proper salary or wages or allowances, he shall be incapable for ever afterwards of holding any office, &c, under this Act, and shall forfeit the sum of £50 for each offence, &c." After evidence was called, Mr. Finlay, for the defendant, submitted there was no case established, as the defendant had in this case openly received the extra allowances from his town council. They had arranged that the surveyor was to receive 5 per cent. upon a part of the drainage scheme and 3½ per cent. upon the remainder. The surveyor had received upon the cost £780, out of which he had to pay disbursements, leaving him about £400. The 1½ per cent. for the quantities had to be repaid, less expenses, out of pocket. The arrangement, it was contended, was for convenience in accounts, as in the case of private improvement contracts the surveyor had been rewarded for his extra work and labour 2½ per cent. upon the quantities, he paying disbursements. There was no formal resolution of the council in respect of the 1½ per cent. commission upon the quantities in the drainage contract, but there was a formal resolution passed that the defendant was to receive on that scheme £750, less disbursements, for which he was thereby made liable, and this was affirmed by the town clerk, the late Mayor of Ramsgate, and several other gentlemen connected with the local authority. The question for the jury was whether the arrangement as to the payment of 1½ per cent. had ever been made as described. Upon this point the jury found a verdict for the plaintiff. In giving judgment, Mr. Justice Mathew regretted the action was brought to recover penalties under the Public Health Act. He referred to the three contracts entered into by the corporation with certain builders for the improvement of the roads and streets, in each of which contracts it was provided that the surveyor was to be paid 2½ per on the amount. His Lordship ruled in the first place that, under the 193rd section of the Act, the defendant was "concerned and interested," and had incurred the penalties of the statute. With respect to the special resolution of the corporation that the defendant was to be paid certain percentages on the sums expended for the drainage not to exceed £750, besides a commission of 1½ per cent. for quantities, he held that the defendant incurred penalties. There was no evidence, he said, nor any suggestion that the defendant had been guilty of discreditable or dishonourable conduct in his office of borough surveyor. In respect of the drainage scheme he had received a moderate remuneration for very valuable and arduous work. The defendant would seem to have been the victim of a law which in this case had operated hardly. He gave judgment for the plaintiff for £200 with costs. The intimation of the defendant's counsel was that the case would be taken to the Court of Appeal. These are the facts as reported.

This judgment strikes a serious blow at a system of increasing the regular emoluments of a borough surveyor in a somewhat doubtful manner, which will probably have a wholesome effect. The Judge, in his last sentence, has summed up the facts of the present case in saying that the defendant would seem to have been the victim of a law which in this case had operated hardly. Mr. Barley, we may also say, has acted in a manner by no means unusual amongst surveyors, and it would be easy to bring instances of officials receiving far greater salaries who have for years been making large emoluments from work thrown in their way. Nevertheless, on broad and public grounds, the exaction of and acceptance by those holding public office of fees and rewards is censurable. Those occupying official posts and receiving lucrative salaries have clearly no right to increase their gains by taking commissions from builders and contractors upon works over which they have the control, and the system which permits the official of a public authority to do so must be regarded as wholly wrong. The system, for example, which makes it possible for a surveyor to enter into an arrangement with the corporation who engages him as a salaried surveyor to exact percentages upon contracts between them and third parties must be pernicious. Yet it is one that still prevails. In this instance there was actually a resolution of the corporation to pay their surveyor certain percentages for making specifications and plans, and supervising the drainage work, amounting in all to £750. Mr. Barley was acting in apparently good faith. The duties entailed by such work was, as Mr. Finlay, Q.C., pointed out, in excess of a surveyor's usual and ordinary duties. A municipal surveyor is generally paid for extra work he undertakes, and often receives special remuneration for so doing. The regular salary of a surveyor is supposed to cover usual and ordinary duties, but all new works, as so much increased labour, have to be paid for. Suppose any additional work like a drainage scheme was undertaken by an independent engineer. Of course, his services would have to be paid for at a proportionately large rate, and the ratepayers would not be the gainers. This was one of the arguments used by the defendant's counsel. Again, bills of quantities have to be prepared, if not by the surveyor, by some other practitioner. All these are facts that must be admitted; but there is another way of looking at them. The public are concerned only in having the works efficiently and economically carried out; but, say they, if the local surveyor is engaged to look after the work, how can he do so conscientiously if on each contract it is provided that he is to be paid 2½ per cent. upon the amount to be paid to the contractor on receiving the surveyor's certificate? If he is paid for quantities by percentage upon the amount of contract, what is there to prevent that amount being increased, as it is clearly in the interest of the quantity surveyor that the amount he is paid on should be large? There is, at least, cause for alarm. Better it would be to vote the surveyor certain sums of money as remuneration for these works, quite independent of contracts or the contractors. The 193rd section of the Public Health Act, which we have quoted above, is so decisive on the point that it is almost surprising the local authorities placed their surveyor in so untenable a position by making any such arrangement. In short the verdict is a decisive expression of opinion on the doubtful expediency of a borough surveyor accepting fees from contractors for work which ought properly to be paid for by the authorities, either by increase of salary or by a sum agreed upon.

STREET FORMATION AND ANCIENT LIGHTS.

A VERY important question has been referred to the Works Committee of the Metropolitan Board of Works on the motion of Mr. Edwin Lawrence, the object of which is that the Board be empowered when forming new streets to provide that all ancient lights and other easements interfered with by the new buildings erected shall be dealt with by compensation and not by injunction. The question is one that we foresaw some time ago when the new thoroughfares in the north and west of the metropolis were being made. A person walking through any of the newly-formed streets must have noticed on one or both sides a ragged fringe of partially-demolished ruinous premises cut through by the new road. Charing Cross-road on the eastern side presents large blocks of properties so bisected with the ominous words "Ancient lights" painted on boards and placed outside every window. These announcements are, of course, protests against new buildings being erected abutting upon these windows in the rear, which would at all interfere with the light thereto. The owners of these old and often dilapidated properties have rights or easements of light which they have enjoyed from time immemorial, and they have the power to impose any terms they like upon intending builders, or to restrain them by injunction from building. Mr. Lawrence, in bringing forward this motion, has said what others know from experience—namely, that the existing law enables the owners of these old premises to levy blackmail, and to impose a severe hardship on those who have acquired land for building some important structure. One case he mentioned is on the face of it a disgraceful instance of this monopoly. A public building was contemplated on one of the new sites. The ground was bounded by a wall 11ft. or 12ft. high in the rear, and a few feet from this

wall was a small, old wooden "building," so constructed, in the first place, on wheels, to evade the Building Act, but which had for over twenty years remained, and had, therefore, acquired the right of light to a small window in it. The owner of this little "shanty" doubtfully acquired was able, through professional advice, to restrain the trustees of the new building, and although the injunction was dismissed, the trustees lost £1,000. Certainly an iniquitous instance of putting the law into operation; but we know of other equally mischievous hindrances which the existing law allows any owner of old property to place in the way of improvements. This is not, however, the worst evil. The ease and readiness with which the law can be put into motion has induced, it is to be feared, unprincipled persons to speculate on this kind of business, to acquire old premises abutting on new thoroughfares, and to make money out of the transaction. Exorbitant compensations are asked for, or impediments are thrown in the way of builders of new premises. Such impositions have frightened away many would-be occupiers of plots in new roads. Extraordinary difficulties have now to be overcome by anyone who purchases a vacant site bounded by old premises having ancient lights. Not only is there the threatening injunction, but the plans of the new building have to be so cunningly devised as to keep clear of litigious neighbours. The Vice-Chancellors have the matter in their hands, and take care to issue injunctions whenever they can. Of recent years the granting of injunctions has been more common than formerly, and any litigious owner who wishes to obtain compensation can prevent building upon land that would improve the neighbourhood. The law, in short, prevents a man from building on his own land and practically deprives him of making the best use of it. But not long ago the easement was regarded as a hindrance to improvement, and the dicta of Judges were rather in favour of not allowing vexatious objections to interfere with the erection of buildings.

It is very difficult to apply a rule that shall be universally held, as buildings are variously situated and are used for different purposes. The statutory law in the Metropolis has prescribed that the width of every new street must be at least equal to the height of every building above the level of the street, the effect of which is that a new building cannot be erected to a greater elevation than that which makes an angle of 45°, and allows 45° of sky to remain unobstructed. But this rule does not apply to the case of back areas. In this case the law regards only the extent of the obstruction or whether there will be a substantial deprivation of the light enjoyed; but the difficulty is to find out what the amount of obscuration really is. In estimating damages there are several things to be regarded: whether the loss of daylight is injurious to those working in the premises; whether it would make them too dark to work in during the winter, thus necessitating the use of gas; the particular trade or business affected; whether the abstraction of light renders the premises unhealthful for occupation; how far the injury to dominant owner may be diminished by the use of white glazed bricks or tiles in the new building. What amount of diminution of light will be considered sufficient to grant an injunction is a matter left to the evidence of surveyors and others engaged in such cases. "Substantial damages" must be proved to obtain an injunction, Mr. Justice Fry once said; not every impediment to the access of light will warrant the interference of the Court, says another; the onus of proving an injury rests upon the plaintiff. Yet these opinions, sound as they appear, do not prevent frivolous objections being made by owners of old premises, prompted as they are by professional advisers who wish to make a little gain by the transaction.

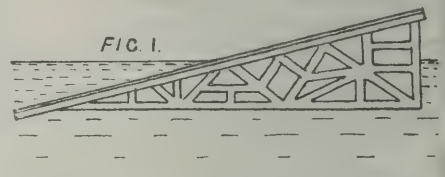
In the Metropolis there are reasons why a clearer enunciation of the law should be laid down; the areas dealt with are small, and therefore there is more probability that the buildings erected will be injurious. But the grievance is that anyone who owns an old tenement may prevent another party from building, by obtaining an interlocutory injunction to restrain the threatened injury. It is true the Courts require proof of the damage likely to be inflicted, and in some cases money damages are substituted for an injunction. Under Earl Cairns's Act (1858) the Court of Chancery have power to award damages to the party injured; these are given in settlement of the matter, or are equivalent to a purchase of the easement. But this sort of settlement does not satisfy the individuals who like the injunction the best. One of the circumstances which render the hardship the greater is that those who apply for injunctions have scarcely any windows worth speaking of to protect. On the other hand, the owner of the servient property may intend to build, or has already built, premises of great value and importance. The principle of the law does not favour the servient owner. For the window in question may be very small, but it can be enlarged to any extent without enabling the servient owner to prevent such act. Nor does it matter whether the window only lights a storeroom or closet, which is never used, the right is one of property.

Building owners on plots of ground so situated are, however, often in fault themselves for not consulting those who have an interest in the rear. After an injunction is applied for there is no retracing one's steps, or making any modification in the plans. Such a course would practically be a new case; the plaintiff would be entitled to the injunction on the original plan, and the defendant would be the loser. The building owner often treats the matter with a high hand, refuses to listen to the dominant owner's suggestions, or to alter his plans in any way. The consequence of this obstinate resistance is often an injunction with costs. Interim injunctions may be often saved if the building owner came to the possessor of the easement, and explained to him what was intended, and asked whether any alteration could be made before the building commenced. Some arrangement at this juncture is often conciliatory; but once granted, the building owner is on his "mettle," and generally refuses to work amicably. The interim injunction is a valuable safeguard, as it prevents greater cost, and often the pulling down of a building when it is far advanced; the Courts, as a rule, not caring for the latter alternative. It can, however, as we have said, be made a very vexatious means of stopping really important works on statements and affidavits not founded on the facts, and upon an imperfect opinion formed from the plans of the new building. In the Metropolitan thoroughfares, where plots not filled can become a public nuisance, the law ought certainly to give the Metropolitan Board of Works authority to provide for all ancient lights by way of compensation instead of by injunction. Why should the owner of a small and dilapidated store in his back premises be enabled to prevent the completion of a new street by demanding a sum of money entirely disproportioned to the value of such light? If the Board were invested with powers to assess the value of such light both parties would be fairly dealt with. We believe the risk entertained by the exacting demands made by owners of old premises has very materially injured the letting of land abutting on old houses. The public are, of course, the sufferers in one sense; but those who have business premises near vacant gaps left by demolished houses have a very strong ground for complaint when they see a few property owners demanding damages that practically close the neighbourhood against enterprising men, and postpone the completion of a thoroughfare to an indefinite period.

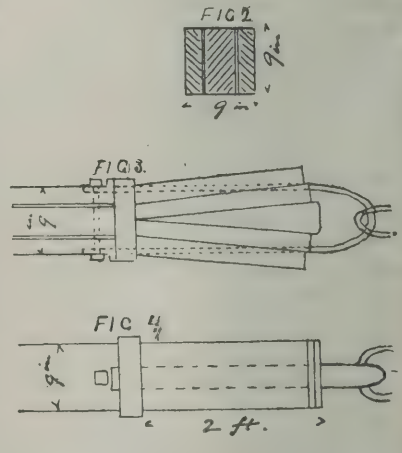
WORKS IN WATER.—XXXV.

OF THE MOORINGS OF FLOATING BREAKWATERS.

THE easy movement of a floating structure with a round bottom, such as that shown in the last article on this subject, would offer, perhaps, too little resistance to oncoming waves. It is an essential point in floating breakwaters that they give way in some degree to the waves, and do not offer a rigid resistance to them, as a solid breakwater of ordinary form does. At the same time it is necessary to consider that some resistance is requisite, though it be of a nature such as to act after rather than at the moment of being struck—a yielding resistance, as it is called. In the diagram, Fig. 1, the inner



side, or side next the protected water in the harbour, is vertical, and descends 12ft. into the water. The bottom is flat and horizontal, and the whole structure, instead of turning as it were on a centre, sinks vertically by the pressure brought to bear upon it, and so presents to the waves a stiff and unyielding barrier, thus obliging the crests of the waves to ascend the platform and be broken into spray. To effect this object the base of the caisson in Captain Sleigh's breakwater was extended in the manner shown, the lines indicating only the essential parts of the structure. The inclination of the platform was reduced from 24° to 12° in one instance, and from 30° to 15° in another, and the breakwater was to be moored both on the sea side and the harbour side, to Mitchell's screws, or, as it was preferred, to anchors



with one arm only, the other arm of an ordinary anchor being cut off, but not so close to the shank, the stump of iron being left for the attachment of a second hold on the ground by a similar anchor where the nature of the ground required it; but on a rocky bottom a hole was to be blown out, the anchor laid in, and filled up with stone. An endless chain would be passed through the ring of the anchor, so that by hauling it round it could be examined without disturb-

ing the moorings. It was considered of great importance to preserve an elasticity in the movements of the breakwater, or floating barrier, and to this end, and to ease the drag on the moorings, heavy weights were to be suspended at intervals along the mooring chains, and in that case a considerable power would be required to straighten the chain before any dead pull could come upon the anchors. The mooring chains proposed by Admiral Tayler were in long links of flat bars of iron placed between 12ft. lengths of timber. There were to be two plates in each length, as in Fig. 2. These were buoyed up and also stiffened laterally by pieces placed between and on each side of them, the centre piece 9in. × 4½in., and each side piece 9in. × 2½in., so that when put together they formed a beam 9in. square, 12ft. long. Beside the iron plates, a longitudinal strain was put upon the fibres of the wood. At each end of the centre piece of timber three saw-cuts were put down to a depth of 2ft., and the ends were wedged out 2in. each way, making the end 13in. by 9in. A strong iron hoop was put on at a distance of 2ft. from each end, being put on as hot as the timber would bear without injury, so that on the cooling of the hoops the fibres of the timber would be compressed there. A bridle strap of flat bar iron passed round the end, and took hold of the ends of the plates by means of a pin passing through them, and a shoulder upon each end of the strap took hold of the iron hoop at the root of the wedged-out end of the timber, the strain which came upon the hoop through the bridle being transferred to the fibres of the timber—or, at least, that was the intention ; but it may be pointed out that both these means of resisting the strain could not act fully together at the same time, for the bolt-hole through the plates would be, of course, no larger than was required for the pin to pass through them, and the strain would first come upon the plates. It would not be until these had been overstrained that any stress would be put upon the fibres of the timber, which would act only as a safeguard to prevent the immediate parting of the chain on the giving way of the iron plates ; but the strength of the timber would not act in conjunction with that of the plates, so as to increase their strength. Nor would the strength of the plates increase that of the timber, as was supposed. Too much importance was laid upon the tensile strength of the timber by Admiral Tayler, who said that straight-grained timber would bear a much greater strain in tension than an equal weight of iron, and that he proposed for that reason to form his mooring-chains chiefly of timber. He omitted to observe the proper reason for combining the two materials, which is that one strengthens the other by stiffening it against lateral pressures, which would interfere with the due exercise of its strength longitudinally. But there is in the use of timber another and separate duty, so far as its lesser specific gravity goes, in reducing the weight of the mooring-chains carried by the floating breakwater, the buoyancy of which is liable to some reduction on this account.

The question of mooring a floating breakwater will be found to be a very important one, especially of the form proposed by Captain Sleigh, or that of Admiral Tayler, and Mr. G. W. Lenox, one of the greatest authorities on this question, was of opinion that a floating breakwater might be perfectly secured in any ground, by suiting the anchor to the ground, even in that which was considered generally bad holding ground, if sufficient time and opportunity were given to decide upon what would be the best mode for any particular ground ; and if anchors were properly arranged with regard to the body which they have to hold, they would work their way into the ground until they become secure. As to the chains which are usually attached to anchors, he was, perhaps, more conversant with them than anybody else in the kingdom was, having made anchors and moorings for all the navies in the world, and worked for our navy for very many years. He had no doubt at all that he could construct chains for such moorings and anchors as were required for floating breakwaters, which could not be pulled away by any floating body.

His late partner, Sir Samuel Brown, who was a captain in the navy, had a project of this kind, and he constantly consulted with Mr. Lenox about it, and Admiral Tayler also consulted and arranged with the firm of Brown, Lenox, and Co., about his moorings ; and he had never seen a structure, either in substance or as represented to him by plans, which he could not hold securely against weather. With regard to the question whether a number of small chains, making up the same weight per fathom as one heavy chain, was any the stronger, he said they were, undoubtedly, provided that the pull could be brought upon all the chains at once. The greatest difficulty in the making of iron was in compressing the fibre : the larger the diameter the more difficulty there was to compress the fibre ; consequently, the centre of a large bolt was much weaker than the centre of a small one, per inch of its sectional area. Then, another advantage of small chains was that they were more easily repaired ; more easily handled. He would give the breakwaters a permanent mooring, and, in addition, he would have a similar set rather larger and rather longer, so that in case of a structure breaking the first mooring or chain, the second would immediately come into action ; but, in the meantime, it would lie a little slack. With regard to the time a chain would last under water on our coast, it depended, in a great measure, upon the water it was in : if there was any copper near it, as of a sunken vessel which had been coppered, a bolt would be much reduced in size in a short time. On the South coast—in the Channel—it would remain for four or five years without much deterioration ; there would be a large incrustation ; that would be knocked off, and the iron would remain pretty much the same—perhaps reduced in a small degree. With regard to the part of the chain which would be subject to the greatest deterioration in any given time, it was not, as was sometimes supposed, where it was washed, near the surface of the water, or "between wind and water," as it was termed ; the greatest friction would be on the lift of the chain, and the perpetual rise and fall ; there was an agitation there which would deteriorate the iron by friction, and materially reduce its size. It would also depend upon the character of the bottom very much ; but, as a general principle, the moorings of all floating breakwaters should not remain more than two or three years without a general inspection ; indeed, there would be no difficulty in inspecting them every year. The system was so well understood by divers and others that they could tell, by certain signs, whether there was any material alteration, and if there was anything serious a diver could go down and detach the shackle, and the chain could be taken up ; and, in the mean time, the floating structure could be held in its place without difficulty. The cost of these proceedings, with cables and anchors, was not sufficiently understood by people in general ; it constituted but a very small portion of the cost of any structure as a whole.

Admiral Tayler's breakwater, as we mentioned in a former article, was tried on an experimental scale at Brighton ; the structure broke from its moorings, or rather one of three sections did so. Admiral Tayler undertook with the Brighton Pier Company to lay down three sections of his breakwater, each about 60ft. in length, and they were to remain there under an agreement for four winter months, exposed to all gales. The moorings were supplied to him from one of the dockyards, and when they were taken thence to Brighton it was found that no proper shackles had been supplied with them ; but as it was necessary, in order to prepare for the next sitting of Parliament, that the work should be proceeded with at once, the master attendant of the dockyard advised a temporary plan, which was adopted, and when the breakwater had ridden out five months instead of the four agreed upon, application was made to the Pier Company for payment, which, however, they could not grant without permission of the Loan Commissioners, of whom they had borrowed £10,000 wherewith to construct the pier. It was then decided that the three sections of breakwater might remain where they were, to see how long they would last, and they remained, apparently without attention of any kind, for 14 months, during all gales. A company was subsequently formed, and two fishing boats were sent out to cast them loose, and they were placed upon the shore to show that they would lie upon the beach exposed to the breakers without injury ; and they remained on Brighton beach for two years, until they were taken to pieces. Nevertheless, in consequence of one of the small chains being broken before it could be properly attached to the mooring, one of the sections did break adrift, but not in a gale of wind, and when it was found to be adrift, two boats were sent out for it, and it was brought on to the beach. When Mr. Lenox was subsequently examined, he said of this trial at Brighton that he was acquainted with it, and that it was badly carried out, because it was hurriedly made and with a great anxiety to show what could be done. The cause of the giving way was that the pins of the shackles—which ought never to have been trusted to—shook out. Accidents of that sort, however, only arise when the moorings are affected by agitation or friction, as when pins are put through shackles, they should be solidly clenched. Formerly, ships got adrift from the Admiralty moorings, and there was a great outcry about it. The Admiralty Department consulted Mr. Lenox, and he devised a most simple plan, which made the connection quite perfect ; he dovetailed a chamfer on the top of the head of the pin, upon the eye of the shackle, and put in a pellet of lead, and by striking the lead with a hammer it dispersed itself, and could not be removed until driven out with a punch ; but that plan was not adopted in the case of the trial of Admiral Tayler's breakwater at Brighton. The shackle bolts would no doubt all be looked at in an annual or bi-annual inspection, and so there would be some safeguard, but it is better to have a clenched bolt ; the iron would in that case break before it would come away.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second meeting of the Institute was held on Monday night, the President, Mr. Edward I'Anson, in the chair.

Mr. McVicar Anderson, hon. sec., announced that they had received from the City Corporation, through Mr. Andrew Murray, a chromolithograph of the new Tower Bridge, the last work of their former President, Sir Horace Jones, and from Mr. R. Phené Spiers, a copy of his newly-published work on "Architectural Drawing."

Mr. Charles Fowler stated that Mr. Thomas Blashill, superintending architect to the Metropolitan Board of Works, had, at his suggestion, presented the Institute Library with copies in duplicate of that Board's regulations.

Mr. C. J. Phipps, F.S.A. : The regulations are very illusory. As soon as one has complied with the requirements, the Board of Works Committee turns round, and wants others met.

The books will be perfectly useless to any architect. (Laughter.)

The PRESIDENT called attention to the fact that the British School of Archæology at Athens invited students to visit that city for a period of four months, the only requirement being that they should be willing to assist in works of excavation. The British School were prepared to contribute the sum of £50 towards the expenses of one student, and that Institute would provide the selected candidate with a second £50. Applications should be sent in before Tuesday, Dec. 10, and particulars would be sent to all intending to enter.

Mr. ANDERSON said he must make a correction to the President's announcement. That Institute had not provided £50 for the selected student, for, unfortunately, their funds did not permit of such a step being taken; but their President had generously done so out of his own pocket—an explanation received with loud applause.

THE BUILDING AND DECORATIVE STONES OF EGYPT.

A paper on this subject was read by Mr. WILLIAM BRINDLEY, F.R.M.S., and was illustrated by numerous specimens of sandstones, granites, marbles, and porphyries, by water-colour sketches, and a relief model of the mountains near the west coast of the Red Sea, by some 200 large photographs of Egyptian buildings and scenery, and by full-scale coloured drawings of mosaic pavements. The limestone which was employed for building the Pyramids and in the temples and other buildings of Thebes was of extremely fine and hard character, and in that climate retained tool marks uninjured for centuries. He exhibited specimens removed from the Great Pyramid at Gizeh, and carved scarabs, and also examples of the Roman period, which were in an excellent state of preservation. Another excellent material was a sandstone of warm grey colour and fine texture. The chief quarries were about 90 miles south of Thebes; they were on either side of the Nile, and formed indeed a shelf or bed beneath the river. The material was worked in large masses, and was floated down the Nile on rafts to the towns where required for building purposes. These sandstone blocks were usually built without mortar, and the upper and inner surfaces were faced with a thin coat of stucco, and the same method was adopted in Roman days. The igneous formations were met with in a range of mountains along the western coast of the Red Sea, a spur running inland to the west, and crossing the Nile at the First Cataract near the ancient Syene, now Assouan. The granites were of many colours and varieties—red, grey, and blackish grey, and owing to the intense heat and absence of rain had been disintegrated on the surface. This face decay must have been going on for many centuries, for the lecturer found that many of the rock faces had been cut down in early times, through the rotten material, into sunk panels, on which were sculptured subjects. The surfaces of the great obelisk at Luxor, and of the sphinx and most other examples of Egyptian granites were peeling off, and the same process could be seen to have commenced in the colossal arm now in the British Museum. At Syene (Assouan) the immense Roman quarries could still be seen in rows, side by side, separated only by masses of *debris*. In one of these was an unfinished and only partially-detached block, measuring 95ft. by 11ft. It was generally called an obelisk, but the proportions did not agree, and the transverse shelves upon it showed it had been intended to cut the immense mass up into short lengths for sarcophagi. Having referred to the granite quarries of Mons Claudianas, Mr. Brindley described the ancient quarries of porphyry worked by the Romans, and to its use in Rome and Constantinople. The true imperial porphyry was, he added, a reddish purple stone of considerable hardness, susceptible of a high polish, and composed of a silicious paste in which were set white and pink crystals of feldspar. Under the Cæsars it was regarded as the most valuable building material the Roman Empire could produce, and it had continued so till the present day. Examples of its use might be seen in the sanctuary pavement of Westminster Abbey, and in the tomb of Henry III. in the same building, and at Durham Cathedral, while there were two columns in the British Museum, and other specimens at South Kensington, besides some in private collections. Pliny and other ancient writers only vaguely stated that the porphyry quarries were in Egypt, and for many ages they had been completely lost. The Roman quarries were actually rediscovered by Burton and Sir Gardner Wilkinson in 1823, and were visited by Lepsius in 1845, but no one of these travellers brought away specimens or took any notes as to the porphyry remaining. Mr. Brindley then described his re-examination of the quarries at Gebel Duchan in February of the present year, of which a full account was given in his paper* read before the British Association at Manchester in August last. He added that the method of extracting the porphyry must have been by metal wedges and not with wooden ones swollen by water or by diamond drills, as was often asserted. Indeed, he saw wedge holes in the vertical faces of the rock where it would have been impossible to have applied water to swell the wood even if water had not been so costly in such an arid and elevated situation. As for the supposed use of jewels for drills, Mr. Freeman had sent him up from Cornwall specimens of granite worked in the usual English manner, with coarse emery-powder tubes, which were precisely similar in working to examples he had brought from Egypt, and which could be compared side by side on the table. In conclusion, the author described some of the marble mosaics to be found in the mosques and Coptic churches of Cairo.

Mr. ALFRED WATERHOUSE, R.A., moved a vote of thanks to Mr. Brindley for his introductory paper, and which had been rendered the more valuable by the sketches, photographs, and specimens by which it had been illustrated. He had always thought that porphyry was to other building materials what the diamond was to other gems, but hitherto it had been out of reach of architects. He should have liked to have learned more about the rediscovered quarries, and how they were to be exploited for the use of this and succeeding generations.

Professor G. AITCHISON, A.R.A., seconded the vote of thanks. He concurred with Mr. Waterhouse that porphyry was a truly imperial material, and he was much afraid that even when Mr. Brindley's quarries were in full working order porphyry would not be cheap, on account of the difficulties of transport and the excessive hardness of the material. For a plain table top, a slab of porphyry, 7ft. by 3ft., he had paid £30, hardly representing the cost of sawing and shaping; but a usual price for pavement material was about £5 per foot super., and ½in. in thickness. The *opus Alexandrinum* mosaic derived its name, not from the town of Alexandria, but from the Emperor Alexander Severus, who made large use of this form of decoration. Many of the Egyptian marbles, granites, and porphyries were magnificent materials for decorative purposes, and the porphyry had this advantage for pavements, that it was only polished by the hardest traffic. The illustrations of mosaic pavements, inlaid with mother-of-pearl, reminded him of his visit to a mosque near Cairo, where he performed one of the few good actions of his life. He was looking over a mosque just outside Cairo, which had been left in the care of only one man, who offered to cut down for him large portions of the mosaic decorations from the interior walls, suggesting that if he did not have them the Khedive would probably give them to some Frenchmen. He declined to avail himself of the tempting offer, on the ground that an architect ought not to be the first to dismantle a historical building.

Mr. R. PHENE SPIERS, F.S.A., said that he, on the other hand, was instrumental in the mutilation of a mosque in the same city, for having persisted in going to the roof of a mosque to sketch, he found on a third visit that this had been rendered impracticable, the custodians having demolished the stone staircase. One of the most interesting points referred to by Mr. Brindley was the extraordinary preservation of building materials in the dry climate of Egypt. He was surprised to hear the disintegration of granite ascribed to the action of the sun, and thought this must be a mistake, and that the stone which was so decayed must have formerly been within reach of the rising of the Nile. Where the stone retained its dryness, as on the Temple on the Island of Philæ, modern inscriptions like those of Lepsius were no more distinct and clearly cut than those done in the days of the Cæsars, or the still earlier Egyptian hieroglyphics. The Egyptian serpentine was a very different material from the English stone known by the same name, and also from the green serpentine found in Sparta. The style of all the mosques in Cairo and its neighbourhood he believed to be based on the one at Kirwan, which had been referred to by Mr. Brindley.

Mr. TOPLER, of the Royal School of Mines having referred to Mr. Brindley's splendid and enormous collection of marbles from all parts of the world at his works in Westminster Bridge-road, remarked that the action of heat in disintegrating rocks did not seem to be generally understood. In this climate building-stones were destroyed by the intermittent action of water, which carried into the pores carbonic acid and other deleterious substances, and also broke up stone by mechanical action, by expansion during frost. In Egypt, however, the sun's heat was the only cause of the decay of the rocks, as the expansion during the day was followed by contraction at night, and the alternations caused the stone to become fissured. So violent was this action that the cracking sound could be distinctly heard, and microscopical examination of the mud of the Delta showed that it differed from other alluvial deposits in the presence of comminuted angular particles broken off the rocks which had not travelled far enough to assume the ordinary rounded forms. Mr. Brindley's theory was, therefore, fully corroborated. No member had alluded to the fact that among the twelve hundred columns in the Mosque of Cordova, pillars collected from all parts of the Mediterranean coasts, were two of purple porphry, rediscovered by Mr. Brindley.

Mr. T. GRAHAM JACKSON, F.S.A., felt that Mr. Brindley was entitled to all credit for having rediscovered the imperial porphyry; but it remained to be seen whether it would come into use again. He feared that it might not be found in large enough quantities to be of practical use, which would be a matter for regret, from its high value in mosaics. If such a hard and beautiful material could be brought within the reach of people of ordinary means, it would be a great advantage.

Mr. FREEMAN, of Penryn, confirmed Mr. Brindley's view as to the mode used by the Egyptians for splitting the granite and porphyry, adding that it would be interesting to know the means adopted by them for detaching the large masses of such very intractable material as porphyry, and the means of transport. By his firm's new process for sawing such materials, work which until recently would occupy two days, could be effected in two days, and the expense and delay was proportionately reduced.

Mr. BRINDLEY, in acknowledging the vote of thanks, said the biographies and inscriptions showed that the ancient mode of transport of porphyry from the quarries and the river, or Red Sea, was by oxen. These quarries at Gebel Duchan were one hundred miles from the Nile at Keneh, by the old Roman route across the desert, but only 22 miles from the port of Myos Hormos, on the Red Sea. He was having the country surveyed, and believed there was an easy gradient down to the latter port. He hoped to be able to supply porphyry in London, delivered viâ Myos Hormos and the Suez Canal, for about £3 per foot cube in place of the £8 per foot cube, the price at which he had been purchasing the material till recently. He was not, as he had explained, the discoverer of these quarries, as Sir Gardner Wilkinson found them in 1823, and Lepsius more than twenty years later, and more recently, unknown to him until his return from Myos Hormos, Schweinfurth had surveyed the district, but they had not made any practical use of their discoveries.

* See report with illustrative map in the BUILDING NEWS for Sept. 16 last, pp. 429-30 *ante*.

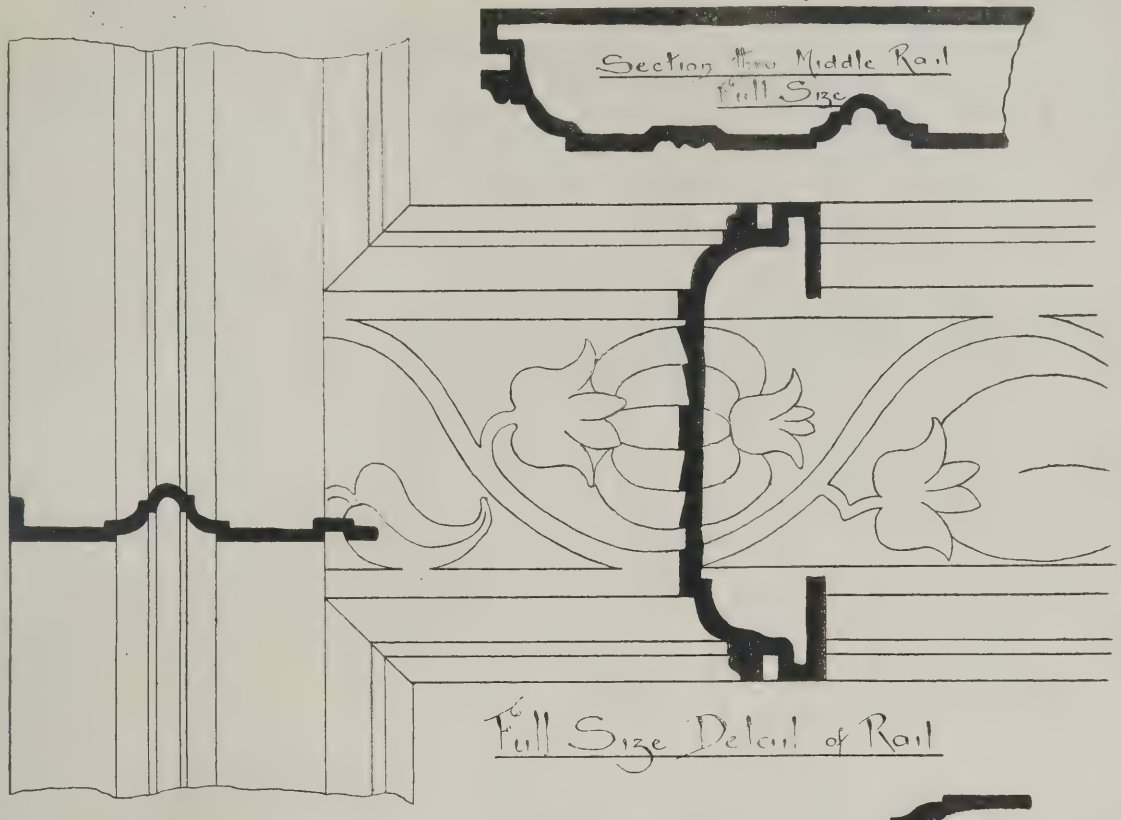
OAK SETTLE.

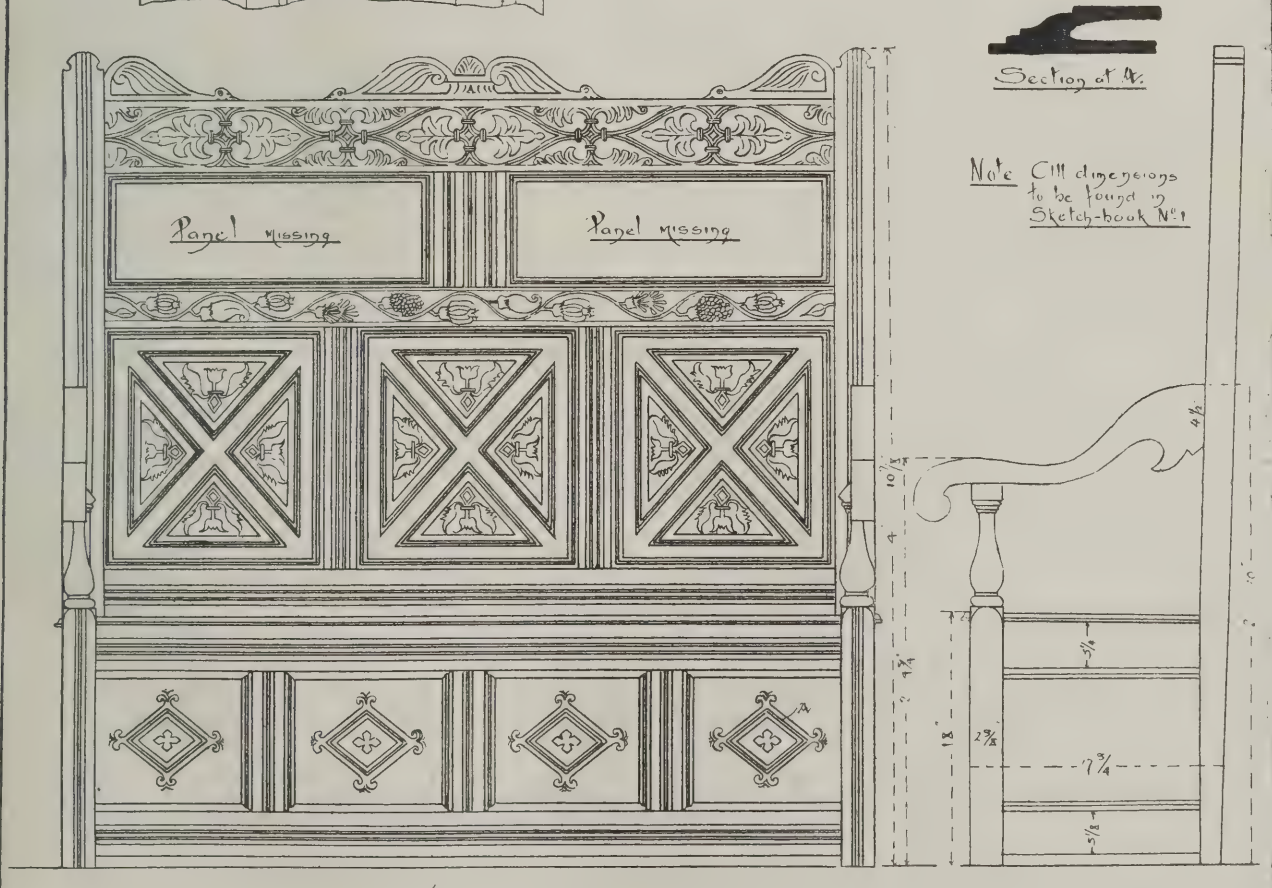
THE Oak Settle is from a collection of old oak furniture at the Old Hall, Gainsborough, and is the property of Sir Hickman B. Baron, Bart. HENRY G. GAMBLE.

Oak Settle from the Old Hall Gainsborough.

The property of Sir H. B. Bacon. Bart.

Measured August 6th.
Drawn August 10th 1887.
By Henry C. Gamble.





ARCHITECTURAL ASSOCIATION.

THE third fortnightly meeting for the present session was held in the R.I.B.A. room on Friday evening, the President, Mr. J. Slater, B.A., in the chair. The following 18 new members were elected:—Messrs. S. H. White, A. Huddart, F. W. Dorman, J. S. Stuart, W. W. Kenworthy, E. Thornton, R. J. B. Proctor, F. W. Bedford, F. W. Shenton, H. Tooley, W. J. Roberts, W. B. Clarkson, E. Box, C. T. Lofts, S. P. Silcock, Hayling, P. Leeds, and E. P. Howard.—Mr. T. E. PEYCE, hon. sec., read a letter from Mr. H. E. Freeman, secretary to the Architectural Union Company, stating that the directors of that company had made a donation of 20 guineas from their surplus fund to the Association library, to be expended on books for the lending department. On the motion of Mr. Burrell, librarian, seconded by Mr. H. W. Pratt, a vote of thanks was passed to the Architectural Union Company for their liberal gift.

The PRESIDENT said he had received a letter from Mr. Banister Fletcher, Warden of the Carpenters' Company, stating that any member of the Association, properly accredited, would be welcome to the use of the reference library of books on building and carpentry lately formed by that company at their hall in London-wall, E.C., and could borrow works from the lending branch on the deposit of 5s., which sum would be returned when the book was brought back. He hoped members would largely avail themselves of this kind offer, and believed that it would be of great practical use.

A. A. CYCLING CLUB.

Mr. F. R. FARROW, hon. sec., announced that on Tuesday, the 15th inst., a meeting of the cycling members of the Architectural Association was held at 9, Conduit-street, W., when a resolution was passed to the effect that it was desirable to form a club, to be called the "A. A. Cycling Club," having for its object the combination of architecture and athletics by instituting cycle runs to places of architectural interest. It was further resolved that the subscriptions to the club be merely nominal. The following were elected as officers:—Captain, Herbert D. Appleton; committee, J. C. Agutter, J. G. W. Buss, F. R. Farrow, B. J. Fletcher, O. Fleming, W. D. Gravell, C. O. King, C. J. Shaw, W. F. White, and Chas. W. Winmill; hon. sec., Leonard V. Hunt, 35, Queen Victoria-street, E.C. The meeting was adjourned till Dec. 6th.

OUR SKETCHING-CLUB SCHEME.

Mr. HERBERT D. APPLETON, F.R.I.B.A., vice-president, read a paper explaining his scheme for assisting architectural students in their sketching tours. The method to be adopted is a system of advisers and local representatives to be called consuls and vice-consuls, the titles used for similar officials in the Cyclist Touring Club. He wished that evening to raise a discussion on the question of the desirability of the Association making the proposed club one of its recognised methods of advancing the architectural education of its members. The United Kingdom will be divided into districts, following as much as possible the county boundaries; but in the case of the larger counties, these have again to be divided. A consul will be appointed for each of these divisions, and up to the present the promoters have succeeded in filling up twenty-seven of these, leaving twenty-five divisions to be filled up. They have only succeeded in appointing ten vice-consuls up to the present, and were particularly anxious to appoint as many of these as possible, as on them will fall the chief portion of the work. The exact boundaries of the divisions cannot be defined until the appointments are made. It is not a *sine quâ non* that the consuls should reside in their divisions. The following is a list of the divisions and the appointments made, and vacancies that have to be filled up:—

I.—NORTHERN DIVISION.

1. Northumberland.
2. Cumberland.
3. Durham—C. Hodgson Fowler, M.A., F.S.A., F.R.I.B.A., the College, Durham.
4. Mid York—G. H. Fowler Jones, 8, Lendal, York.
5. East York—John Bilson, A.R.I.B.A., 23, Parliament-street, Hull.
6. West York—J. D. Webster, F.R.I.B.A., 21, Church-street, Sheffield.
7. Lancashire—R. Knill Freeman, F.R.I.B.A., Bolton-le-Moors, Lancashire.

II.—NORTHERN CENTRAL DIVISION.

8. Cheshire—T. M. Lockwood, F.R.I.B.A., Chester.
9. Derbyshire—F. J. Robinson, F.R.I.B.A., Strand-chambers, Derby.
10. Nottingham.
11. Lincoln—James Fowler, J.P., F.R.I.B.A., Louth, Lincolnshire.
12. North Northampton and Rutlandshire—J. A. Gotch, F.R.I.B.A., Kettering.
13. Staffordshire—C. Lynam, F.R.I.B.A., Stoke-on-Trent.
14. Shropshire.
15. Leicester.

III.—EASTERN DIVISION.

16. Norfolk—E. P. Willins, A.R.I.B.A., 6, Bank-place, Norwich.
17. Suffolk.
18. Cambridge—W. M. Fawcett, M.A., F.R.I.B.A., 1, Silver-street, Cambridge.
19. Essex—Fred. Chancellor, F.R.I.B.A., 20, Finsbury-circus, E.C.
20. Huntingdonshire and Bedfordshire.
21. Hertford.
22. Middlesex.

IV.—SOUTHERN CENTRAL DIVISION.

23. Warwickshire—F. B. Osborne, F.R.I.B.A., 13, Bennett's-hill, Birmingham.
24. Worcestershire—Aston Webb, F.R.I.B.A., 19, Queen Anne's-gate, S.W.
25. Herefordshire and Monmouthshire—E. Seward, A.R.I.B.A., Cardiff, South Wales.
26. South Northamptonshire—W. T. Brown, A.R.I.B.A. Wellingborough.
27. Buckinghamshire.
28. Oxfordshire—T. G. Bruton, F.S.A., F.R.I.B.A., 17, New Inn-street, Oxford.

V.—SOUTHERN DIVISION.

29. Gloucestershire.
30. West Kent—E. I. Bennett, F.R.I.B.A., 5, Hammtreet, Gravesend.
31. East Kent—H. Benstead, F.R.I.B.A., 86, Week-street, Maidstone.
32. Surrey—E. Tuke, St. Michael's House, Basinghall-street, E.C.
33. Sussex—L. W. Ridge, F.R.I.B.A., 7, Upper Woburn-place, W.C.
34. Hampshire—C. R. Pink, Castle Hill, Winchester.
36. Wiltshire—C. E. Ponting, Lookeridge, Marlborough.
37. Berkshire.
38. North Somerset.
39. South Somerset.
40. Dorsetshire.
41. North Devon.
42. South Devon—E. A. Appleton, F.R.I.B.A., Torquay, Devon.

VI.—WELSH SECTION.

43. Flint, Denbigh, Carnarvon, Anglesey—A. Baker, 14, Warwick-gardens, Kensington, W.
44. Pembroke, Cardiganshire, Carmarthenshire.—D. E. Thomas, Haverfordwest.

VII.—SCOTTISH DIVISION.

45. South-east Scotland.
46. South-west Scotland.
47. East-central Scotland.
48. West-central Scotland.
49. Northern Scotland.

VIII.—IRISH DIVISION.

50. East Ireland—J. L. Robinson, A.R.H.A., 198, Great Brunswick-street, Dublin.
51. South Ireland.
52. West Ireland.
53. North Ireland.

LIST OF VICE-CONSULS.

6. West York—G. F. Terry, Buckingham Chambers, St. James-street, Sheffield.
11. Lincoln—R. Fowler, Louth, Lincolnshire.
14. Shropshire—W. A. Webb Somerville, Wellington, Salop; J. F. Fogerty, Priors Lee Hall, near Shifnal, Shropshire.
22. Essex—J. W. Lee, North-street, Colchester; H. Saul, Dover House, Fairlod-road-Leytonstone.
29. Gloucestershire—G. W. Sadler, jun., 6, Clarence Parade, Cheltenham.
33. Sussex: Eastbourne Division—N. C. Nisbett, A.R.I.B.A., 20, Oakley-square, W.
36. Wiltshire—C. Adye, Bradford-on-Avon.
42. South Devon—H. E Mallett, 11, Burton-crescent, W.C.
44. Merioneth, &c.—Telpe Smith, Rayden, Radnorshire.
46. Carmarthenshire—H. H. Moses, 55, Lower Cathedral-road, Cardiff.

The promoters are anxious to nominate as many vice-consuls for each division as will come forward. If possible they should be resident in their respective divisions, although a vice-consul living in London who had an intimate acquaintance with some locality in the provinces could render great assistance in connection with the central register. The duties of a consul are chiefly to receive reports of the vice-consuls and check the information supplied by them, and supply information to students who intend making sketching tours in his district. After this information has been checked and corrected, one of the vice-consuls, whose duty it will be to keep the register for the division under the superintendence of the consul, will enter the matter in the register and send a duplicate to the central office in London, where copies of all the reports will be filed. The form of the report should be based on the excellent examples to be found in Mr. E. Sharpe's book on the "Architectural Excursions in Lincolnshire," and to this might be added references to books which contain descriptions or illustrations of the building, a note whether the building has been measured, and, if it has been measured and not illustrated, a reference to the place where the drawing can be seen if possible. We have specially in view, as a first step, the indexing of what has been done in the way of illustrating interesting buildings. Many of the best illustrations are in recent publications, such as our A.A. Sketch Book and other similar books. The professional press contains a wonderful collection of illustrations of old work, and the Transactions of other societies must be carefully searched for information. The work of keeping the mind posted up to date with the vast number of publications will be a great work of itself. It is to be hoped that students will endeavour to measure up work that has not been previously illustrated, and it should be a point of honour with them to supply copies of their drawings to be deposited in the central office. A small collection of measured drawings exists in the library of the Institute, and some of the drawings which obtain the Architectural Union Company's prize are also deposited in the library. We could not do better, therefore, than to add to the collection already begun, and all the measured drawings obtained through the agency of this scheme should be presented to the Institute library, unless this scheme can be further developed, and an imperial collection be formed at the Imperial Institute, when our scheme might furnish the section devoted to the United Kingdom. Already an enormous mass of information exists on the subject, and among the books that must be consulted is W. Upcott's "Bibliographical Account of the Principal Works relating to English Topography," 3 vols., London, 1818, 8vo; R. Gough's "British Topography; or, an Historical Account of what has been done for Illustrating the Topographical Antiquities of Great Britain and Ireland," 2 vols., Ined., 1780, 4to., and M. J. Anderson's "Book of British Topography," a comparatively new book, referring only to books in the British Museum. Mr. E. Sharpe's account of the churches visited in the Lincoln excursions of the Architectural Association, London, 1871, does admirably for a limited number of buildings what we wish to do for the whole of the buildings in the United Kingdom. Among other books of value are "Notes on the Churches of Kent," by the late Sir Stephen Glynne, Bart. (London, 1877, 8vo.); "Hints on the Practical Study of Ecclesiastical Architecture and Antiquities," for the use of the Cambridge Society, 4th edition, 1843; Whewell's "German Churches," 3rd edition, 1842, concerning notes as to vaulting; and the "Ecclesiastical and Architectural Topography of England," (Parkers, 1851), dealing with Oxford, Beds, Huntingdonshire, and Cambridgeshire. In addition to this, in the portfolios of architects all over the country lie innumerable drawings of interesting buildings, and the author appeals to them to send a postcard to him at 157, Wool Exchange, Coleman-street, E.C., if they are willing to place these at the disposal of the scheme. Practically speaking, he added, the great bulk of this information is utterly lost for want of proper indexing, and the question is—how can we make these dry bones live? He thought by some such organisation as he had sketched out much of the valuable work done can be made of living interest, and, in course of time, of great historical importance. Of late years there had been a tendency to substitute sketching for measured drawings; but for a register of this nature, while sketches should not be excluded, efforts should be made to obtain as many measured drawings as possible. Now, when our scheme has got to work, the student who has made up his mind which district he proposes to visit writes to his consul for that division, and receives from him a list of the buildings of architectural interest and notes of the books which refer to the particular buildings and the number of buildings that have been already illustrated. The student is thus able to judge at once of the character of the work he is about to study, and to either read up beforehand the historical or antiquarian information that he may wish to acquire to render his studies complete or to take such books with him as will assist him in his investigations. From his experience, as

secretary to the Annual Excursion of the Architectural Association, the author knows the difficulty there is in finding accurate information about the buildings in particular districts. Even when we have had the assistance of the local architects and the accumulated wisdom of the committee, it has been the custom for some years past for the secretary to go over the ground before the excursion is arranged, and report on the number of good buildings to be found in the neighbourhood of the headquarters proposed. Now, much of this information the private student is quite unable to obtain, and it is to fulfil this purpose that the scheme was mainly started. To the student properly introduced to the consul special facilities for obtaining permission to visit buildings not usually open to the public might be granted, and generally the vice-consuls would act as guide, philosopher, and friend to the tourist; such necessary information as to board and lodging would also be supplied by the vice-consuls, and, possibly, in course of time, we might arrange tariffs like our prototype the C.T.C. The reason why the former attempts to form a register of buildings in the United Kingdom have more or less been failures, seem to be chiefly on account of the want of youthful vitality in the undertakings, those who started them having, in the inevitable course of events, grown old, and passed away, leaving no successors to carry on their work; but we hope to attract to the scheme a constant accession of young blood, so that the work being done by students for students it may, like our Association, always boast of perennial youth and enthusiastic support. Mr. I'Anson, in his presidential address, remarked the most fitting work for the Imperial Institute would be the production of a thorough and complete record—perfect in all its details—of the more important architectural monuments contained in India, and the many historical sites and ruined cities to be found within the various dependencies of Great Britain and Ireland. This has already been accomplished to a slight extent by private enterprise and liberality, but there is no complete or national work of the kind. We might help in this idea by presenting to the Imperial Institute the materials for the sections devoted to the United Kingdom. This scheme is for students worked by students; but if we might be allowed to work for an Imperial scheme as well as benefit ourselves, surely it ought to give an additional impulse to the movement. If of silver and gold architects have none, all can help in placing on record for the Imperial Institute the splendid inheritance which our forefathers have left us. The collection of such a register as Mr. I'Anson foreshadowed would be almost the complete architectural history of all time, and no prouder position could the Association occupy than to do its humble part in helping forward so monumental a work. Again, the value to our colonists of a complete record of all the architectural buildings in the United Kingdom would be almost greater than to ourselves. The value of some such collection is so obvious that surely an appeal has only to be made to the Council of the Imperial Institute for it to be warmly taken up, and he would suggest that as soon as the scheme had succeeded in making some substantial progress, he should offer to place the information collected at the disposal of the Imperial Institute as a foundation for the larger scheme. I simply suggest, said Mr. Appleton in conclusion, this ambitious view of my subject, as its ultimate development for your consideration; but I hope that, should it not meet with approval, it will not prejudice the simpler scheme out of which it has grown. The value of the great index of buildings of architectural interest is hard to exaggerate, and this could be compiled without the illustrations suggested for the larger scheme; but the collection, preservation, and systematic arrangement of carefully-measured drawings of old buildings is well worthy of the consideration of the Architectural Association as affording facilities for the study of civil architecture — the leading object of the Association, as set forth in the rules — and I will conclude by proposing: "That the Sketching Club Scheme be adopted as one of the recognised methods of the Architectural Association, and that the committee be asked to appoint a sub-committee to carry on the work."

Mr. J. A. Gotch, ex-president, said he had very great pleasure in seconding the resolution with which Mr. Appleton had concluded. He approved generally of the scheme, and it was evident that a remarkable step in advance would be made if in the first place a general list could be drawn up of the buildings of architectural interest to students existing in England, although they could not expect to get a complete catalogue for some years. The system of mapping England out into consulships was a good idea, as the consuls being familiar with their own districts, would be able to advise students as to the buildings best worth examination. The compilation of a general list of illustrations of all buildings was a formidable task, and it would be necessary to indicate which were good and which indifferent illustrations. Many were only of historical interest, as showing how badly at some periods people had drawn. In the same manner many buildings would be unworthy of notice.

Mr. F. T. Baggallay moved a vote of thanks to Mr. Appleton for bringing forward his scheme, which was well devised and would supply a want much felt by students.

Mr. Elgood, in seconding the motion, suggested that this movement could be combined with the proposed cycling club.

Mr. Hampden W. Pratt suggested that consuls should forward all information to the proposed sub-committee, who could tabulate the information, and so provide students for a small fee with information as to widely-separate districts and those overlapping several consulships. Such lists should indicate whether or not private houses and other buildings could be inspected, and if so the days and hours at which students were permitted to sketch. He thought the scheme for depositing drawings with the Imperial Institute would have to wait a few years before being developed.

Mr. F. R. Farrow supported the suggestion that all information should be transmitted by consuls to the general sub-committee, and Mr. T. E. Pryce wished to see Mr. Appleton's scheme carried out in its integrity, though it would be difficult to draw the line, as almost all buildings would be of interest to the architectural student. Much of the ordinary work they would probably find had been already done by local archæological societies.

Messrs. S. F. Clarkson, W. Randolph, C. C. Winmill, W. J. H. Leverton, and others took part in the discussion, and the resolution approving of the scheme and a vote of thanks to Mr. Appleton were passed by acclamation.

DINING-ROOMS.

A PAPER on this subject formed one of the contributions to the recent Convention of Architects at Chicago. Mr. Fredericks, the author, dealt with the subject in a practical manner. Taking the dining-table as the dominant centre to which all else must subserve, the author observed that the essentials are light and colour. "The exposure of the dining-room should, where possible, be on the side, avoiding the direct sunlight (especially during summer), and if feasible, should come from only one direction—that is, from windows placed on one side of the room, and if it can be done, from a single opening made sufficiently large and proportionate to the room, either as a single, double, or even triple window to suit the circumstances. The preference for this light should be given to the narrow side of the room. If light from two sides cannot be avoided, let the openings be placed opposite to each other on the narrow sides in preference to two successive sides, but never permit the light to come from more than two sides." Speaking of the colour, the walls are suggested to be of some neutral tint, never a violent or even a light tone, nor dark or showy. Warm tints are to be preferred; blue should be avoided. Warm, reddish tints, of a sombre but rich and tolerably dark tone are recommended because they will not lose their identity in the deepest shadows nor reflect the light, and they form good backgrounds for silver and glassware. For joinery hard wood naturally finished is preferred to dark wood; oak is a favourite wood. Dining rooms should be wainscoted. A panelled wooden ceiling and a hardwood mantel are suggested. Referring to decoration, the author observes that harmony and repose are necessary, and this may be obtained in three ways—by harmony of shades, of contrasts, and of combination. The first depends on one colour, but two or more shades; the second upon two colours—the combination of complementaries; the third upon more than two colours. Regarding picture ornamentation, the class of subjects should avoid the dramatic; the cycle of seasons or months is in harmony with the dining-room—so also are agriculture, the forest, and chase, incidents of domestic life of a cheerful kind. The ideal of such decoration is to be found in the Pompeian walls, with their decorative subjects upon a simple ground. Hanging-pictures by destroying harmony are to be avoided.

ARCHITECTS' ASSISTANTS' PROVIDENT FUND.

A MEETING of architects' assistants was held in the room of the Society of Architects, St. James's Hall, Piccadilly, on Friday evening, to consider the advisability of starting a provident fund. The chair was taken by Mr. Robert Walker, of Cork.

Mr. W. A. Chambers read several letters which had been received in support of the movement from the Architects' Benevolent Society, the Surveyors' Institute, the Society of Civil and Mechanical Engineers, the Glasgow Architectural Association (which offered a yearly subscription of two guineas to the fund), the South of Ireland Society of Architects and Engineers, and others from assistants in various parts of the country, some of which contained valuable suggestions as to the lines upon which the fund should be worked. Mr. Chambers explained that there was a wide difference between the existing Architects' Benevolent Society and the proposed Provident Fund; the former being a charity, while the latter is intended to take the form of a system of insurance. He asked the meeting whether it would be better to work under the auspices of any society, or to be entirely independent, and, speaking for himself, he warmly advocated entire independence and self-support. He gave a general outline of the obligations imposed by the Friendly Societies Acts, and suggested that the proposed society should be registered under them, both for the security of the promoters, and to give assistants confidence in the scheme. After a few words of thanks to the Press for giving prominence to the notice of the meeting, and to the Building News especially, for an article of the 4th inst, he concluded by moving the following resolution:—"That this meeting of assistants considers it advisable that an Assistants' Provident Fund should be established to provide monetary assistance to members in case of sickness, and insurance at death, on the consideration of the payment of a small subscription."

This was seconded by Mr. R. W. Coventry Dick, who advocated the Provident Society being open not only to the assistants of architects, engineers, and surveyors, but to all draughtsmen. He pointed out that men of his own class were more liable to sickness from the alternate confinement in offices and exposure on buildings than were men in most callings, while the risk of accident was also considerable.

Mr. Edgar Farman, in supporting the motion, suggested that the executive should consist of gentlemen drawn from the ranks of assistants themselves, and upon them would depend the ultimate success of the project. The one great principle to observe in framing these rules should be that the association must be self-supporting; he did not mean that it would not be open to receive subscriptions, but it must be framed upon a sound financial basis, independently of any outside aid that might be afforded. The letters that had been read from the various architectural and engineering societies on the subject showed that there was a great feeling of sympathy with the movement, and no doubt directly some scheme has been formulated subscriptions would readily be given to such a deserving object. The proper course would be to appoint a committee from the assistants present at once to draft the rules and call another meeting to consider them. If the association was to be a success the executive

committee must not, in framing the rules, deal with the subject of eligibility to membership in a narrow-minded spirit, for the larger the membership the better for the association and to all its individual members. The right to become a member should be open to any draughtsman's assistant, whether he were assistant to an architect, engineer, surveyor, or any other occupation directly or indirectly akin to architecture. The whole success of the scheme depended upon it being established on a liberal basis.

Mr. L. Sargent raised the question as to where the line should be drawn for admission to membership; and Mr. Ernest Farman drew attention to the Law Clerks' Provident Society as an example of a similar institution to that now proposed to be formed.

Before putting the motion, the Chairman remarked that it would not, if adopted, limit the scope of the proposed society, but would merely establish a principle. He strongly advocated the setting aside of all such crutches as patrons would be, and advised the widening of the base to the utmost possible extent; the movement must for success be a self-supporting one. He expressed great sympathy with it, and said that he considered it a duty of principals to see that their assistants joined; as for himself, he intended to pay the subscriptions for his own assistants. He also advised a graduated scale of subscriptions according to the age and salary received by the members, with a corresponding scale of benefit. The resolution was then carried unanimously.

Other resolutions were afterwards carried appointing Messrs. Brindley, Cattermole, Chambers, Davies, Coventry, Dick, Egan, Jewitt, and Kenny as a provisional committee to draw up a set of rules for the management of the society, and to call a future meeting to consider them, and accepting the offers of Mr. G. A. T. Middleton to act as hon. secretary, and of Messrs. Morse, Hewitt, and Farman to act as hon. solicitors to the committee. Votes of thanks were passed to the Society of Architects for the use of its room, and to the chairman for presiding, the speakers (Messrs. Chambers, Lethaby, Farman, and Walsh) laying great stress on the necessity for independence, as did also Mr. Walker in his reply.

STRESSES IN BRIDGES FOR CONCENTRATED LOADS.

AN exhaustive paper on the calculation of stresses caused by active concentrated loads appears in a recent number of the *Transactions* of the American Society of Engineers. The author, Mr. George Fillmore Swain, C.E., deals with a method of calculating stresses by taking the prescribed actual loads, finding their position on the structure necessary to cause the maximum stress in any particular member. The ordinary method has been to assume a uniform load over the whole length covered by the engines and train, or such load with the concentrated loads for the engines. The leading specifications now require the use of actual loads for engines and tenders followed by a uniform train load. The author proceeds to deal with the moments at any point of a beam, the maximum shear at any point, with and without floor beams. Mr. Swain alludes to the method of finding moments and shears by graphical means, or what he terms "Lines of Influence." The method is well understood by all who have studied graphical statics. The beam is drawn to scale, and the maximum moment at any point on it is to be found for any given load. The influence lines are drawn from each extremity to a point over the beam, such that its vertical height is equal to the product of the shorter segment of beam into which the load divides it by the longer segment divided by the total length. Then at any point a vertical ordinate to the said lines will determine the moment of the load. Any position of actual loads can be thus found. The "influence" line thus enables us to find any moment due to any loading; it also shows how much of the beam must be loaded to produce maximum stress, or at what point a single load must be to produce it. These lines may be drawn not only for moments, but for the shear or for the stress on any bar.

The author proceeds to show how a system of single loads must be placed to cause a maximum moment at any point; how the principle can be applied to find moment of floor beam, for shear and for stress. Examples of maximum shears and moments are given by the aid of diagram. The same system is applied to single intersection trusses, Fink and Bollman trusses, trusses with multiple system of web, curved chord trusses, and cantilevers. Mr. Swain's paper will be read with close attention by all who desire to simplify the operation of finding stresses. The method of moments is applied to the stresses of chords, verticals, and other members. The stresses in cantilevers may be found also by using influence lines, an illustration of which is given. The wide application of the method to all kinds of structures is a well-known fact. Mr. Swain has shown by demonstration and examples the readiness with which the stresses can be determined.

ARCHITECTURAL PRACTICE IN CHICAGO.

IN a paper on the "Difference between the Methods of Architectural Practice Now and Fifty Years Ago," read before the Chicago Convention of Architects by Mr. W. W. Boyington, the author said there were more architects in practice in the City of Chicago to-day than there was fifty years ago in the whole United States. Half a century ago America knew no styles except the Classic and Gothic, and very few pure examples of either were executed. The majority of buildings were planned and built by master builders, who usually made their plans on the face of the trustle-board, and shaded them with white, red, and blue chalk to designate wood, brick, and stone. Half a century ago there were no Schools of Technology, very few teachers of architecture; young men had to gain their knowledge as best they could. The studies at that time were chiefly the Orders of Classic architecture and their application to various buildings. Geometrical stair-building was at that time considered a great achievement. Fifty years ago, and less, architects were largely supported by contractors; now owners have found it to their interest to deal directly with architects. Formerly miles of street fronts were built from one pattern, as was the case in Philadelphia, but now architects' designs are adopted. English architecture has experienced the same changes. All that Mr. Boyington said with regard to architecture in the States fifty years ago may be said of the art in this country, with some slight differences. Alluding to Chicago, this gentleman said thirty-four years ago master builders drew up their own plans, but in course of time they saw the advantage of giving up designing, which took time, and induced one of their number to undertake plans, entirely guaranteeing him a compensation of two dollars a day. Making plans was ill-paid then; five dollars was considered a good sum for a set of plans for a dwelling. Since then the compensation has increased, and a percentage system adopted, which has become as general as it is in this country. There are said to be now three thousand practising architects in the States, though how many are doing legitimate business is not stated.

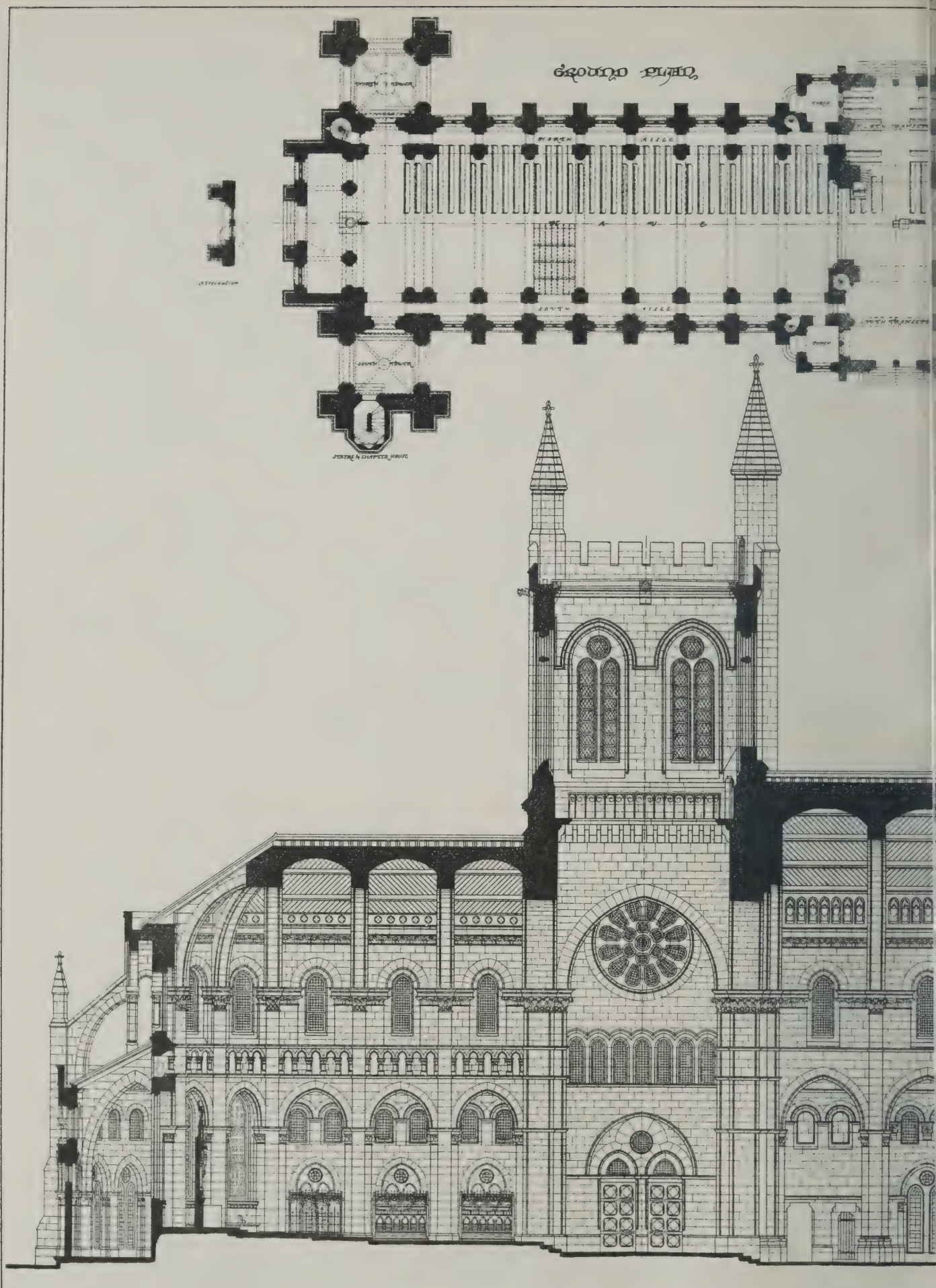
BOOKS RECEIVED.

Colour: An Elementary Manual for Students. By A. H. CHURCH, M.A. Oxon., F.C.S., Professor of Chemistry in the Royal Academy of Arts. New Edition (London: Cassell and Company). This little manual is a revised and extended edition of a small volume written by Prof. Church in 1871. The author, whose original researches and experiments are well known, has availed himself of the labours of Chevreul, Clerk Maxwell, Helmholtz, Rood, and others. The work is concisely expressed; thus, the definition of colour is satisfactory. "Colour is an internal sensation, and has no external and objective existence. As, however, it originates, in all the cases considered, in the impact on the optic nerve of that force or energy or 'mode of motion' which we call light, the study of some of the elementary facts of optical science may very suitably precede the consideration of the laws of colour and their application." So we have, first, a *résumé* of facts in connection with physiology and optics, the undulatory theory of light, &c. The subject is scientifically treated. The composition and analysis of light and the solar spectrum receive full attention. The history of the discovery by Sir Izaac Newton, and the experiments of Wollaston and Fraunhofer, are interesting, the author in separate paragraphs giving the results of scientific investigation in a clear manner, explaining the beautiful properties of the white light of the sun, how it can be decomposed into coloured elements, such as red, orange, yellow, green, blue, and violet; and how this white light admits of recomposition by the union of its elements. Those who take an interest in the scientific basis of colour, and all artists must do so, will find Prof. Church's remarks on tints, shades, and greys, the phenomena of colour sensations, complementary colours, simultaneous contrast, and successive contrast are instructive. Several coloured plates illustrating these properties of colours are given, and the observation on contact and separation of colours, double and triple combinations, chromatic equivalents, use of broken hues, will be found of value to artists, decorative artists, and colourists. As a textbook, Prof. Church's little treatise ought to be in the hands of every student.——*Life and Work of Joseph Firbank, J.P.D.L., Railway Contractor*, by FREDERICK MCDERMOTT, Barrister-at-Law, is an interesting sketch of the life of a man who commenced as a railway contractor 50 years ago, and who has constructed various lines in the kingdom. Amongst these contracts were the Settle and Carlisle, Bedford and Cambridge branch of the North-Western, the Bedford and London extension commenced in 1864, Tunbridge Wells and Eastbourne, and Metropolitan Extension to Harrow. He was engaged, too, on many great tunnels—the Woodhead, between Manchester and Sheffield (1841); the Oxted, on the Brighton and South-Eastern; the Belsize, on the Midland; and the Mark Beech, on the Brighton and South Coast, in which class of work his training as a miner had fitted him. Mr. McDermott's biography is of value in showing what indomitable industry and energy, combined with honesty, can do in raising a young Durham miner to a position of wealth. The chapters contain interesting records of Firbank's labours on the various railway systems. One of his latest and important contracts was the extension of the St. Pancras Goods Depot in 1883, including the screen wall surrounding the site on Somers Town adjoining the passenger station and hotel—a fine piece of red brickwork. The wood engravings are all poor, and the narrative would have been quite as well without them.——*Marion's Practical Guide to Photography* (Soho-square) is a new and enlarged edition of a very useful guide, which all amateur and professional photographers should have.

ARCADING OF STONE SCREEN BETWEEN THE NAVE AND NORTH-WEST CHAPEL, LINCOLN MINSTER.

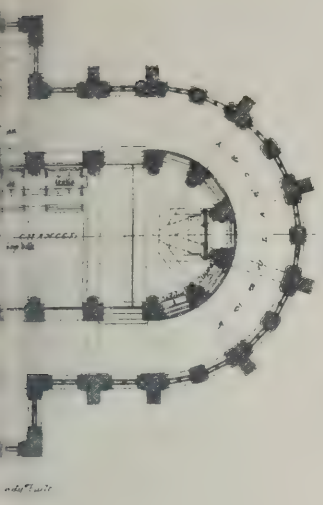
THIS arcading is from Lincoln Minster, and is arranged upon a low screen wall separating the North-West Chapel from the nave. It is Early English in character, and was built about 1220. The arch moulding is very vigorous, and the caps, devoid of all foliage, present a bold outline.

A circus in Nicholson-street, Edinburgh, recently destroyed by fire, is about to be rebuilt from plans prepared by Mr. J. Murray Robertson, of Dundee, the aim in reconstruction being to make the building absolutely uninflammable. The roofing is to be constructed throughout of iron, the walls are of brick and cement, and the whole of the wall surface, floors, and ceilings of the exit and entrance passages will also be of concrete. The roofing of these passages where outside the main building will be of iron. The space under the seats is to be solidly filled up. The seats and stalls are to be coated with asbestos or similar paint. Large iron tanks to furnish a ready supply of water will be erected at the level of the main roof, and hydrants will be put in round the building to the satisfaction of the firemaster. The general feature inside is an amphitheatre, and no part of the audience will be over another except at the main entrance, where there is a small gallery. Altogether there will be eight wide exits from the interior of the circus. Mr. Stewart is the builder.



LONGITUDI

Scale 10 5 0 10



ALL SAINTS CHURCH CANNINGTON ALLAHABAD.

WILLIAM EMERSON. F.R.I.B.A.
ARCHITECT.

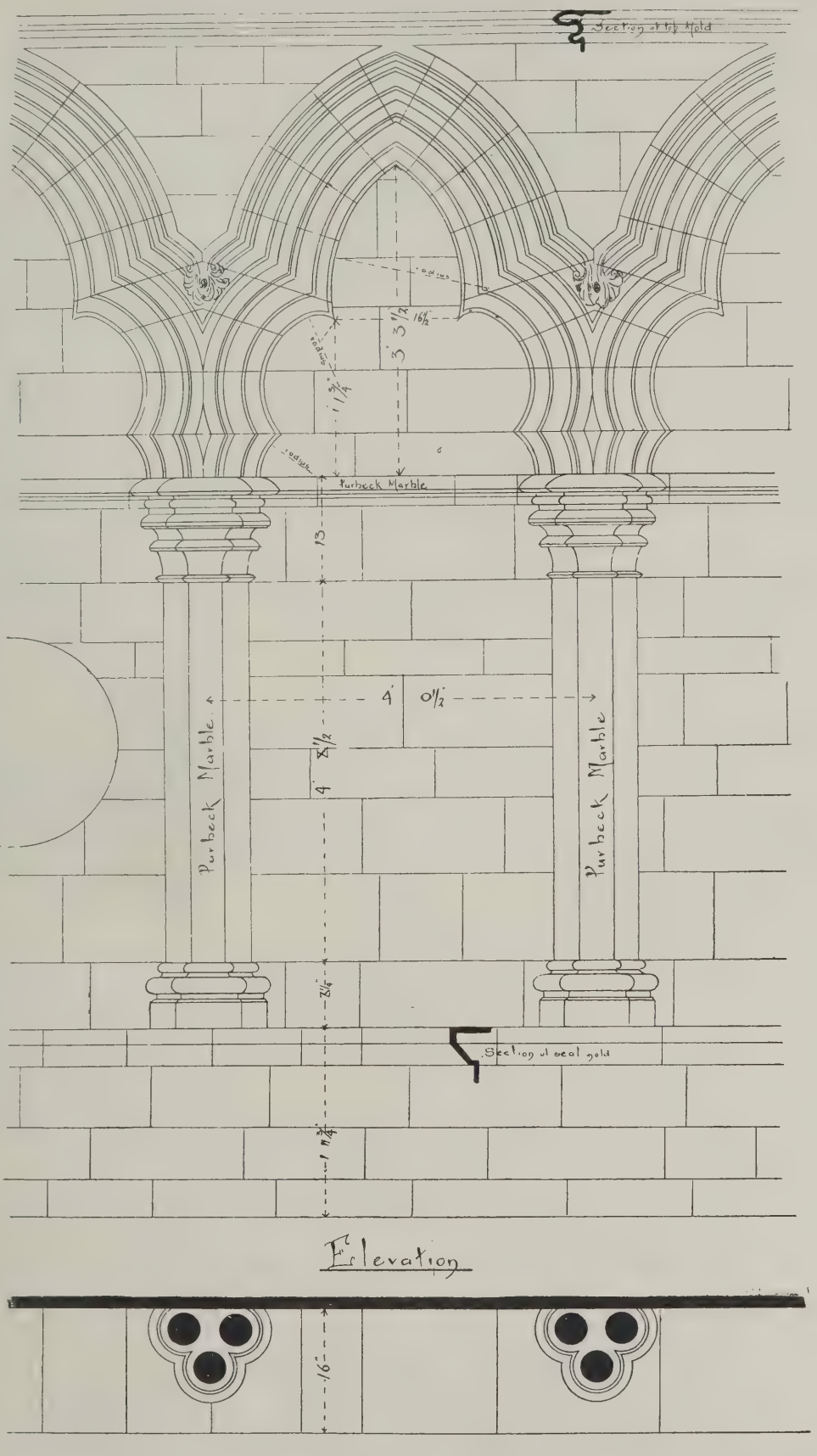
AL SECTION.

0 20 40 50 feet

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

Lincoln Cathedral.

Arcading on Stone Screen between the Nave and North West Chapel.



Elevation

Plan

Scale 0 1 2 3 4 5 6 1 2 3 of Feet

Measured and drawn by
Henry Gilbert Gamble
Lincoln July 5th 1887

CONTENTS.

Surveyors to Local Authorities and their Perquisites... 781
Street Formation and Ancient Lights 781
Works in Water.—XXXV. 782
Royal Institute of British Architects 783
Oak Settle 784
Architectural Association 786
Dining-rooms 787
Architects' Assistants' Provident Fund... 787
Stresses in Bridges for Concentrated Loads... 788
Architectural Practice in Chicago 788
Books Received 788
Arcading of Stone Screen between the Nave and North-West Chapel, Lincoln Minster 788
Our Lithographic Illustrations 790
Competitions 790
A Sheet of Brick Gables 790
Memorial of the late Rev. W. J. E. Bennett 790
Wayside Notes 811
Building Intelligence 812
Engineering Notes... 812
Architectural and Archæological Societies 813
Correspondence 813
Intercommunication 815
Legal Intelligence... 815
Stained Glass 816
Our Office Table 816
Meetings for the Ensuing Week 816
Tenders 817

ILLUSTRATIONS.

ST. MARY'S CHURCH, BANBURY.—SKETCHES IN NORMANDY AND BRITTANY.—ENTRANCE LODGE, STONELANDS, SUSSEX.—ALL SAINTS' CHURCH, ALLAHABAD.—ARCADING IN LINCOLN CATHEDRAL.—A SHEET OF BRICK GABLES.—BENNETT MEMORIAL CROSS, FROME SELWOOD.—OAK SETTLE FROM GAINSBOROUGH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. MARY'S CHURCH, BANBURY, OXON.

SOME few years since this church was restored by Mr. A. W. Blomfield, M.A., and it has been decorated in a very elaborate fashion by Messrs. Heaton, Butler, and Bayne, of Garrick-street, London, as will be seen by the photographic illustration now printed. The chancel lends itself very happily to a mural treatment of this kind, and the dome roof is filled with a representation of Christ seated in glory surrounded by the four-and-twenty elders casting down their golden crowns, while the four emblematic beasts are shown in front of the throne, and the seven lamps burning. In the three bays beneath are represented the Twelve Apostles, richly painted on gold backgrounds, the pilasters and columns are in Pompeian red, embellished with gold ornament, the details being of an elaborate character, both cleverly designed and executed. The remainder of the church is decorated in gold and colours, the whole effect produced is harmonious, rich, and pleasing. Our plate is reproduced from a photograph taken by Mr. G. Mold, of Banbury, and exhibited by him at the recent exhibition of the Photographic Society in Pall Mall.

SKETCHES IN NORMANDY AND BRITTANY.

IN the BUILDING NEWS for October 14th last, we published a series of pencil sketches under the above title, and printed some descriptive notes by their author, Mr. Francis Massey, giving an account of his architectural trip recently made in this district. To-day we give another sheet of his studies chiefly illustrative of old work in Dinan, together with a view of Arguiel Castle, Jersey. These sketches readily explain themselves, each sheet representing a page out of Mr. Masey's sketch-book: hence the quaint arrangement of some of the "notes." Studies of this kind, though open to the charge of being fragmentary, are certainly suggestive, and often useful.

ENTRANCE LODGE, STONELANDS.

THIS lodge stands on the summit of a steep slope close to the high road, from which the drive descends into a valley, rising thence to the house on the opposite hill. The external walls are hollow, those of the lower story, including all moulded work, being of the grey sandstone quarried upon the estate, while the upper story is hung with weather tiling, and the gables are of pitch-pine, coated with Stockholm tar, and roughcast. The roof is covered with brown Broseley tiles. The builder is Mr. James Longley, of Crawley, who has also built the house, stabling, and farm buildings for the owner, Mr. Frederick Frank, from the designs of Mr. Edward W. Mountford.

CANNINGTON CHURCH, ALLAHABAD.

THIS church was commenced some 15 years ago, and was at first intended for the cathedral of the North-West Provinces, and was designed to accommodate some 300 or 400 persons, and to have an open verandah or ambulatory all round. It was, however, afterwards decided that the cathedral of the North-West Provinces should be at Lahore instead, though it is now thought probable that this will eventually form the cathedral church of a new diocese. Since first begun, Allahabad, by reason of the extension of the railway system, has increased so enormously that it is found necessary to provide for the addition to the transept and choir of a nave accommodating a much larger congregation than was dreamed of at first. The illustrations show the new nave and western towers to be added. The nave is 56ft. wide and 130ft. long, and the total length of the church will be 240ft. The choir will probably be situated eventually under the central tower. The great heat necessitates the massive construction, and the two carriage porches under the towers, as well as windows low down that can be filled during the hot weather with wet Cuscus mats. The roof is supported on arches on account of white ants, and the general simplicity of the detail is necessitated by the class of workmen obtainable in this part of India. The pulpit is an exceedingly fine piece of workmanship in alabaster, by Mr. Nicholls, of Lambeth, from Mr. Emerson's designs. The work is carried out in a cream-coloured stone, with fine red sandstone dressings, and the roof is covered with red native tiles. The site is an extremely good one, being in the centre of a large open space at the crossing of four of the principal roads, each about 100ft. wide. Our illustrations to-day comprise a longitudinal section with the principal plan, and a cross section showing the western towers and end of the nave. At an early date we hope to publish some details of the exterior.

COMPETITIONS.

LUDLOW.—The first premium of £20 for the best design for a town hall and covered market, has been awarded by the town council, acting on the advice of the assessor, Mr. F. R. Kempson, of Hereford, to the one submitted under the motto "Straight and True," which proved to be by Mr. Henry A. Cheers, of Twickenham. The estimated cost of the building is £5,000. Mr. Cheers has been definitely appointed architect.

CHIPS.

The Earl of Meath, better known by his former courtesy title of Lord Brabazon, delivered an address on "The Importance of Open Spaces," at the Parkes Museum, on Thursday night, the 17th inst. Mr. E. C. Robins, F.R.I.B.A., presided. After explaining the importance of his subject, the lecturer argued that the City Corporation had set an excellent example in buying Epping Forest, Ham Park, Burnham Beeches, and Coulsden Common.

On Tuesday a special service was held at St. Michael's Church, Tenterden, for the purpose of unveiling a window placed in the sacred building to the memory of Admiral G. T. Gordon, K.H., K.S.F., J.P., by his widow. The subject is Christ walking on the Sea, and St. Peter, as he is sinking in the waves, looking up to Him and seeking His aid. The work has been executed by Messrs. Ward and Hughes.

Mr. W. Noel Sainsbury, of the Public Record Office, editor of the "Calendar of Colonial State Papers," has been appointed Assistant Keeper of the Public Records.

The Forster Memorial Committee have finally decided to erect a memorial statue at Bradford, and to apply the surplus of the subscriptions as a nucleus for a fine art gallery, towards which a sum of £5,000 is promised by Mr. G. Hodgson.

The City Court of Common Council have again discussed the question of the appointment of an architect, and decided at their meeting last week, by 92 to 53 votes, to refer the matter to the Officers and Clerks' Committee to consider and report forthwith as to the duties of the office.

Lord Wolseley will unveil at Liverpool on Dec. 16 a statue to General Earle, who was killed in the Khartoum expedition. We illustrated the statue, of which Mr. C. B. Birch, A.R.A., is the sculptor, in the BUILDING NEWS for June, 1886.

A SHEET OF BRICK GABLES.

THIS page of drawings of German brickwork is taken from the portfolio of Herr von O. Spekler, Director of the Building Trades Technical School at Erhernforde, entitled "Die Bauformenlehre mit besonderer Berücksichtigung des Wohnhausbaues und der Bürgerlichen Baukunft."* The plates include elementary studies illustrative of the construction of walls, piers, arches, and vaults. Varieties of treatment with splayed and shaped bricks are elaborated with practical diagrams both in sectional drawings and perspective views, showing the bond of the work and its particular jointings. Eaves courses and oversailing cornices, composed of ordinary bricks, are evidently esteemed somewhat highly, though it must be confessed that they are at best but crude contrivances as compared with the details easily obtainable in terracotta, such as we in England are accustomed to in many of our leading public buildings, such as the New Law Courts at Birmingham, now building, or the Science Schools at Kensington and the Natural History Museum. The plate of Herr von Spekler's designs, herewith reproduced, shows a series of typical gables, for the most part constructed of the ordinary brick, and designed with ingenious variety. Figs. 3A and 4A introduce ridge and pantile terminals, and Fig. 4B gives a quaint-looking cresting, Fig. 6C being another example of more simple form. For warehouses and railway stations such a style of work has been often found more or less suitable, being a bold and comparatively cheap form of giving a finish and degree of detail to what, by the nature of things, must otherwise remain possibly a spankingly plain dead wall. To cultivated tastes, of course, a broad well-proportioned breadth of good brickwork is by no means despised or lightly esteemed; in fact, there can be no doubt that our modern designs generally fail on account of their overfussiness and want of dignified simplicity. Tastes, however, necessarily do, and will continue to, differ, so that a large class of readers connected with the arts of building will value the style of design here adapted with so much skill and knowledge of technical detail by Herr Spekler, whose book we may thus introduce on the present occasion. The diagrams on the sheet here printed are delineated to scale, and in a general way will explain themselves. The plates measure 16½in. by 11½in., and several of them are printed in washed tintings. The letterpress pamphlet, with the lithographs, is printed to a smaller size, for easy reference. For technical teachers, this portfolio will probably be found very useful.

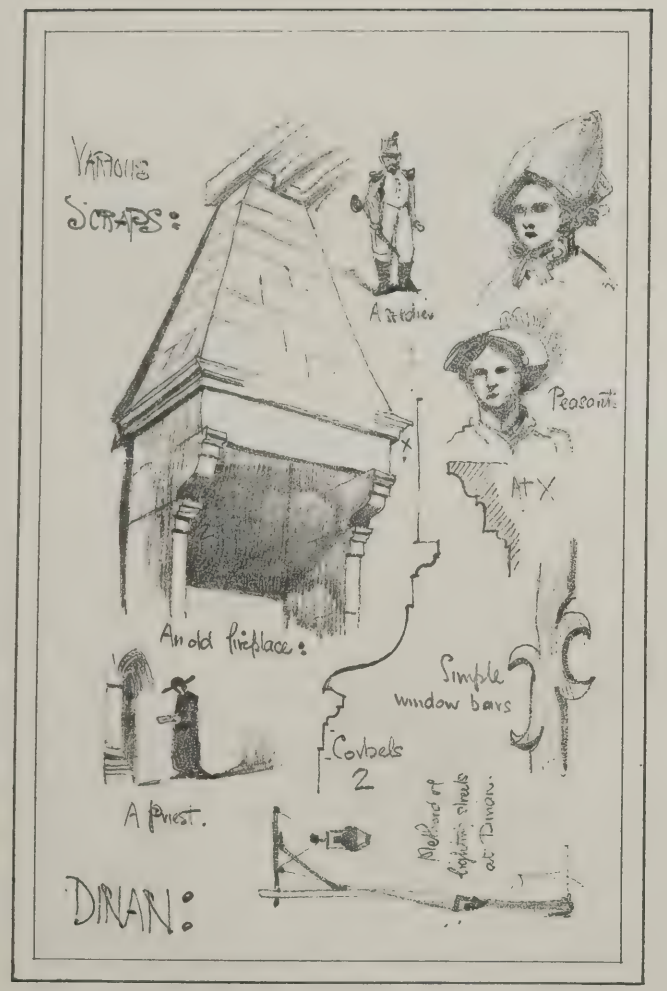
MEMORIAL OF THE LATE REV. W. J. E. BENNETT.

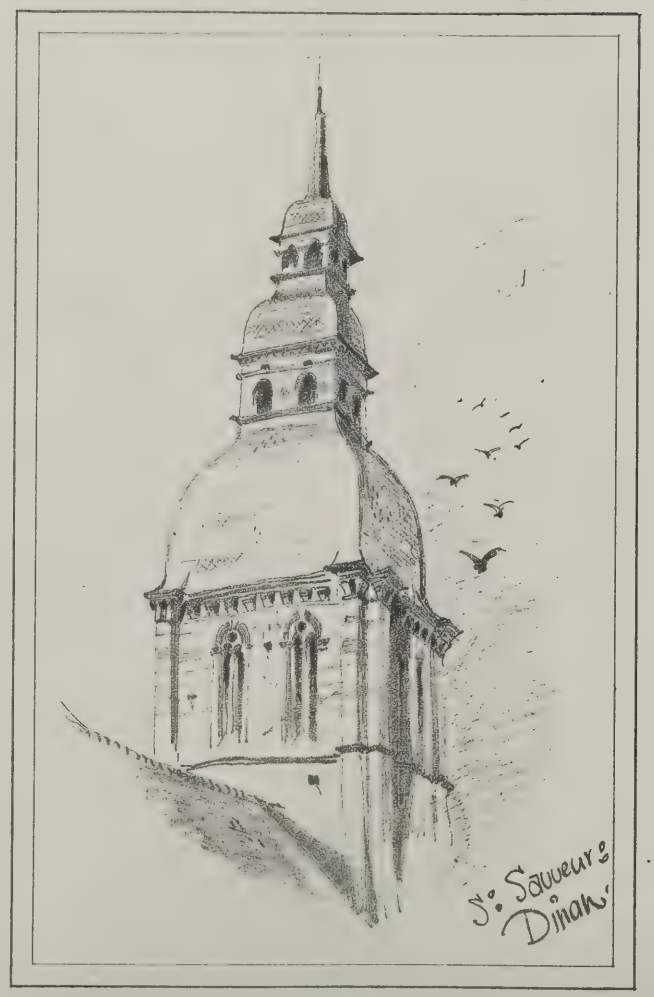
DURING the lifetime of the late Rev. W. J. E. Bennett, vicar of Frome, Somerset, a churchyard cross was erected by him, intended to serve as a memorial of his tenure of the living. The cross and its approaches having fallen into a bad state of repair, it was determined to perpetuate his memory by restoring it and adding an ornamental balustrade, as shown in the drawing. The churchyard being laid out in terraces, the site allows of a prominent position to the memorial, which will group effectively with the fine parish church adjacent. The steps are of red Mansfield stone and the balustrade of Doulting stone, the space inside the balustrade being laid with tile (mosaic), having Mr. Bennett's monogram introduced in the design. The carving is by Mr. H. T. Margetson, of Chelsea; Mr. F. P. Brown, of Frome, is the builder; and Mr. W. V. Gough, 24, Bridge-street, Bristol, the architect.

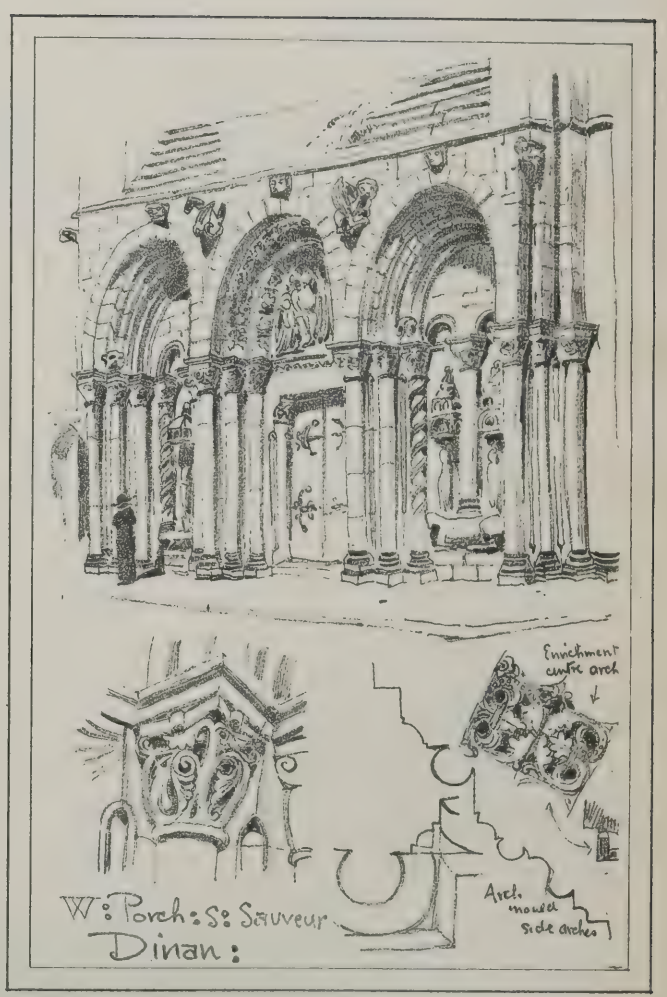
As a memorial of Canon Alcock's 40 years' incumbency of the parish of Ashford, East Kent, it has been decided to fill the south transept window in the church with stained glass. The committee have requested Messrs. Powell, of Whitefriars, to furnish designs and estimates.

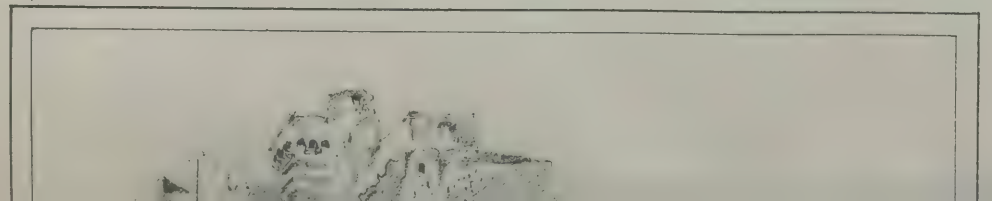
The internal restoration of St. Stephen's Church, Bristol, is being completed under the direction of Messrs. Pope and Paul, of that city. The carving to the seats has been carried out by Mr. Harry Hems, of Exeter, and the lighting and ventilating by Messrs. Jones and Hudson.

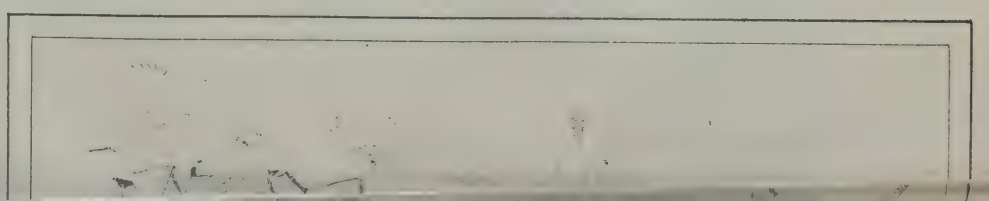
eipsig, T. O. Weigel. 1887


VARIOUS SCRAPS:
A Peasant
A Peasant
An old Fireplace:
Simple window bars
Corbels 2
A Priest.
DINAN:

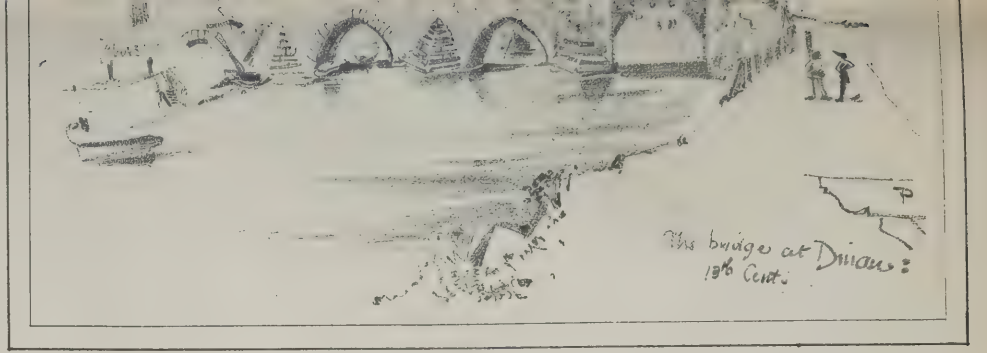

S: Sauveur: Dinan:

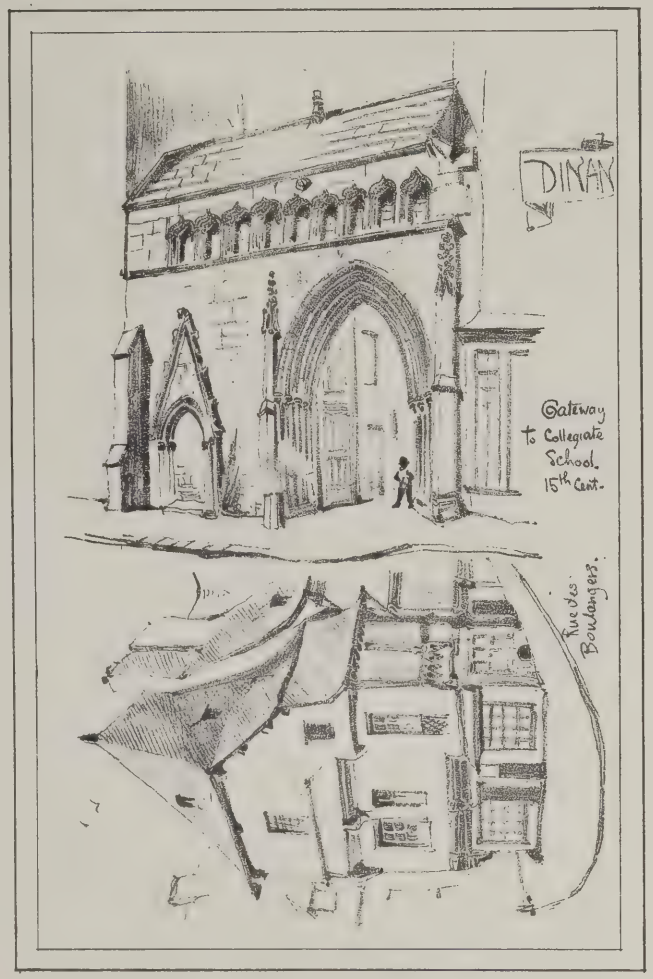

Enrichment centre arch
Arch. moulded side arches
W: Porch: S: Sauveur Dinan:

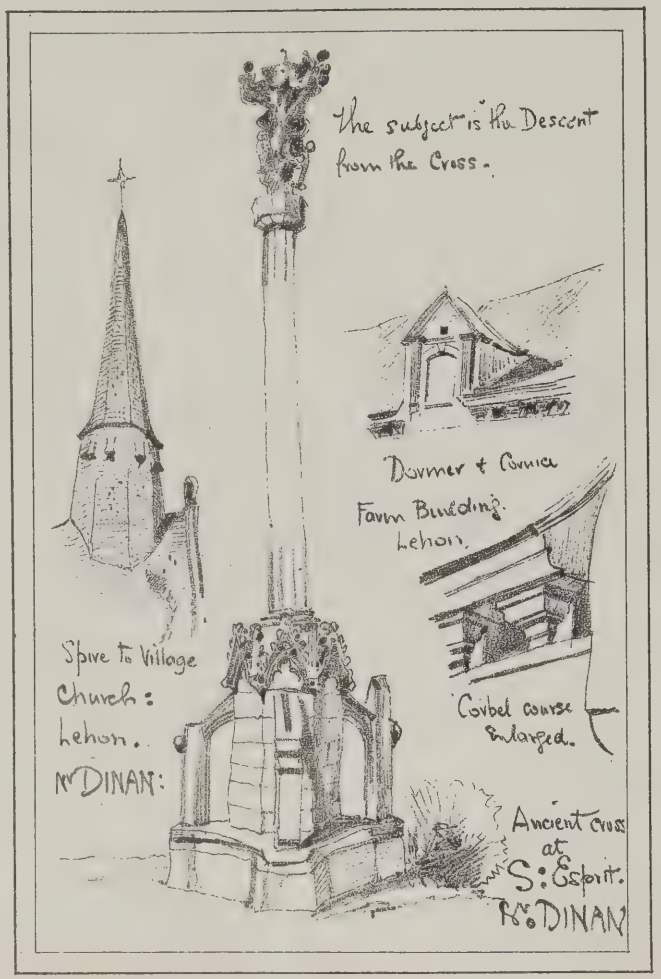


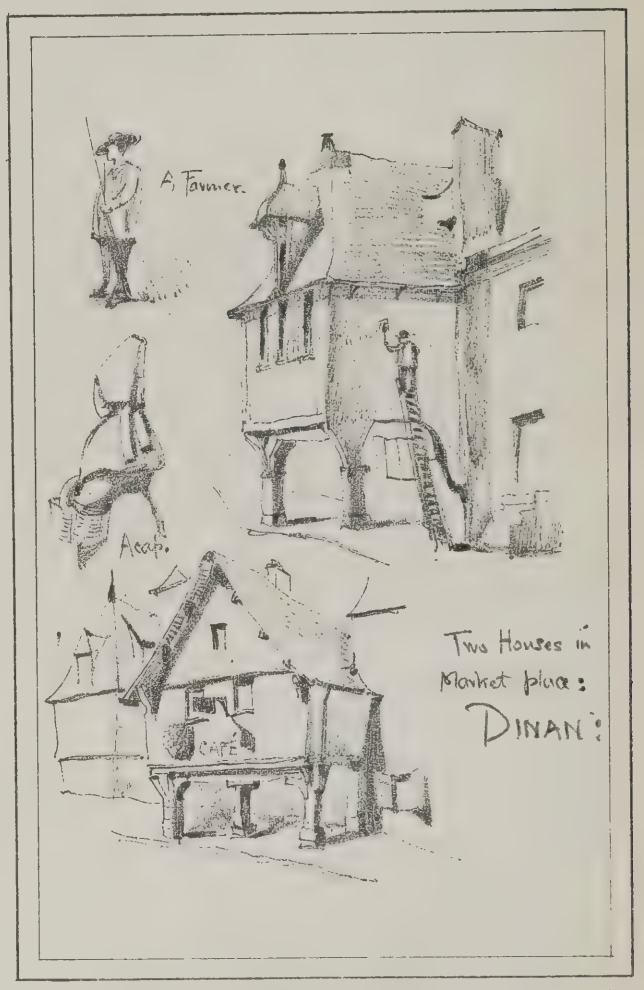










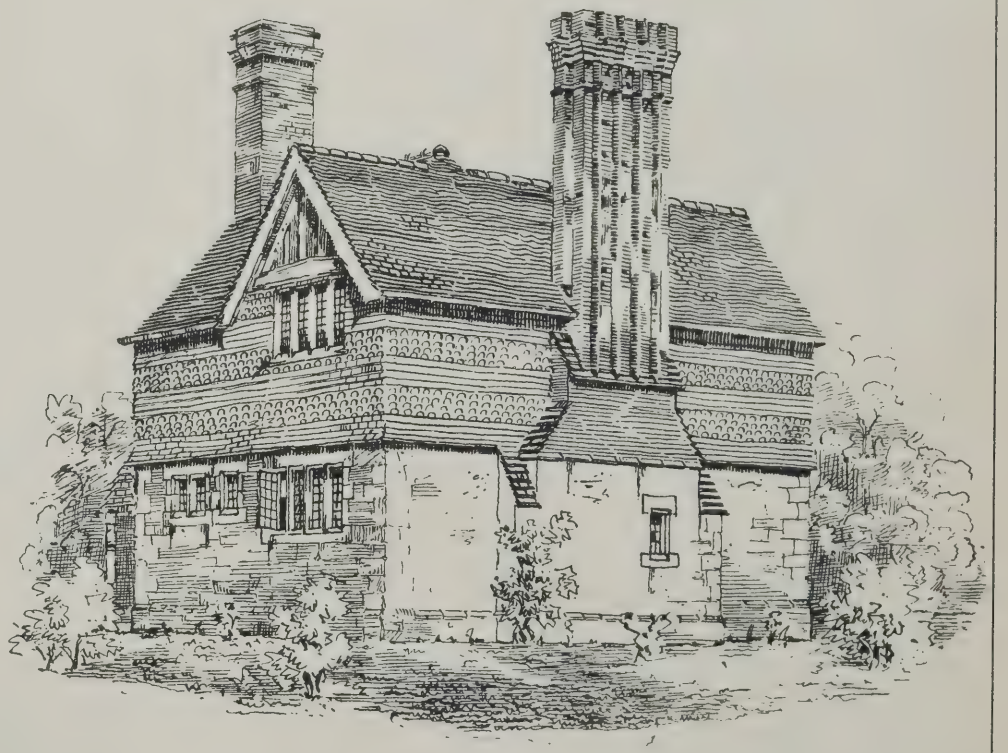


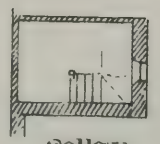
"PHOTO-TINT." by James Akerman, 6, Queen Square, London, W.C.

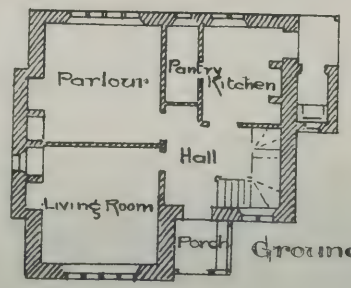
NOTES IN NORMANDY AND BRITTANY

BY · FRANCIS · MASEY









Entrance Lodge

Stonelands. Sussex

For F. Frank Esq

E. W. Mountford. Architect.
22. Buckingham St. W.C.

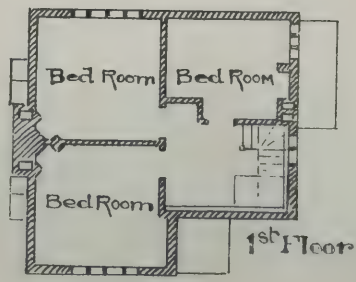


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.


LORD GOD ALMIGHTY
THOU HAST CREATED ALL THINGS



ST MARY'S · CHURCH · BANBURY · OXON

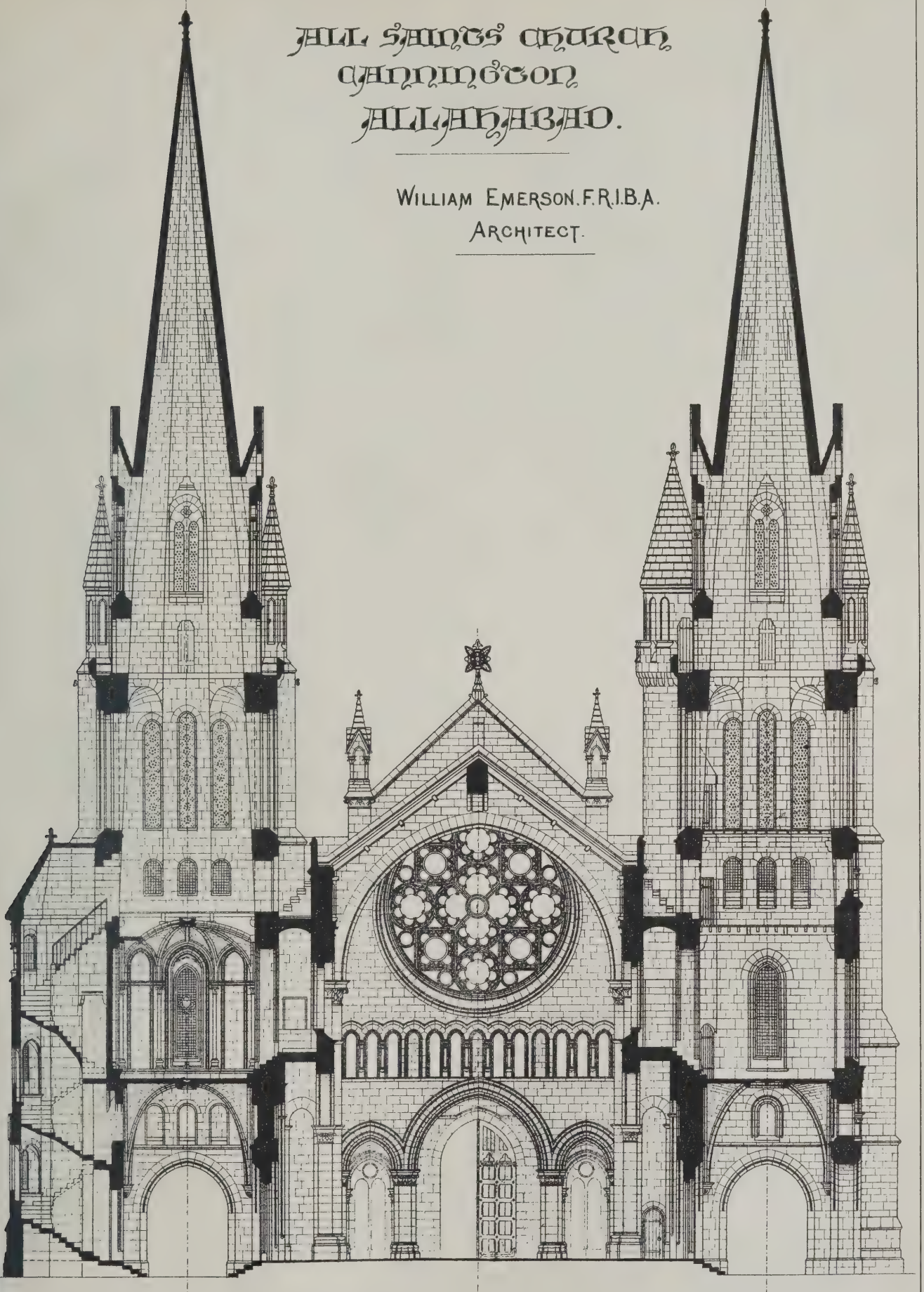
RESTORED · AND · DECORATED · BY · A·W· BLOMFIELD · M·A· ARCHT

PHOTOGRAPH · BY · G·MOLD

"PHOTO-TINT" by James Akerman 6 Queen Square London W.C

ALL SAINTS CHURCH CANNINGTON ALLAHABAD.

WILLIAM EMERSON, F.R.I.B.A.
ARCHITECT.

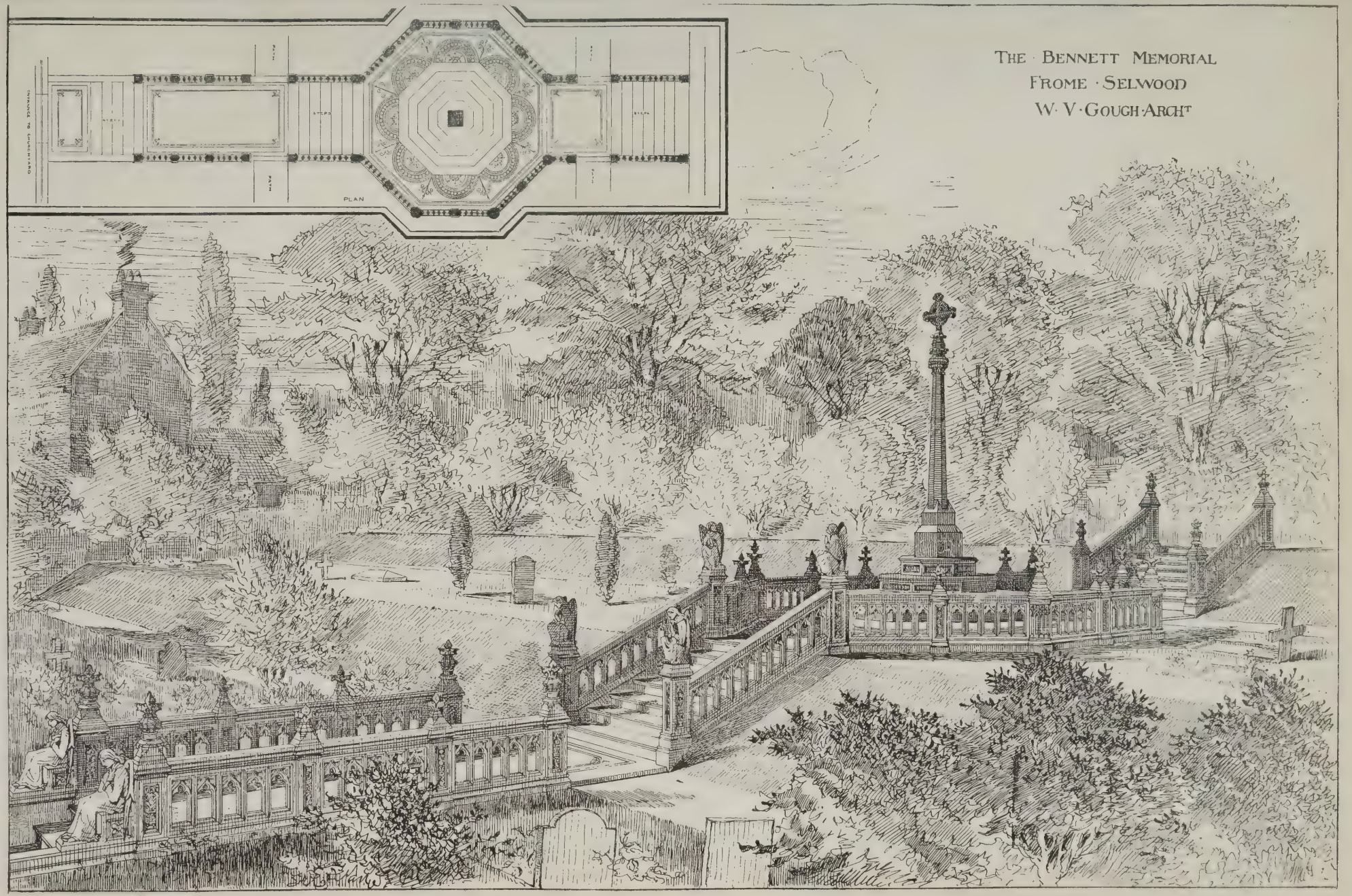


CROSS SECTION OF NAVE THROUGH TOWERS

LOOKING WEST.

Scale 0 1 2 4 6 8 10 20 30 40 50 feet

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



THE BENNETT MEMORIAL
FROME · SELWOOD
W. V. GOUGH ARCHT

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

WAYSIDE NOTES.

THE City Fathers having changed their minds in the matter of the office left vacant by the death of Sir Horace Jones, we are provided with an interesting topic, and one that affords us margin for considerable speculation. Who is to be the new architect to the Corporation? Have you noticed that Mr. So-and-So has put up for the post? Have you seen the candidates' appeals in the papers? &c.

Personally, I have seen and noted a good deal, and much has struck me as not a little curious. A comfortable berth like that of architect to the Corporation of London has called forth many candidates whose names are familiar to us, and one indeed that is a household word in the profession. Messrs. FF.R.I.B.A. will doubtless come forward in considerable force and endeavour to obtain the very desirable architect- and surveyor-ship. In these times it must appear a sort of heaven upon earth to step into the shoes—large as they were—of the late Sir Horace Jones.

It is to be supposed that merit will go before favour in this instance. We may talk about "exalted Bumbledom," but it is probable that the best man will win the day. Let us hope so, at any rate. It is true the canvasser seems to imagine that if he can show that he is a member of many and varied "worshipful" companies—be they butchers or bakers or spectacle-makers—he is at least a score of rungs of the ladder in advance of his competing fellow-professionals. Perhaps he is right, in spite of our anticipations. "Influence," quoth a rather 'cute friend once, "goes for a good deal in this world; marriage next; and the gift o' the gab is the most powerful instrument of all."

The fact that the City folk have, in the eleventh hour, repented of their former decision ought really to somewhat cheer up those who have got into a Slough of Despond over the prospects of the profession. Touching this question of "the future of the architect," I would suggest that every youngster who enters an architect's office, if he be but fitted for the calling in the first instance, and possesses the *mens sana in corpore sano*, has in his own hands the power to build up a sound reputation and solid business, be the present condition of the profession what it may. But he will not do much if he halts on the way to complain, and he will never reach his goal if he allows himself to grow faint-hearted at every difficulty. Neither as an assistant nor as a full-blown architect will he earn honour or a competency by taking a pessimist view of his own position, that of his profession, or that of affairs in general.

Life is "a soldier's battle," it has been said—a sailor's, too, for the matter of that. Those who can only swim in smooth waters must go under at the first storm they meet. At the present time, as we all know, there is a pretty considerable tempest raging, and the good ship *Architecture* has been buffeted about mercilessly by the waves. But despondency amongst her crew will only increase the danger of the company.

Moreover, the architect is not the only one who has to complain. All businesses are now under a cloud. And to be candid, it must be confessed that it has all along been my innermost thought that, should good business some day result, and some degree of prosperity once more fall upon the old country, all our talk and querulous complaint as to the condition of the profession and the shortcomings of it as a body or in detail would cease, till the years of plenty once more gave way to another period of starvation prices.

Meanwhile, therefore, let us look upon matters in the brightest possible light, and guard against the evil effects of giving way to despair. Let us also—as President Lish suggested in his recent address to the Society of Architects—endeavour to become more practical, and reserve archæology for our own pleasure and delight. There is no doubt that the public (when they think about the matter at all) judge the architect by tests much as those given by Gwilt, which, it will be remembered, are according to his ability to solve the following problems:—(1) For a given sum, as in private buildings, to erect the most convenient and suitable house for his employer; and (2), the requisites in a building being given, as in public buildings, to erect it at the smallest possible expense.

These are both purely practical questions; and, Sir, in directing attention to the necessity for a more practical education for the architect, your correspondent Mr. Woodward has done good service. But if this be so, we should surely recognise Lord Grimthorpe as one of our greatest benefactors. Last Monday there appeared in the columns of the *Times* a letter from his lordship which was not over respectful to architects in general and the R.I.B.A. in particular. Referring to the question of the compulsory examination of all architects, it suggested that *engineers* and *builders* should examine the young architect, and insinuated that architects themselves knew little or nothing of constructional matters!

In last Friday's issue of the journal referred to there was an article on St. Alban's Abbey, detailing the most recent works in connection with the "restoration" of this noble old pile. It is some time now since I was at St. Alban's—two or three years—so I suppose there is much of the building that would be unrecognisable. I remember they were then at work on the nave, and a pretty wholesale restoration it was! Any who may be anxious to "get up" the subject of St. Alban's Abbey will find the work on the history of the building by Messrs. Buckley very complete and interesting.

The chief glory of the external architecture of St. Alban's is—no, *not* the world-renowned turrets at the west end, but the fine lantern tower. There is something of the sublime in this noble mass of Roman bricks, and, in certain lights, there is much of the beautiful. The old bricks have assumed a wonderfully fine tone; and, standing under the south-east angle of the tower, it exhibits a marvellous variety of tints. I trust that it has not been interfered with in any way by the "restorations." To those of us who have not visited the building for years, it is rather a shock to read, in the article above referred to, that "The great increase in bulk from the new roof and turrets is now very striking from the Midland Railway."

It does not appear to me that there can be much gained by this increase of bulk in the roofs. The sturdy old tower will now be less dominant, which is to regretted, as, from its hoary age and noble design, it was deservingly the dominant feature of the composition. A fine object from afar is this old tower. I have seen it miles away, both from the south, where we may look out from an elevated position on the great north road, over miles of pleasant, undulating country, and see its misty outline in the blue distance, or from the road to Dunstable (of Priory renown), when it soars grandly above the trees and house-tops of the old village.

Of archæological interest, I note an illustration in the *Graphic* of a "Nestorian tablet near Li-Ngan," in North-Western China. The tablet is said to date from 780 A.D., and to be the only relic of the Nestorian Christian Church yet discovered in China. It appears from the letter of the gentleman who forwarded the photograph from which the illustration was prepared that the existence of the memorial was known before. It is an upright slab of commonplace outline, but curiously carved. Have been rather "gone" on old sepulchral monuments of late, so endeavoured to find out something about this one, but could glean nothing about it; nor, in fact, anything about Nestorian monuments in general. Fergusson merely hints at the subject.

Oh, Jubilee! What is the profession coming to? The wail is prompted by the perusal of the splendid offer of the East Grinstead Jubilee Memorial Institute Committee. That embodiment of economy proposes to put up nine hundred pounds' worth of loyalty, and offers the fortunate competitor £5 5s. "as his sole remuneration"; and does not pledge itself to employ the architect whose plan may be selected. I hope the committee will not ruin their builder as well as starve their architect—they want enough for their £900. "The building must contain spacious entrance-hall, reading-room and library, committee-room, smoking and games room, coffee bar with kitchen and scullery, lecture-hall *as large as possible*, at least two bedrooms for caretaker, lavatories, w.c.'s, and coal and wood store. The coffee-bar and kitchen will probably be best situated at the narrowest end; but this and *other details* are left to the architect's judgment." All plans must be in by Dec. 10, so the sucking Nelson of the profession has only a fortnight to earn his "honorarium of five guineas" in.

It being requisite to pay over to the Horsham Local Board the sum of ten shillings sterling, if we would become acquainted with the nature of their proposed competition, I have not considered myself justified in surrendering that amount for the privilege of viewing the conditions. Many more must feel that, small though the sum be, it is too large a price to pay for merely satisfying one's curiosity. The wisdom of this kind of "blackmailing" may be doubted. It is, of course, argued that the compelling of the payment of a fee keeps out the smaller fry (though every office-boy might get his aunt to advance ten shillings) and encourages only "genuine" competitors. But one can never tell from an advertisement whether or no it is worth our while to enter a certain competition. By demanding an "entrance fee," therefore, the inaugurators of competitions often debar themselves from the suggestions of good men, as, however wealthy these latter may be, it always goes against the grain of average humanity to part with hard cash on such conditions.

GOTH.

CHIPS.

A new wholesale and retail fish market is being built at Aberdeen Harbour concurrently with the erection of a wharf for the quay adjoining. The cost of the wharf—the piles of which are now being driven by the harbour workmen, under the superintendence of Mr. William Smith, the harbour engineer—is estimated at £4,144. The cost of the market will be about £3,000. The designers of the latter are Messrs. Smith and Kelly, the city architects.

The city council of Manchester accepted, on Wednesday, from Alderman Goldschmidt, a marble bust of the late Prince Leopold, Duke of Albany, the work of Prince Hohenlohe.

The Oriental Museum at Vienna, which during the twelve years of its existence has done much towards promoting the commercial relations between Austria-Hungary and Oriental countries, has changed its name, and is henceforth to be the Imperial and Royal Austrian Commercial Museum. The chief object of the museum, which is subsidised by the Government, will be to offer the fullest information on Austrian trade and art industry, partly by sample depots, partly by lectures and publications.

The premises and timber stacks of Mr. J. R. Roberts, builder, Barkstone-gardens, Earl's Court-road, were destroyed by fire on Monday night.

Some time since two chambers of a Roman house of the 4th century were discovered under the high altar of the church of SS. John and Paul, on the Cœlian hill, at Rome. Quite lately another large chamber has been discovered beneath the nave of the church, which seems to have been the *tabularium* of the house. Traces are visible of paintings representing wild beasts, sea-horses, and other decorations, including two pictures of unquestionably Christian character. This is the first specimen of a Roman house in which scenes of a Christian character have been found represented. Such subjects have hitherto been found only in the catacombs.

On Sunday night the Congregational School Chapel at Blackford Bridge, near Bury, was destroyed by fire. The damage is estimated at £1,300. The fire is attributed to the overheating of the warming apparatus.

The Mayor of Halifax cut on Monday the first sod of the new High-Level Railway for Halifax, which is to connect the upper part of the town with the Great Northern Railway at Holmfield, between Halifax and Bradford.

A new guardians' board-room and offices, which have been added to the workhouse buildings in Hallam-street, West Bromwich, were opened on Friday night. Mr. W. Henman, of Birmingham, is the architect, and the cost has been £11,000.

Building Intelligence.

BAGSHOT.—A hunting-box near Bagshot, Surrey, has been erected for General Hunter Thompson. It is built with red brick, with stucco dressings, &c., and is situated on the north side of the Lightwater-road. The upper windows on the south side of the house overlook what is known as the "Folley," which extends southwards for miles, and is covered with heather and pine trees, and from the upper windows of the north side between and over the foliaged trees of the well-timbered grounds can be seen peeping up almost close at hand the Surrey hills, conspicuous amongst which is "High Curly," the highest hill in Surrey. Both the stables and the hunting-box have been erected by Mr. E. Kemp, of Frimley, near Farnborough. Messrs. Burr and Meadway, MM.S.A., of 65, Chancery-lane, are the architects.

CITY OF LONDON COURT.—The foundation stone of this building was laid by the Lord Chancellor on Wednesday. The building occupies the sites of the old Court, the Land Tax offices, and the tap of the Guildhall Tavern. It will ultimately be extended over the site of No. 84, Basinghall-street, and the new building has been designed to cover the entire area. On the ground floor will be the offices for the clerks and bailiffs, on the upper floor the Judges' Court, 45ft. by 26ft., and the Registrar's Court, 36ft. by 26ft., each with a private room attached and approached by a separate stair. In the basement will be the lavatories and stores for books, papers, &c. The style is Late Gothic, similar to the style adopted for the Library and the new Council Chamber. The external moulded work will be in Portland stone, with grey granite plinths, the walling of Kentish rag; internally, the hall and staircase will be of Bath stone, the open roof of oak; the Courts will have wainscot panelled ceilings. The warming will be effected by means of hot-water coils and pipes. The amount of the contract is £13,637. The architect is Mr. Andrew Murray; the builder is Mr. James Morter, of Stratford.

COOKRIDGE, LEEDS.—A "semi-convalescent" hospital, adjoining the Convalescent Home at Cookridge, is now roofed in, and is being finished in its internal arrangements. The committee for its erection selected plans prepared by Messrs. Chorley and Connon, of Park-row, under whose superintendence the works are being carried out. Accommodation is provided for 42 patients—one-half of these men, the other women and children. All the patients will be on the ground floor. The central portion of the structure is an administrative block, with wards on either side. The closets are fitted with Doulton's isolated pans, having no inclosing woodwork. The baths are of porcelain, and are placed in the centre of the rooms, thus allowing of patients being lowered into them by means of slings. The corridors and wards are warmed by steam supplied by a boiler, which also heats water for baths and lavatories. The buildings are erected of brick, with stone dressings, the upper stories being finished in rough-cast cement and with half-timbered work.

KNOTTINGLEY.—The Archbishop of York took part in the reopening of St. Botolph's Church, Knottingley, on Friday. The interior has been completely transformed, a clean sweep having been made of the old fittings. The chancel has been enlarged, and an open-timbered roof has replaced the old plastered ceiling. The east window is to be filled with stained glass. Formerly the pews encroached into the chancel, the floor of which was level with the nave. These have now been removed, and carved oak clergy and choir stalls have been erected in place of them. The organ, which stood in the west gallery, has been placed in the chancel, the floor of which has been raised 2ft. The entire church has been re-seated with open seats in place of high-backed pews, and the galleries on the north and west side have been taken down. The carrying out of this work has necessitated the expenditure of £2,100. Mrs. Rhodes has presented a carved stone pulpit, adorned with statuettes of saints in white marble, and a font, both being the work of Messrs. Jones and Willis, London. The same lady has also given the lectern. The altar cloth has been embroidered by the East Grinstead Sisters. Messrs. John Hall Thorp and Son, Leeds, have done the joinery work.

CHIPS.

At a late hour on Monday night a fire broke out at the Ship Hotel, Greenwich, resulting in considerable damage and total destruction of the two top floors. The hotel is so well known in connection with the Ministerial Dinners held there that it is of general interest. The origin of the fire was supposed to have originated through the kitchen flue (on the top floor of hotel) becoming overheated.

Mr. William Wimble, of Queen Victoria-street, has been appointed architect and surveyor to the Vintners' Company.

The *Croydon Advertiser* is giving a series of articles on "Surrey Artists and their Houses." The subject of the first of the series is Mr. Edward Frampton, of Buckingham Palace-road and Sutton, whose design for a stained-glass window for Newcastle Cathedral was illustrated in our last issue.

The names of Francis Butler, of Edith-grove, Fulham-road, Earl's-court, architect, and of Joseph Walker Peters and Charles Alfred Stevens (trading as J. W. Peters and Co.), Red Cross-street, Southwark, artists in stained glass, appear in Friday's list of receiving orders in bankruptcy; and among the adjudications in bankruptcy in the same *Gazette* is Goodman Brown (trading as Brown and Son), Kingsland-green, High-street, Kingsland, builder, surveyor, and contractor.

St. Cuthbert's window in the south aisle of the choir at York Minster will be opened on Sunday next, after renovation at a cost of £800.

The local board of Pudsey, near Leeds, have accepted the resignation of their surveyor, Mr. Isaac Wood.

A reredos, built entirely of alabaster, has been erected in the parish church of Whitechapel by Mrs. Coope, as a memorial of her late husband, Mr. Coope, M.P., who defrayed the entire cost of erecting the church, amounting to £30,000.

Mr. Bridgeman, Lichfield, has been selected to execute statues of the Queen and the late Prince Consort for the Royal Albert Asylum, Lancaster. He has just completed some pulpit work for the church of St. Michael and All Angels, Christchurch, New Zealand.

The Metropolitan Board of Works, at its meeting on Friday, passed by 18 votes to 14, the following resolution:—"That Mr. T. J. Robertson, assistant surveyor, be removed from the Superintending Architect's Department, and that it be referred to the Works and General Purposes Committee to consider to what position he should be transferred."

The Wharf Station at Newhaven, recently built in woodwork for the Continental traffic of the London, Brighton, and South Coast Railway, was destroyed by fire on Sunday. The damage is estimated at £6,000.

Mr. Whistler has decided on a new departure in "private views." The winter exhibition of the Royal Society of British Artists will be first opened to an invited company at 9.30 this (Friday) evening, Mr. Whistler preferring to make the private view an evening event, and to show the pictures by gaslight rather than run the risk of showing them on a foggy day.

The town council of Bristol have decided to contribute £1,800 towards the restoration of the Mayor's Chapel on College-green, in accordance with the report and plans of Mr. J. L. Pearson, R.A., and on condition that another £1,800 needed to complete the work is raised by subscription.

A formal contradiction has been given on behalf of Dr. Schliemann to the report that he had expressed an intention of bequeathing his collection of antiquities to the Berlin Ethnological Society or to the German Government. Dr. Schliemann is at present engaged in excavations at the Temple of Venus, in the island of Cerigo.

The Governors of Alleyn's College of God's Gift have now opened their secondary college in Townley-road, Dulwich, for the education of some 450 students in advanced science and technical subjects. The buildings have been erected at a cost of about £12,000, by Messrs. Oliver and Leeson, architects, of Newcastle-on-Tyne, whose plans, submitted in competition, were selected on the advice of Professor T. Hayter Lewis and Mr. Charles Barry, F.R.I.B.A., the assessors appointed by the Governors.

The internal decoration of St. Anne's Church, Manchester, has just been completed by Mr. Reuben Bennett, of that city.

Engineering Notes.

BRADFORD.—On Friday last, Major-General Hutchinson, R.E, one of the inspectors of the Board of Trade, visited Bradford to inspect the tramway which the Bradford Corporation has constructed from Four Lane Ends to Allerton. The new line is constructed on Winby and Levick's system; it consists of a steel rail weighing 65lb. to the yard, and a continuous wrought-iron base plate 12in. by ⅝in. Although this system acts well enough for horse traffic, it does not seem to answer on severe gradients where heavy steam-engines have necessarily to be used. The Tramways Committee of the Bradford Corporation, acting on the advice of the borough engineer (Mr. J. H. Cox), therefore decided that any future extensions should be laid on the Gowan system. This method was adopted on the Manchester-road line, which was laid in 1884, and up to the present time, we understand, it has proved eminently satisfactory. It has also been adopted on the Allerton line. The rails are made of rolled steel of T-section, and weigh 103lb. to the yard, 7in. deep, and 7½in. bottom flange. They are fastened together with steel fish plates, and securely bolted with four 1in. bolts. The ends of the rails are laid on a wrought-iron bed plate, 12in. by 12in. by 1¼in. Wrought-iron tie rods, 1¼in. by ⅝in., with screw ends, are fixed at intervals of 15ft., thus keeping the line rigid and secure to gauge. The rails are laid on a foundation of concrete composed of 1 part of lias lime and 5 parts of broken stone and sand. A layer of pitch is run between the base of the rail and the face of the concrete, and effectually prevents any water getting under the rails, and in addition makes the rail firmer. The points and crossings are 12ft. and 8ft. long respectively, and have been made out of the rail by Messrs. Thwaites Bros., Limited, of Bradford. The gauge of the new line is the same as that of the other tramways in the borough—namely, 4ft., and the interspace between the double lines is 4ft. 3in. The length of the route from Four Lane Ends to Allerton is 2,081 yards, of which 839 yards is double line in six passing places, and 1,242 yards is single line. The tramway between the rails, and for a distance of 18in. on each side, is paved throughout with granite setts, 6in. by 3in.; where the most severe gradients occur, Dalbeattie granite setts are used, the steepest being 1 in 19½. Both at Four Lane Ends and at Allerton triangular termini have been constructed; this entirely obviates the danger which exists on steep gradients of the car running away when it is necessary to uncouple the engine and car before a return journey can be made. The Allerton line has been constructed under the supervision of the borough engineer (Mr. J. H. Cox, M.Inst.C.E.), assisted by Mr. W. H. S. Dawson. Major-General Hutchinson expressed himself as satisfied with the result of his inspection. The line was opened for public traffic on Saturday.

The Archbishop of York opened, on Friday, the new church of St. Saviour, at Ulleshelf, near York. It has been erected as a chapel of ease to Kirby Wharfe Church, and is situated in the centre of the village. The building is in the Late Gothic style, and accommodates 180 persons. It consists of nave and chancel 21ft. wide and 68ft. long. The walls are of brick, with moulded strings and stone traceried windows, and the roofs are slated. A bell turret, covered with lead, and containing a bell, marks the division between nave and chancel. The cost will be £1,000. Messrs. Demaine and Brierley, of York, are the architects.

The arts committee of the Liverpool town council have recommended for purchase by the corporation the following pictures from the current Autumn Exhibition at the Walker Art Gallery:—No. 243, "Pelagia and Philamon," £400, by Arthur Hacker; 247, "The Bow Net," £150, T. F. Goodall; 962, "The White Lady of Nuremburg," £220, Wyke Bayliss, R.B.A.; 1,117, "Peonies," £300, by C. E. Perugini. The exhibition will close at the end of next week, and a soiree and conversazione will be given on Monday, December 5. The attendance of visitors shows a falling off from previous years.

Mr. C. W. Methven has been appointed engineer to the Greenock Harbour Trust. He was for many years assistant engineer under Mr. W. R. Knipple.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

MANCHESTER ARCHITECTURAL ASSOCIATION.—The ordinary fortnightly meeting was held on the 15th inst. at the Diocesan Buildings, Mr. T. Chadwick in the chair. Mr. J. Corbett, sanitary engineer, read a paper on "House Hot-Water Fittings," which was elaborately illustrated. The development was traced from the crude "set pot" or water-box in a cooking range to the present cylinder with its necessary circulating pipes, safety valve, &c. Special appliances were described for intercepting and removing deposits of lime and mud from the boiler. Precautions against frost are necessary, and instances were quoted of collapsed cylinders, frozen pipes, damaged boilers, &c. A vote of thanks, proposed by Mr. Hodgson, seconded by Mr. Woodhouse, and supported by the chairman, was carried unanimously.

SCOTTISH ARCHÆOLOGY. — The thirty-first annual meeting of the Glasgow Archæological Society was held on Friday night in Glasgow, the Rev. Prof. Lindsay, the president, in the chair. The council's annual report congratulated the members on the growing interest in the objects of the society, and stated that the membership was now 267. Dr. R. W. Cochran-Patrick, F.S.A., then delivered the opening address of the session, his subject being "Archæology in Scotland, its Past and Future." He said that for a long period the sympathy of large classes in Scotland had been alienated from the study of archæology; but Scottish antiquaries of some generations ago had themselves to blame because they had neglected the proper scientific methods. In the present day they lived under happier conditions. The real object of archæological study was clearly recognised. They had realised that it was possible to get real knowledge out of the past otherwise than by the testimony of record only; and that the only way to do this was by a scientific method, the first step to which was the accumulation of the largest possible body of carefully-ascertained facts. Proceeding to trace the progress of Scottish archæology down to the present day, he dwelt at some length on the rise and progress of the Scottish Antiquarian Society. The credit of first employing a strictly scientific method of collecting archæological facts was due to Mr. Rhind, Mr. Petrie, and Dr. Joseph Anderson, in the investigations conducted by them in Caithness and Sutherland, which first gave the clue to the true historical position of the "brochs" in past times. Under the head of "Future Prospects of Scottish Archæology," he elaborated numerous suggestions with the view to progress, pointing out that the first and most important condition was the collection of thoroughly reliable facts. He suggested that the National Society should take the initiative in inviting the co-operation of local societies and museums towards the publication of a complete collection of Scotch antiquities. A local society should work up its own district, and the more members confined themselves in their papers to what they saw and knew, the more valuable would be their work. A record should be made of every monument of antiquity at present existing in Scotland.

The Lingen Monuments in Hereford Cathedral have just been restored, at the cost of Lord Lingen, the present head of the family, and has been set up in the Bishop's cloisters, close to Cecilia Lingen's grave. The monumental stone commemorates, as the low brass tablet which adjoins shows, two cousins, Cecilia, daughter of Sir Henry Lingen, died 1689, and Blanche, daughter of Roger Lingen, died 1721. Mr. E. H. Lingen Barker, of Hereford and London, was the architect; Mr. Robert Clarke, of Hereford, the carver, and Mr. T. J. Gawthorpe, of Long-acre, W.C., executed the brass plate.

At St. Paul's Church, Stafford, the new tower and spire were dedicated last week. The church is a cruciform structure in the Early Decorated style, and was erected in 1844 from designs by the late Mr. Ward. The new tower is on the south side of the church, and has been built from designs by Mr. Robert Griffiths, county surveyor of Staffordshire. Both the tower and spire, a broach one, are executed in Weston and Alton stone, and rise to the height of 122ft. Mr. H. Lovatt, of Wolverhampton, was the contractor.

The town council of Doncaster have decided to take steps for obtaining plans for a proposed new Free Library and School of Art, the maximum of cost being fixed at £3,300.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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THE "BUILDING NEWS" DESIGNING CLUB. (In reply to numerous inquirers, we cannot undertake to send the rules of the club by post, or to answer individual inquiries. The rules were published in the "B.N." of Nov. 4, and intending competitors must get that number.)

Correspondence.

ARCHITECTS' AND ENGINEERS' REGISTRATION BILL.

To the Editor of the BUILDING NEWS.

SIR,—It has been decided by the Architects' and Engineers' Registration Act Committee to appoint local honorary secretaries throughout the United Kingdom for the purpose of making known the scope and object of the proposed Act, and I should be glad if you will allow me space to bring this to the notice of your readers.

The duties, I imagine, would not be arduous; but the most important step to take would be to seek interviews with members of either House of Parliament representing the various cities and towns where the local hon. secs. are appointed. A petition in favour of the Bill praying that the Bill may pass into law has been prepared, and will be placed in the hands of the local hon. secs. for the purpose of obtaining signature.

The name of a well-known member of the House of Commons, with whom arrangements are almost complete to pilot the Bill in the House early next session, will be published almost immediately.

I shall be glad, therefore, if gentlemen interested in this important movement, willing to undertake the duties of local hon. secretaries, will at once communicate with me in order that I may submit their names to the next meeting of the committee.—I am, &c.,

EDGAR FARMAN, Hon. Sec.

39, King-street, Cheapside, E.C.

ARCHITECTS AND SPECIALISTS.

SIR,—The times of the architects have very much altered, as you have had occasion to hint of late; his lot has fallen on what he may choose to think evil days; he is no longer looked to as a designer of Greek temples or Gothic shrines, but as some one able to build with attention to a hundred little wants and details, and to give his attention to special requirements, like sanitation. This conclusion is forced upon us when we look at what the better informed among the profession think they ought to know, but which very many unhappily do not. The letters you have lately published from Mr. Wm. Woodward, Professor Corfield, M.A., M.D., Mr. Hugh Roumieu Gough, and others on "The Future of the Architect," will have convinced the most sceptical of the versatile nature of the modern architect's requirements, and of the opposite opinions entertained of his acquirements. While one with true *esprit de corps* defends the profession from the charge of ignorance in sanitary matters, the others boldly deny their attainments. The controversy has arisen from misapprehension. In the first place, it is a mistake to assume that because the principles of sanitation are simple and few, the majority of architects understand them, or because a few individuals have mastered the science others have done so. Years ago we showed the very few and simple rules upon which a perfect system of house drainage consists, and which may be summed up under the words "disconnection" and "ventilation"; yet it is by no means unusual to find the drainage of houses for which architects have been engaged based upon the erroneous system of a quarter of a century ago. How is it that at least 70 per cent. of the houses now built retain the old connected and sealed drains, the same deadly traps of lead, the same laying on of sewer gas into the house? The Acts in operation have not, at least, reached the builder of suburban dwellings. We admit there has been a great deal of unnecessary talk and fuss about house drainage by those whose business it is to introduce new inventions, and this will continue so long as the profession employ specialists and do not trouble to master the subject. Why have the sanitary engineer, the specialist, and the professor sprung into existence? Simply because architects have permitted them to do so. Specialists of whatever kind are the growth of circumstances; they could never have obtained a footing if architects and others had rendered their services unnecessary. But if there are specialists of medicine, of engineering, and other subjects, why not specialists of architectural science? At all events, the profession now is passing through a revolutionary stage of its existence. There are those within the ranks of architecture who are profoundly sensible of the shortcomings of architects, others who believe it has little need of instruction. Perhaps it will be said they are as well informed as most professional men are: but this standard will not now do. The age says, "Press onwards. You cannot learn too much; for if you are satisfied with your attainments, the specialist will overtake you."

We are quite of the opinion of Mr. Woodward when he says: "The architect should, even if he avails himself of the specialist, be his master, and not allow the positions to be reversed"; but the fact is that knowledge gives power, and the specialist who knows, let us say, iron construction better than the architect can and will take advantage of his position when any chance falls to his lot. We have known of engineers who have been called in by architects to prepare details for ironwork compete with them, and send in designs when such a building as a large winter garden or an iron and glass structure has been wanted. We know, too, that sanitary experts compete every day with the architect in reporting on the sanitary condition of houses. Other specialists, like decorative artists, do the same. Can we stop this invasion of the architect's province? In these days of free trade in art, as in commerce, there is no alternative but to convince the public that we can do better, or that by the employment of the architect the client obtains a *quid pro quo* for the money he expends. The specialist devotes himself exclusively to one thing—iron construction, sanitation, ventilation, or decoration; and as

matter of course he often is enabled to excel the architect in this particular branch, the same as the special practitioner in nervous diseases, an oculist, or aurist excels in expertness the general medical practitioner when a case of partial paralysis, the eye, or the ear is involved. And it is quite impossible for one man to become an expert in each of these cases. In architecture the art has unquestionably suffered from the division, as I have shown before—the system has tended to produce unsatisfactory design as a whole, inharmonious combination, and a lack of general unity and feeling. Yet we cannot help it. The architect of the future will have to grapple with this problem. There is only one method by which the disconnected and disjoined arts can be reorganised—namely, the wider interest and sympathy of the architect in the accessory arts, a wider knowledge of them, and, above all, co-operation with the workers.

On all sides we hear of the architect's "aloofness," of his keeping "above" the rank and file of the building industries and manufacturing interests; of his one desire to be thought a "professional man"; of his general incapacity to descend from "fine art" to the practical art worker, or to understand technical processes—aims that seem in strange contrast to all we read of the old masters of the art. No wonder Mr. Lish, in his opening address the other night at the Society of Architects, dwelt rather strongly on this professional bias and forgetfulness of those who make up the thews and sinews of art, and spoke of the importance of a more thorough acquaintance of the trades. If architects are to retain their position in the public regard they must first set their own house in order, before attacking the pretensions of those whom their own indifference has called into existence.—I am, &c.,

G. H. G.

THE FUTURE OF THE ARCHITECT AND "THE ARCHITECT OF THE FUTURE."

Sir,—It would be interesting to learn from Mr. Woodward what proportion, if any, of the "works ranging from £4,000 to £100,000 carried out by builders without the aid of architects," have been satisfactory—satisfactory from the employer's point of view that is. It is, in reality, not of very much consequence to architects whether they think well of the builders' designing or not. The important point they should consider is, it appears to me, Is there a demand for builders who can design? and if that question can be answered in the affirmative, it is utter folly in them not to supply the demand. I am afraid some of the kid-glove and "gentlemanly" architects might consider their social position lowered by being at the head of a building business; but need this be the case, and is not "chief builder," the architect's right place?—I am, &c.,

Charles F. Moxon.

THE A.A. SKETCHING CLUB.

Sir,—Will you kindly allow me to invite the assistance of all who take an interest in the proposal made in the paper on "Our Sketching Club Scheme," either by volunteering to act as vice-consuls, or if not able to undertake the regular duties to furnish us with particulars of any buildings of interest they are acquainted with? Any information forwarded to 157, Wool Exchange, Coleman-street, E.C., will be most gratefully acknowledged; it should be tabulated in the following manner:—

Subject.	Name.	Place.	County.	Date of work or style.	Architect.	Any features of particular interest.	Remarks. Especially note if illustrated or not.

We hope that the value of such a register will be sufficient to induce all who have the power to forward the movement to the utmost of their ability.—I am, &c.,

Herbert D. Appleton.

DRAUGHTSMEN'S PROVIDENT FUND.

Sir,—May I through your columns thank those gentlemen who have written to me concerning the above? I cannot write to each one separately, because I am pleased to say that now their number is too great. It is, therefore, from no want of courtesy that their letters have not been answered. Their names will not be lost sight of; when the committee, which is now formed, has drawn up rules, &c., they shall have a copy, and it is to be hoped they will all become members.—I am, &c.,

W. A. Chambers.

44, Battersea-rise, S.W., Nov. 21.

SCARBOROUGH CONSTITUTIONAL CLUB COMPETITION.

Sir,—I notice design for the above-named building in your publication for October 28th, with statement to the effect that the arrangement is almost precisely similar to the original design.

The following statements placed side by side show that such is not the case:—

DESIGN SUBMITTED IN COMPETITION.	DESIGN AS ALTERED SINCE COMPETITION.
1. Twelve offices provided in all.	1. Eight offices only in all.
2. Conveniences on north side.	2. Conveniences on south side.
3. One card room on first floor, instead of near billiard room, as stipulated.	3. This card-room is now altered and placed on ground floor, as stipulated.
4. Servery lighted from dome only in adjoining corridor.	4. Servery lighted through screen apparently; the room also is differently situated.
5. Large assembly room on the southern side.	5. Large assembly room on northern side (thereby greatly improving approach, &c., to the retiring room).
5. Main staircase on north side.	6. Main staircase on south side.
Memo.	Memo.
7. The cost stipulated in conditions was £3,200, and was to include architect's commission and all other cost in the erection of the building.	7. Lowest tender published at £3,774; add commission, say, £188; making total cost, £3,962.

With regard to the cost, the same space only (as in original plan) is covered, and as four offices are omitted, it seems that the cost should be less instead of more, the space simply being thrown into the club portion, and consequently requiring less partition walls, fittings, &c.

It would certainly be interesting to the numerous competitors to receive the assessor's explanation with regard to these discrepancies, also to see his report published on the designs received.—I am, &c.,

A Lover of Fair Play, and Competitor.

Nov. 22.

SEVILLE CATHEDRAL—GOTHIC FOLIAGE.

Sir,—Mr. Doughty speaks of having sketched his view of Seville Cathedral "in the building"; but surely it is from some gallery at least 60ft. or 70ft. above the floor, and looks rather as if through one of the outer windows, exactly level with the sill of the chief lateral one shown. I was struck by the discrepancies between this view and Fergusson's plan. According to him, all the nave severies are but five, and beyond the crossing are three of similar width to those of the nave. The view shows four on this side the crossing, and but one beyond it, or possibly the vaulting of two, a high screen shutting off all beyond the first pier. No severy of the vaulting, however, appears any narrower than the crossing or *ciborio* itself, and as the next before it, or last one of the nave, shows a lierne vault, of the exact pattern of that under the tower of Salisbury, a pattern only suiting a square, not an oblong plan, it forces on us the notion of square severies throughout; whereas Fergusson is positive as to the *ciborio* alone being square, all the clerestory severies oblong, in the ratio of $\sqrt{2}$ to 1 that he thought peculiar to this building. Neither he nor Mr. Doughty, nor any account I have read, notes the greatest peculiarity thereof: that its vaults have never been covered by any roof, but remain with their backs open to the sky. This, without going within 1,000 miles of Seville, I can certify by a photograph taken from the adjoining Giralda tower that I happen to have seen.

On the question of what plants were the chief models to the Gothic carvers, I am astonished that the frequent resemblance to celery is not remarked. Long before comparing any of their decorations therewith, I had thought that nothing else in our markets was on the whole so beautiful as celery, both for subtle gradations of curvature, colours, and richness of form. The Early English foliage proper, till about 1260, does not seem to suggest any particular plant, but rather to have developed from the illuminated manuscripts. With the Eleanor crosses, distinct botanical imitation seems to have begun, and for the next century it looks to me as if celery had afforded the designers most suggestions.—I am, &c.,

E. L. Garbett.

HOUSE DRAINAGE.

Sir,—Mr. John W. Alexander, in your paper of the 18th inst., says:

> "I consider a patentee a dangerous person to employ, as he naturally leans to his own nostrum, even though in his heart of hearts he may know it is not the best. I had some experience of this when inspecting some large house drainage works carried out by Mr. Rogers Field, C.E., when his patent trap was, in my opinion, used in season and out of season."

The facts are as follows: I have no "patent trap," nor any trap in which I am pecuniarily interested. Moreover, I do not use a multiplicity of disconnecting traps in my practice, but limit their number as much as possible, frequently using only one. I think your correspondent should, therefore, be more careful in what he says.—I am, &c.,

Rogers Field, M.Inst.C.E.

4, Westminster Chambers,
Victoria-street, S.W., Nov. 23.

SANITARY ASSOCIATIONS AND HOUSE DRAINAGE.

Sir,—I have carefully read the letter from Mr. John W. Alexander, diocesan surveyor for York (on p. 779); but so far as I can judge from it, he seems to know about as much of what constitutes the sectional system of house drainage as I do of Hebrew, and I have yet to learn its alphabet.

He considers "a patentee a dangerous person to employ," and he "carefully eschews any connection with patents." James Watt and Sir William Thomson would be persons that Mr. Alexander, from his superior elevation, would have nothing to do with; and yet, I believe, he will often avail himself of the steam-engine. Professor Fleeming Jenkin, F.R.S.E., when he started the first Sanitary Association in Edinburgh in, I think, 1878, also published that he intended to steer clear of patents; but after a few words from me before the Royal Scottish Society of Arts in Edinburgh, he found this was a mistake, and afterwards wrote:—"Mr. Buchan's (patent) trap is excellent, and largely used at the recommendation of the Sanitary Protection Association in Edinburgh." So if Mr. Alexander has been really eschewing patents, I expect that for his own credit and the benefit of his employers, he had better begin to use some of them, and see and do it properly.

Mr. Alexander says he objects to the sectional system of drainage because it prevents proper cleansing and flushing of the drains with air. He does not know what he is writing about; it does neither. Further, his own words prove his ignorance practically of the subject when he tells us that a Buchan's trap "was forced by the pressure of air." If the trap was forced, that showed want of ventilation, which Mr. Alexander should have provided for. And seeing he has confessed to this overlook or mistake, we may ask, "How many more exist?"

It is perfectly astonishing the amount of ignorance that still exists in quarters where we would not expect it—*e.g.*, an I.A. architect, several years in business in Glasgow, a few days ago wrote: "House drains are generally 9in. in diameter, soil-pipes 6in., and the clean water, rain, and waste-pipes 4½in. in diameter"! A clerk of works, again, who led me to understand that he knew how to fit in my traps with side fresh-air inlets, had all these connected with bends stuck into the *top* of the traps, so that when I came to examine how things were working I could see nothing! All the bends had to be taken out and the work done so as to ventilate without interfering with provision for examination, &c.

Mr. Alexander says he is ready to follow Mr. Honeyman. Very good; but with the drain-pipes at present in use Mr. Honeyman and I are "at one," and I carried out the drainage work of Craigton Castle and other places for Mr. Honeyman upon the sectional system. Mr. James M. Gale, C.E., the well-known engineer of the Glasgow Corporation Waterworks, had his house drainage altered by me this year upon the sectional system, and he says: "If a trap be good between the drain and the sewer, I

cannot see why it should not also be good between the house and the drain."

As to Mr. Norman Shaw fitting up water-closets without water traps, that has been condemned long ago by Mr. S. S. Hellyer and Mr. Ernest Turner, F.R.I.B.A., of London, and by myself. In doing work in this style, Mr. Shaw, in my opinion, only shows that although he may be a good artistic architect, he is a very bad sanitary plumber.

A good many people with a weak corner in their cranium do things, not in the best way, but in an odd sort of style, merely because they imagine it is odd, or novel, while it is simply an oddity.

As to Mr. Honeyman's Bolton paper, I beg to say that I have not as yet heard any sanitarian of eminence support it, while many disapprove of his proposed new pipe. It could not be fairly discussed, however, unless an illustration of the pipe were given.—I am, &c.,

W. P. BUCHAN.

Intercommunication.

QUESTIONS.

[9473.]—**Hospitals.**—Could any reader give me particulars of the latest publications upon hospital planning, sanitary arrangements, &c.? Also, what hospital is considered to be the most perfect?—STUDENT.

[9474.]—**Ordnance Maps.**—Will some reader kindly explain the meaning of the following contractions and figures occurring on a 6in. ordnance map? "Cr. 321·5," and "Snr. 323·0," preceded by a round dot enclosed in a triangle. Also "Bolt 144·1," and the letters "R. H." and "C. R," occurring at lines of fences.—P.

[9475.]—**Extras and Omissions.**—I am a surveyor for some alterations and additions to a building which was let to a firm of builders who completed the contract, upon which are some deductions, also extra works. I have asked them to please send me their priced quantities, so that I may make out a balance-sheet for extras and omissions of the work in order to pay them. But they refuse to let me have the priced quantities. What is my remedy? I do not wish my name to appear in print.—J. T. S.

[9476.]—**Symbols.**—I should be glad to know if these are the correct symbols for the Four Evangelists:—St. Matthew, the Angel; St. Luke, the Ox; St. Mark, the Lion; and St. John, the Eagle; and if not too lengthy, how they came to be applied to each? Am I right in believing they originated in Byzantine art?—WM. JONES.

[9477.]—**Moreton Old Hall, Cheshire.**—Can any reader inform me how the spaces between the framed timbers of this house (which was built about 1556), were filled in? Was it "brick nogging" or "wattle and plaster"?—MINERVA.

[9478.]—**Lime-Washed Walls.**—In last week's BUILDING NEWS the question is asked, "How to remove whitewash from outside stone walls"? I ask and should be glad to know how not to remove limewash from the inside of brick walls?—as one of my rooms has been whitewashed—lime was ordered—and a portion of the white is removed every time any article of clothing comes in contact with it. Can anything be put into the lime to prevent this?—LIMEWASH.

[9479.]—**Ecclesiastical Architecture.**—Are there any works published treating of the distinctions between the different orders of monastic establishments? Can anyone tell me the peculiarities found in Benedictine abbeys and of a few typical examples?—ALPHA.

[9480.]—**Harmonies of Contrast.**—What colours would make a harmony of contrast suitable for a dining-room? Any hint will oblige.—A SUBSCRIBER.

REPLIES.

[9459.]—**Concrete Roofs.**—I venture to offer Mr. H. Melbourne a little advice on the above. In the first place, 9in. by 2in. joists, 30in. apart, 18ft. bearings, covered with match-boards, would be far too light to carry a 3in. bed of concrete, then afterwards to be coated with asphalte and cement, ½in. thickness, to be used for stores, &c. Whoever suggested to construct a roof as given above would surely be trying on a joke. To carry such a load, the joists should not be less than 11in. by 3in., 15in. centres, with two rows of stout bridging, and covered with 1½in. boards. But why load the roof with cement concrete when the following would be equally effective at about half the cost? One and a half years ago I superintended the erection of a range of No. 14 shops for the Lancashire and Yorkshire Railway Co., in the neighbourhood of Victoria Station, Manchester. The roofs were constructed as follows:—11in. by 3in. joists, 16ft. bearing, 15ft. centres, then sloped on the top side to give a fall to gutters of 1 in 60. The gutters were on each alternate party wall, then laid with 1½in. rough-sawn boards, afterwards covered with Graves's Patent Roofing or Danish asphalte (manufactured by the Graves's Patent Roofing Company, New Ross, Ireland). The asphalte was laid on 1½in. by 1½in. wood rolls, then coated with two coats of patent mastic and dry river sand. The whole has now a very neat appearance, very hard, and forms a substantial dry roof.—CLERK OF WORKS.

[9452.]—**Norman.**—William de Carileph, Bishop of Durham, laid the foundation of the present cathedral in the year 1093; but no considerable progress had been made at the time of his death, which occurred two years afterwards. His prececessor, Ralph Flambard, carried on the work, and had nearly brought it to its completion when he died, in 1128. The aisles and transepts were finished by the monks in 1133, and the chapel of the "Nine Altars" was commenced about the year 1230. In the year 1091 Herbert de Lozinga, who came from Normandy with William Rufus, purchased the bishopric of Thetford for £1,980, and for this and other Simoniacal practises was commanded by the Pope to build certain churches and monasteries. He removed the see from Thetford to Norwich, and in the year 1096 he laid the foundation of a new cathedral. In the course of five years the cathedral was in a great state of forwardness, as well as the palace on the north and the priory on the south side, both begun at the same time. The choir, transepts, and central tower are the work of this bishop, who died in 1119. Eborard, his successor, completed the cathedral by building the nave, which, in the year 1171 was a good deal damaged by fire, and was restored by John de Oxford, who finished his work about 1197. The cathedrals of Gloucester, Norwich, and Peterborough, the chapel in the Tower of London, Tewkesbury Abbey, and the churches of Kilpeck and Mocas, in Herefordshire, East Ham in Essex, Steetly in Derbyshire, and Checkendon in Oxfordshire, still retain the Norman apse. The remains of the original churches of Brixworth and Worth also show the apsidal termination which is, I believe, of Saxon date.—A. C. W.

[9453.]—**Load on Beam.**—"G. B. N." will require the weight each beam will sustain in the middle if supported at the ends, because it is the point of greatest strain, and if the beams are strong enough to bear the weight in the centre, he may rest assured it will bear the weight if distributed as in his question. The rule is—Multiply S by four times the depth and by the area of the section in inches, and divide the product by the length between the supports in inches, and the quotient will be the greatest weight the beam will bear in pounds, and a fourth of the result will be the safe load. Value of S for pitch-pine = 1632.

Value of S. Depth of beam. Area of section.

$$1632 \times 18\text{in.} \times 4 \times (18\text{in. by } 18\text{in.}) = 158630{\cdot}4\text{lb.}$$

$$\frac{158630{\cdot}4}{\text{Length of bearing } 240\text{in.}} = 17{\cdot}7 \text{ tons}$$

$$\frac{158630{\cdot}4}{4} = 17{\cdot}7 \text{ tons}$$

so each beam 18in. by 18in. and 20ft. span will bear a load of 17·7 tons in the centre of the beam.—C. C. H.

[9460.]—**Formula.**—The value of T would be 4·28; but it would not be correct for practice unless D = 1·06, the given formula only applying to arches in which D = ·4 $\sqrt{}$R.—PHOS.

[9461.]—**Picture and Chimney.**—If the chimney breast was covered with silicate cotton (slag-wool) 1in., it would prevent the picture being injured by the heat.—C. F. DEAN.

[9464.]—**Tiles in First Floor.**—It certainly is not good construction to lay tiles on the top of flooring. If you really do wish tiles on first floor, take up your flooring, fillet joist and cut in boards 2in. below top edge, and fill up with fine concrete and bed tiles. Would recommend thin parquet flooring—warmer for the feet, and may be laid thoroughly waterproof at a cheaper cost without removing original floor.—H. D. H.

[9466.]—**Early Churches.**—Mention is made of Kempley and Adel churches in Bloxham's "Gothic Architecture," but no plans are given. I presume that "Student" wishes for instances of English churches with aisles, as of course there are a very great number of churches with aisles abroad, which were built long before the 12th century. I therefore send a list of some of the more notable. The cathedrals of Canterbury, Winchester, St. Alban's, Norwich, Lincoln, Rochester, Carlisle, and Durham, which were founded previous to the year 1100, were all planned with aisles; and the churches of Brixworth, being, perhaps, the most complete specimen of Saxon work now remaining; Wing, in Bucks; St. Michael at St. Alban's, built in 941; Repton; Worth in Sussex; Brassington in Derbyshire; Waltham Abbey; the chapel in the Tower of London, and others.—A. C. W.

[9467.]—**Stone Beams.**—Example, Temple of Pæstum.—L. H.

[9468.]—**Whitewash.**—To remove whitewash from outside stone walls use warm water with a stump brush, plenty of rubbing and rinsing. But are you sure it is whitewash? I should give an opinion it is limewhite, and in this case your only chance is to scrape.—H. D. H.

[9470.]—**Gas-Lighting for Draughtsmen.**—I have never found any gas-burner absolutely steady. I have always used the Argand as being the best. In the house I occupy at present however, there are no pipes, and I took no steps to put them in, for the gas is very dear here—4s. 6d. per 1,000. I had, therefore, to take some other course, and acting on the advice of a friend experienced in the use of petroleum oils, I adopted the "Silber" burner and Strange's A 1 crystal oil. The result is perfectly satisfactory. I fitted a brass cup or basket upon the gas-bracket to receive the vessel, and surmounted the burner with an opal reflecting-up shade. The light is a beautifully soft white light, and absolutely steady. It is quite a relief from the unsteady gas.—WILLIAM PEACHEY, Saltburn-by-the-Sea.

[9471.]—**Music Hall.**—There is an article on the regulations for the better construction of music-halls, &c. in the BUILDING NEWS. Vol. XXVI., p. 528.—A. C. W.

Mr. James Young, who was believed to be the oldest Freemason in Scotland, died at Stevenston last week. Deceased, who was a builder by trade, was initiated a member of the Stevenston Thistle and Rose Lodge, Stevenston, on the day that Queen Victoria was born, the 24th May, 1819, so that he had been a freemason for nearly 68½ years. He attained his 90th year a month ago, and two weeks ago he took part in the centenary proceedings of his mother lodge. For more than forty years he was in the employ of the late Provost Barr, of Ardrossan.

At a vestry meeting held at Lymm last week it was decided, in accordance with the report by Mr. J. S. Crowther, of Manchester, to take down and rebuild the upper 40ft. of the tower of the parish church, at an estimated outlay of £1,000.

LEGAL INTELLIGENCE.

SERIOUS CHARGE AGAINST AN ARCHITECT.—At the Winchester Assizes on Monday, before Mr. Justice Wills, Thomas Fleming, 48, architect, was charged with feloniously causing to be delivered to Ellen Clark a forged process, purporting to be a copy of a writ of summons. The prisoner formerly lived at Southsea, and married as his second wife a friend of the prosecutrix, who also lives there. Soon after the marriage she left him, and went in the first instance to the house of the prosecutrix. In January of this year he wrote to the prosecutrix threatening her with an action, and in September sent her a printed form of a writ summons, issued by the High Court of Justice, with particulars filled in, and purporting to be a copy of a writ in an action by himself against her. It was proved that no such writ had been taken out and filed at the Central Office. When charged with the offence the prisoner said that he had only meant to show the prosecutrix the sort of document he was going to serve on her through her solicitor. The jury found the prisoner guilty of serving a forged writ, with intent to intimidate, and his Lordship, taking into consideration the fact that the prisoner had been six weeks in prison awaiting his trial, ordered him to be bound over in his own recognisances to appear and receive judgement if called upon.

ACTION FOR QUANTITIES.—SCHOFIELD V. BARNADO AND ANOTHER.—(Queen's Bench Division, Nov. 21, 22, and 23.—Before the Lord Chief Justice and a Special Jury.)—In this case Mr. James Schofield, a quantity surveyor, of Bloomsbury, sued Dr. Thomas J. Barnardo and Mr. Ebenezer Gregg, an architect, to recover £123 5s. 11d., balance of an account for professional services rendered in connection with the Edinburgh Castle Mission Hall, Limehouse. The defendants denied their liability on various grounds. In June, 1883, Dr. Barnardo was contemplating building the Mission Hall in question, and employed Mr. Gregg as his architect. The plaintiff was engaged as quantity surveyor, and there was some alteration of the plans which involved extra work. The lowest tender being £11,200, in excess of the sum which Dr. Barnardo was prepared to spend, the plans were abandoned and others made in accordance with which the mission hall was erected at a decreased cost. The plaintiff's charges in regard to the quantities of the original plan amounted in all to £273 5s. 11d., and of this sum he had received £150, his claim now being for the balance. On behalf of Dr. Barnardo it was stated that he only authorised the preparation of bills of quantities which should limit the cost of the building to £5,000. As to part of the work, the defendant contended that if the architect employed the plaintiff it was on his own account, and further, it was alleged that the charges were excessive, and that the £150 paid was sufficient to satiify the plaintiff's claim. The hearing of the case occupied three days, and a large number of witnesses were called. The Lord Chief Justice, in summing up, said, while giving full credit to Dr. Barnardo for absolute truthfulness in intention, suggested to the jury that perhaps from sanguineness of temperament Dr. Barnardo had confidently expected the cost not to exceed £5,000, and so had come to think that he had actually, in conversation with Gregg, as he alleged in defence, imposed that limit. This limitation, however, was denied by Gregg. It was for the jury to say what they deemed the more probable explanation of this difference. As a rule, he ventured to state with confidence that it was the part of the builder, for whose convenience it was done, to pay the quantity-surveyor. The payment, probably in every case, eventually came out of the building proprietor's pocket, as the amount was probably in every case added by the builder to the amount of his tender; but it was another thing for the surveyor to claim, as a matter of contractual right, to recover it from the building proprietor. However, here it seemed that, by his payment of £150 to Gregg, Dr. Barnardo had deprived himself of the right to raise that defence; and the main question for the jury would be one of amount—viz., whether the payment made by Dr. Barnardo was, in fact, sufficient. The jury found for plaintiff, as against Dr. Barnardo, £68 7s. 1d., as against Gregg, £38 17s.

The timber stores and premises of Mr. Leonard Marshall, timber merchant, James-street, Old-street, E.C., were destroyed by fire on Saturday night.

Mr. J. Thornhill Harrison, C.E., Inspector for the Local Government Board, held an inquiry at Birmingham, on Friday, upon an application by the town council for sanction to borrow £78,869, for the erection of assize courts, and £6,000, for the purchase and adaptation of premises to be used as judges' lodgings. Mr. Aston Webb, F.R.I.B.A., joint architect with Mr. Ingress Bell, of the courts, produced the plans.

STAINED GLASS.

DODDINGHURST PARISH CHURCH, ESSEX.—This church, which has recently undergone complete restoration, has recently had all its windows filled with stained glass in harmony with the various periods of architecture. The east window, which is of three lancets, consists of the subject of the Te Deum, representing "All Saints," to whom the church is dedicated. The centre light contains Our Lord in glory, surrounded by a multitude of cherubs, of remarkable pieces of ruby glass, forming a special feature in the design; at His feet the earth, His footstool, and the four winged beasts, above the cherubim and seraphim, and below all St. Michael overcoming the dragon. In the side lights are groups of Apostles, Prophets, Martyrs, and Holy Church, divided by a belt of Holy Innocents, the whole surmounted by canopies of the 13th-century period. On the south side of the chancel are three single-light windows, with the scenes of "The Agony in the Garden," "The Crucifixion," and "The Entombment." On the south side of the nave is a window with stonework of 15th-century date, and filled with glass of the same period, and consisting of three lights; this is treated with the subject of "The Marriage Feast at Cana," running through the whole. Above are delicate canopies peculiar to the period, making an interesting contrast to those in the east window. On the north side are two single-light windows, the one "Our Lord in the Temple among the Doctors," and the other "His Blessing Little Children." The ornamental portions of these windows, together with those on the south side of the chancel, are varied specimens of the 14th-century period. The great west window, which is a three-light Perpendicular one, is filled with the scene of "Our Lord's Charge to St. Peter," and the treatment is remarkable for its simplicity, being devoid of all ornament. In the centre light is our Lord, in the left St. Peter, and in the right St. John; in the foreground are groups of sheep, and in the background the Lake of Gennesareth, while the figures themselves are little short of life-size. The whole work was designed and executed by Messrs. A. O. Hemming and Co., 47, Margaret-street, Cavendish-square, London, W.

CANTERBURY.—The City Council have just received a report from Dr. J. Brigstoke Sheppard as to the stained glass in the City Museum. Dr. Sheppard says the Museum windows are filled with fragments of glass evidently collected from many different buildings, but all belonging to one style of art, and almost to one century. The greater part of those pictures in anything like a complete condition consists of roundels or circular plates, many of which are accompanied by inscriptions. From these inscriptions it may be gathered that the several pictures of this class were paid for and dedicated by benefactors whose names are appended to the roundels, the date of the gift being often also given, and that the pictures once adorned the windows of chantries or side-chapels of churches in Holland or Flanders. The glass is interesting rather than valuable, having all been manufactured between the years 1550 and 1700, at the time when the art of making stained glass had greatly degenerated, and was on the point of dying out. Whilst the windows are wanting in glow of colour and rich illumination, nevertheless the scenes represented in the various pictures are mostly interesting, instructive, and even amusing, from the lively manner in which they delineate the ordinary occupations and costumes of Dutch men and women of 300 years ago, and from the quaint shapes in which their ideas of the scenes and personages of sacred history are expressed. From the inscriptions, then, and the comparatively modern date of the glass, Dr. Sheppard concludes that up to the year 1700 devout Dutchmen continued to spend a pound now and then in decorating their guild-chapel, that at the beginning of this century the armies of revolutionary France invaded what are now the kingdoms of the Netherlands and Belgium, one result of the invasion being that the Canterbury Museum has painted glass which some prudent person appropriated and exported when he had the chance. The east window of the south (Bourne Park) aisle of Bishopsbourne Church is filled with glass out of the same batch as those in the Museum. The City Council resolved that tenders be invited for wire protection to the windows.

M. Louis Gallait, the celebrated Belgian historical and portrait painter, died at Brussels on Sunday. The deceased was in his 77th year, having been born at Tournay in 1810. M. Gallait was elected in 1869 an honorary member of the British Royal Academy. His last great work was "The Plague of Tournai."

The tender of Messrs. C. Shepherd and Son, of Cardiff, has been accepted at £349, for the erection of Wesleyan Sunday schools in Roath-road, Cardiff. The architects are Messrs. Habershon and Fawckner, of London, Newport, and Cardiff.

Our Office Table.

As will be seen from our report of the meeting at the Society of Architects on Friday last elsewhere, the Draughtsmen's Provident Fund bids fair to become a reality. The thanks of all likely to be interested are due to Mr. Chambers and the other gentlemen who have laboured to bring about the formation of the association, and it is to be hoped, as soon as the rules are tabulated and the society registered, members and subscribers will hasten to enrol themselves. The assistants especially should now bestir themselves. At more or less frequent intervals during the past 20 years men among them have occupied our correspondence columns with pleas for the establishment of a Provident Fund—let them now see that the opportunity is secured.

MR. LAWRENCE HARVEY begs us to state that the President and several members of the Council of the Royal Institute of British Architects have decided to give a prize for the best working drawing and model of the vaulting at the angle of a cloister. Full particulars of the competition, which will be open to everyone, may be obtained on personal application to the secretary of the R.I.B.A., at his office, 9, Conduit-street, Hanover-square, on the 4th of June next. The working drawings and written explanations of the methods followed will have to be delivered to the secretary of the R.I.B.A. on the following Monday, June the 11th. The candidates whose drawings and papers are considered satisfactory will be invited to construct the models on which the prize will be finally awarded. The prize of ten guineas will be given to the best model presented; the other candidates selected to compete in making the models will receive honorary mentions and certificates. In view of preparing candidates for this competition, Mr. Harvey has undertaken to open a second evening class of masonry at the City and Guilds of London Central Institute, Exhibition-road, S.W. Applications to join same to be sent as early as possible to Mr. Lawrence Harvey, 10, Great Queen-street, Westminster. We are glad the Institute is moving in this important matter. If they and Mr. Harvey will accept our co-operation we shall be pleased to supplement the encouragement thus offered by adding a second prize of £5 5s., to be awarded by them on the same conditions.

APPLICATION will be made to Parliament next session for leave to bring in two Bills in connection with the proposed parks for Vauxhall and Brixton. By the Bill relating to Vauxhall Park, powers will be sought to purchase the Lawn and Carron-house, Lambeth, the lands proposed to be acquired comprising about 8½ acres. In the Bill relating to Brixton Park power will be asked authorising the purchase of Raleigh House and lands surrounding, and certain adjoining houses and gardens at the Lawn, Brixton-hill. Clauses will be inserted in both Bills authorising the preservation of the properties to be acquired as parks, gardens, or open spaces, and conferring on the Metropolitan Board of Works and the Lambeth Vestry the necessary powers of purchase. The Metropolitan Board of Works decided on Friday, on the motion of Mr. F. H. Fowler, to contribute £1,500 an acre towards the cost of purchase on condition that an equal amount is given by the Lambeth Vestry.

MR. J. C. HORSLEY, R.A., writing to a Staffordshire correspondent on Government art schools and technical education, says, referring to the South Kensington Museum, "that from the date of Redgrave's retirement the whole character of the school has become changed, and from being one in which the all-important work of design for manufactures is the chief consideration, it has drifted slowly but surely into a place of perfunctory art teaching for the delectation of shoals of female amateurs, and for the turning out of a cartload of most mediocre artists of both sexes, who flood the country and public exhibitions with worthless productions. It is doubtless owing to this action that at the Royal Academy, for instance, whereat some 15 or 20 years since from 4,000 to 5,000 works were sent for annual exhibition, that number has of late years more than doubled. I cannot, however, do more now than hint at this large and important question, which calls for the most searching investigation, and especially at the hands of the British taxpayer, for whereas in 1837 the original grant to the School of Design was £1,500 per annum, the total cost of the present establishment in 1886-7 was £410,337."

THE committee of the Palestine Exploration Fund have received a letter from Herr Schick, of Jerusalem, containing interesting particulars of new discoveries with reference to the topography of the neighbourhood of the Church of the Holy Sepulchre in that city. At the south-east corner of the block of buildings which includes the Church of the Holy Sepulchre, the Russian and Greek churches have been clearing the ground and erecting new buildings. One result of these alterations has been to sweep away the old street mentioned in "La Citey de Jherusalem" (about 1187 A.D.) as "une rue coverte à voute, par u on va el mostier del sepulcre." Many years ago the street was walled up, and until now no one suspected that it had remained almost intact to our own day. The removal of the old street led to a discovery of even greater interest—viz., that it had been built upon an ancient pavement of very large, flat stones, of great thickness, which proved to be a continuation of the pavement found some years ago in the ground to the north owned by the Russians. This pavement is, with much probability, regarded as the actual work of Constantine, part of the "space open to the sky which he paved with polished stones," or of the wide market-place at the east-end of his group of churches in honour of the place of Our Lord's Resurrection. If so, there is an end of a very important part of the controversy which has raged for so many years over the so-called Church of the Holy Sepulchre, and the theory of the late Mr. James Fergusson may be treated as having been finally disposed of, for Constantine's site is thus proved to have been that on which the present church stands.

THE first of a course of six lectures on Raphael Sanzio was delivered by Mr. T. Matesdorf at Steinway Hall, Lower Seymour-street, on Wednesday week. The lecture was illustrated by about 20 limelight reproductions of Raphael's pictures. The lecturer dwelt on the various influences by which the early work and life of Raphael were affected. He entered upon a critical examination of the art of the great master as regarded from historical and other points of view. The motives of several of Raphael's earlier masterpieces were explained, and attention was drawn to the respects in which they differed from those of his masters. The opinions of the best English and Continental critics with regard to the various phases of Raphael's art were cited in the course of the lecture. The "Sposalizio," the "Three Graces," the "Vision of a Knight," and the Madonna Ansidei were among many other of Raphael's works which were criticised and examined by the lecturer. The many changes of possession which most of Raphael's pictures have undergone, and the extraordinary prices which have at various times been paid for those highly-valued works were also touched upon.

MEETINGS FOR THE ENSUING WEEK.

MONDAY. — Royal Academy. Lecture No. 6 on "Chemistry," by Prof. A. H. Church. 8 p.m.
Society of Arts. "The Elements of Architectural Design," Cantor Lecture No. 1, by H. H. Statham. 8 p.m.
Leeds and Yorkshire Architectural Society. "The Legal Registration of Architects," by J. W. Connon.

TUESDAY.—Society of Architects. "Technical Examinations," by G. A. T. Middleton, secretary. St. James's Hall, Piccadilly. 7 p.m.
Birmingham Architectural Association. "German Romanesque," by A. Reading.
Institution of Civil Engineers. Discussion on Sir F. A. Abel's paper on "Accidents in Mines." 8 p.m.

WEDNESDAY.—Society of Arts. "Economical Illumination from Waste Oils," by J. B. Hannay. 8 p.m.

FRIDAY.—Architectural Association. "Perspective Drawing and the Apparent Form of Objects," by F. T. Baggallay. 7.30 p.m.
Institution of Civil Engineers, "Classification of Continuous Railway Brakes," by A. W. Metcalfe. 7.30 p.m.

SATURDAY.—Association of Public Sanitary Inspectors. "The Duties of Port Inspectors of Nuisances," by Dr. W. Collingridge. 6 p.m.

Architectural Association. — "Perspective Drawing," by F. T. Baggallay. 7.30 p.m. December 2.

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EMPLOYERS' LIABILITY FOR UNUSED QUANTITIES.

IS an employer responsible for the preparation of quantities for a building which exceeds in cost the sum of money he had agreed to expend? This, in brief, is the question that was raised in the case of Schofield v. Dr. Barnardo and Gregg, before Lord Coleridge and a special jury in the Queen's Bench Division the other day. It was an action by an architect and surveyor for the balance of a claim in respect of professional services as a quantity surveyor. Dr. Barnardo, well known in connection with philanthropic enterprises, engaged Mr. Ebenezer Gregg, an architect, to prepare plans for a Mission Hall at Limehouse, and in prosecution of his duties the latter employed plaintiff to take out the quantities for the new building, and also to make certain alterations in the said quantities, consequent upon certain alterations being made in the plans of the building. Mr. Gregg acted as architect and agent of Dr. Barnardo, as he said in his defence, within the plaintiff's knowledge, and did not employ him as a principal. The architect also pleaded that none of the expenses were incurred by his order. Dr. Barnardo pleaded that he had contracted alone with Mr. Gregg, and that his agreement with him was that the mission hall was limited in cost to £5,000, beyond which he was not liable. The lowest tender was £11,200, a sum much in excess of the limit Dr. Barnardo had agreed to spend. The plans were therefore abandoned and others made for a smaller building at a reduced cost, and the mission hall was built in accordance with them. The plaintiff's charge amounted to £273, of which sum the defendant paid £150, being at the rate of 1½ per cent. on the builder's tender.

It may be mentioned that the architect, Mr. Gregg, was subsequently added as one of the defendants in the suit, and that the plaintiff included him, inasmuch as some of the services rendered were said to be architect's work. To this Mr. Gregg replied that the work was done without his authority, and was quite unnecessary. He only employed the plaintiff to do the customary work of a quantity surveyor, acting as Dr. Barnardo's agent. Many leading London architects and surveyors were called, and the hearing of the case occupied three days. The jury, after deliberating, found a verdict for the plaintiff against Dr. Barnardo for £68 7s. 1d., and against Mr. Gregg for £38 17s.

The reports of the case are meagre, and do not furnish all the particulars necessary to enable us to speak with certainty of the legal aspect of the question. It is well known, however, that an architect who is retained to prepare plans and specifications has an implied authority to employ a surveyor to take out the quantities as agent of the employer. This authority has been confirmed in some instances. The celebrated case of "Moon v. Guardians of Witney Union," is known to all architects and surveyors, and up to a certain point is on "all fours" with the facts reported. The main difference is that the Union, by its own act, refused to allow the building to proceed, and objected to pay for the quantities, whereas in the present case the defendants relinquished the original design. There is, however, no question here as to liability, for the defendant paid £150 to the quantity surveyor, which was, he thought, a sufficient discharge of all liability. By this payment the defendant admitted his liability, though not to the full amount claimed.

We have here, at least, a general grievance of the building owner. He very naturally asks why he should be called upon to pay for services that have been rendered of no use to him. He employs an architect to make out plans for a building not to cost more than a certain amount, and surely he thinks he has a right to pay only on that amount for all services rendered in connection therewith. Any charge beyond has been entailed by no word or act on his part, and he very justly thinks he cannot be legally compelled to pay it. But this is one of those cases in which the architect, as agent, binds his employer. We do not know all the circumstances of the case. There might be some grounds for believing that the defendant intended to carry out the first and more costly design, and had subsequently changed his mind. We can only surmise. From the facts as published the conclusion is that an employer is liable to pay the surveyor's commission on any plans, whether they exceed the amount named or not. If we look at the decision from the surveyor's standpoint, we cannot but see the justice of the verdict. The surveyor receives plans and details of a certain building from which he has to take out his quantities, and for this labour he has a right to be paid. If the tenders are too high, the fault does not rest with him: he has done his work and expects remuneration, whether the building is executed or not. A bill of quantities is a laborious undertaking, requiring close attention and thought, and occupying a long time. This labour must be paid for. There is a farther justification. Quantities are the means by which cost can be ascertained. An employer about to build cannot obtain with any approximation the cost without them, nor can his architect, till the plans are prepared. It is unreasonable to expect an architect to tell what a building will cost within a certain percentage. The preparation of quantities may, therefore, be regarded as an essential step which the architect is authorised to take in order to obtain this information. If it sums out at much or little, it is for the owner's advantage, and has, therefore, to be paid for.

The process is a slow, tedious, and thankless preliminary, which it will be impossible to ever make a pleasant one either to the employer or the architect; but the cost must be counted before a building is commenced. At present the question of quantities is shelved till it becomes a matter of necessity. Architects do not like to hint about them, and employers imagine that they are unnecessary, and might be dispensed with, or think the architect ought to be capable of estimating without their use. The matter is one, however, that ought to be generally recognised by employers. In any way, the preparation of quantities must add to the cost of the building, whether known to the owner or not, and the fees usually paid to surveyors generally, however, by the builder ought to be as well known as the architect's own commission. This decision will materially strengthen the hands of quantity surveyors, and increase the responsibilities of the architect. It will point to the importance of preparing designs, with more reference to the cost contemplated. No surveyor can be asked to give his services for nothing, because the tender is too high, and that, therefore, reduced plans and amended quantities have to be prepared. In this instance, the lowest tender exceeded the contemplated cost by £6,000, or more than double, and the surveyor had taken out the quantites to this extent. He was afterwards required to make alterations in the said quantities, owing to the cutting down and alterations of the plans, involving considerable extra labour. To revise a bill is no easy matter; items cannot be struck out, and new ones inserted, as in an ordinary bill of merchandise; each has to be gone into *de novo* from the plans, and the calculation made. Nevertheless, as reductions are often found necessary, an arrangement as to the commission to be charged in amending or preparing a new set of quantities is one of importance. The decision of the jury ought to make architects careful how they arrange for quantities in large works, the actual execution of which seems to be doubtful, lest they be made defendants in the suits. There are facts that are wanting to make this part of the verdict clear. The duties of a quantity surveyor ought to be clearly laid down; he is not called upon to do any of the architect's work—such as finishing the drawings, making details, or tracing, though we have known instances where he has lent a helping hand in these matters, and not only taken out the quantities, but completed the design and drawings, and rendered various services. The public are beginning at last to learn that the erection of buildings entails costs that are not entirely limited to the charges of the architect.

THE ROYAL SOCIETY OF BRITISH ARTISTS.

UNDER the inspiration and leadership that have characterised recent exhibitions of this Society, the winter exhibition opened this week gives every assurance of a continued revival. The collection of water-colours by the late F. H. Potter in the north-west room is not the least interesting portion of the exhibition. These works have been lent by various owners, and they make up a very complete collection. What can be more charming than the girl studies—and they are all of girl life—"The Palm Fan," "The Blue Jar," "Her First Companion," "The Music Lesson," "Laziness"? As studies of colour contrast, "The Palm Fan" (47), a girl in a claret-red dress, and "The Blue Jar," a red-frocked girl holding a blue vase, are admirable in their simplicity and childlike grace. "The Music Lesson"—two girls at a piano—is solidly painted in a dark tone, displaying considerable feeling and sympathetic treatment. The treatment of these water-colours is not the less remarkable for their oil depth of tone and the "stippling" resorted to, the effect of which is to give transparency and an opaline variety to the flesh tints. "Twilight" shows a lady before a fire in a darkened room, the flickering light of the fire and the sombre colour of the surroundings being treated with much poetic grace. "Reflections" is another charming study of child-like simplicity. The other water-colours contain specimens by A. Ludovici, jun., William Collins (75), James Hayllar (77, 83), A. W. Weldon (78), Horace H. Cauty (81), Jules Lessore, T. B. Hardy (82), W. Ayerst Ingram (90), and other artists. In the north-east room, a corner picture, by H. Caffieri, is worth notice. The subject, "Anxiety," represents three female figures, wives of sailors, on a prominent part of the coast anxiously looking and waiting for their relatives. One, a seated figure of a young mother with child in her arms, is weary of waiting. The picture is full of freshness, and the drawing vigorous. Nelson Dawson's "Blowing in from the Sea" (111), Carlton A. Smith's "Family Cares" (137), the fine summer sunset landscape of Stuart Lloyd (146), and S. Giampietri's "Chapel in Westminster Abbey" (152), well drawn and boldly handled in the colouring, are particularly worth mention. In the large gallery the one important picture is by Edwin Ellis, "The King and the Queen, Flamborough" (317), a grand coast scene, in which the gigantic limestone rocks, lit by the sun, rise precipitously from the deep blue sea, set off

against the dark, stormy-looking sky in the distance. The rocks have parted above, forming a great chasm; their magnitude is seen from the boat and wreckage introduced into the foreground. For technical qualities, fine colour, and powerful, solid handling, this work of Mr. Ellis is not surpassed. In singular contrast is Claude Monet's "Coast of Belle Isle, Bretagne" (212), a rock-bound coast painted with an utter disregard of aërial perspective, in every conceivable hue of the rainbow. This impressionist painter has certainly a blind infatuation for the sensational in colour, as the staring, garish landscapes in another part of the gallery attest. "The Birth of Venus" (341), by William Stott, of Oldham, is hardly the ideal visionary beauty which we read of in Greek mythology as having sprung from the foam of the sea, at least in the face; the treatment, however—a circular canvas—and the figure-drawing and colour are decorative, and in better keeping with the poetical legend, for the mythical theme has its own laws. Theodore Roussel, in "Bathers" (207), has produced a nice study of colour. Hayne King's "Resting" (210) and R. J. Leigh's "In Summer Time" are good. A very large landscape, "A Summer Holiday in the South of England," by A. F. Grace, puts one in mind of the undulating pastures or downs of Sussex. The sea in the distance, and the windmills in middle distance; but the foreground is wanting, and the canvas looks rather barren. W. Christian Symons sends a pleasing picture of a little girl with a Christmas tree; Wyke Bayliss gives a view of Evreux Cathedral from the Lady Chapel (230), and further on a more interesting interior, in all the rich play of light and colour for which this architectural painter is noted, representing a group of villagers attending a shrine in St. Madeleine, Troyes. Troyes Cathedral, with its wealth of carving and colour, presented a good field for the display of the poetic quality of Mr. Bayliss's pencil. Another contribution is a clever drawing of "Westminster Abbey from the North Aisle of Choir" (187). Alfred Hartley has a small sketch in oil of a sunny meadow, "Summer" (237), and Yeend King a charming piece of woodland, with two sisters seated at the foot of a tree, "Lessons Out of Doors" (239). We pass works by Henry J. Simpson, J. J. Shannon (a clear portrait), A. Ludovici, jun., "Kept In," a schoolroom somewhat commonplace in treatment. Peter Macnab's "Mussel-Gatherer" (262) in its colour and tone is worth notice. At the corner of room hangs a full-length portrait of "G. S. Willard, Esq." (266), by Sidney Starr, good in pose, but intensely black, with the same lugubrious background and frame. E. J. Cobbett contributes two works. "A Sandy Pathway, Surrey" (272), is natural and effective. Alfred Stevens, in his two studies of morning and evening effect, "Effet de Matin" and "Soleil Couchant" (273 and 280), has shown ability in producing sunlight effects. The latter is a red sunset. Other effects of light, like No. 283, are exhibited; but we pass on to notice Theodore Roussel's fine portrait of Dr. Howard Stewart (293), which bears traces of Whistlerian influence. The President's (J. Mc N. Whistler) contributions are few. "A Red Note—Fête on the Sands, Ostend," is an impression merely, and those who can see the poetry of faint impressions of light and shadow will find something in it, and also in the collection of etchings on the staircase. "A Grey Note" (235) is another example of Mr. Whistler's eccentric genius. Few can see much in his "Symphony of White and Red" in the south-east room (352)—a garden with two or three female figures, and one must look at it from a little distance and by itself to discover the grace of line and colour harmony. Of other pictures in the large room we note Edward R. King's "Village Street, Harting" (204); A. Ludovici's stage fairies behind the curtain in a theatre (306); E. G. Gerardot's "Here's Papa"; Charles Thorneley's "On the Scheldt" (311)—nice in tone; James E. Grace's delicately-painted piece of woodland (315); and Eliza Armstrong's "Matinée Musicale" (316)—a boy at a cottage window playing the accordion to two girls. R. J. Gordon's "Hard Hit" is clever and a trifle dramatic in its action (362)—probably it tells the tale of a betting man. The figures are at least carefully painted, and the colouring and light background well put in and effective. The south-east room is chiefly given up to studies, more or less finished, and to impressionist pictures like those of Claude Monet—one a meadow (375), with trees, representing a somewhat misty effect, the "loading" of pigment being extravagant. Light in its brightest aspects is supposed to be studied in this and the other piece, "Village of Bennecourt" (384), where one sees only a few tall stems of trees of bright rose tints, as straggling as the dark shadows they throw on the sunny meadow. J. E. Blanche has a rather crudely finished sketch of a head (345). E. Aubrey Hunt's "Gathering Seaweed" (350) has a nice harmony in grey tones, and the atmosphere and boats are effective. Another grey study is "Lisiere de Bois," by W. B. Tholen. Theodore Roussel's portrait of Mrs. Mortimer Menpes (316), a full length figure of that lady in black velvet dress on an Indian red ground—"a note in black and red," to use a Whistlerian phrase is one of the chief works. Between the grey subjects of W. B. Tholen and P. W. Steer (364) the red contrasts well. G. F. Whetherbee's "Seaward," and works by G. Demain (407), G. P. Jacomb Hood (414, 425, 426), Jas. Hayllar (429), Mark Fisher (440), Edward Holmes (431), A. W. Weedon (479), are worth notice, and also Solomon J. Solomon's capital portrait of "Prof. Gaetz" (454). E.W.Waite's coast subject, "Daddy's Boat" (441), is pleasingly painted. However sketchy and crude some of the pictures are, they are by a class of artists who are seeking to embody ideas that till lately were refused admission into picture galleries of the conventional standard, and their presence gives zest to the exhibition.

INSTITUTE OF PAINTERS IN OIL COLOURS.

THE present show of oil pictures is strong in landscape and *genre*; perhaps, on the whole, we may be inclined to think there is a little too much of the "padding" element. The council are evidently still of the opinion that the walls must be filled, and a large discount must therefore be made of the pictures of merit. In the West Gallery landscape holds a high place, and the picture of Stuart Lloyd, "Moonrise" (12), with its summer haze and sunlight passing into moonlight, the fine colour and reflection on water; Tom Lloyd's "May Morning" (18)—a delightfully-painted hillside overlooking the sea, with a tree bent in the breeze; Claude Haye's "The Hammer Ponds, Godalming" (73)—a grey-toned heath; James Webb's "Salisbury after the Floods," despite the ill-proportioned spire; and E. M. Wimperis's "Ferryman's Cottage" (119), are sufficiently important contributions to make a small gallery. Figure and incident studies are numerous; perhaps one of the cleverest is by G. G. Kilburne, jun., "Just Too Late," an incident of old days, told with his usual minuteness of detail. C. N. Kennedy (3) paints a small classically conceived picture with figure of refined colour. Stanhope A. Fisher's "He Won't Bite" is not without pathetic interest, and the grey colour and children are natural. J. J. Shannon's centre study of portraiture, "Mrs. Thornton" (69), dressed in light pink, is admirable in its technical qualities, though somewhat prim in pose. The most pretentious figure subject is the Hon. John Collier's "A Priestess of Bacchus," an ivy-crowned figure holding a rod with fir cone, standing amid rocks—a composition that is at least bold in its conception, and painted with the master's careful attention to background and detail. John R. Reid's Miss Nelly Tate as "Alice in Wonderland," is clever as a piece of brushwork and colour; but the expression is not happy. H. Fantin's "Sara la Baigneuse" (162) is not without merit as a composition, but decidedly lacking in delicacy of treatment. A small study of "Hero," by George Morton, is delicate and refined in colour; the beautiful maiden of Sestos is shown looking through a curtained doorway, her hand screening her eyes. Oscar Wilson's "Idling" is a clever piece of technique; and Arthur Severn's "Santa Maria della Salute, Venice" (201), G. G. Kilburne's "After the Ball" (196), J. MacWhirter's "Shores of Arran," Miss Rosa Jameson's "A Vanishing Sail," and works by J. T. Nettleship, and L. R. Hill (34), the humorous pictures of ducks, by J. C. Dollman; "Those the Gods Love Die Young" (136), and one by W. Dendy Sadler, in his usual vein, an incident of monastic life, may be mentioned. F. Walton's "Hill Top" (128), is exceedingly true to nature, and solidly painted.

Sir James D. Linton, the president, sends one work, a head, "Henriette," refined and scholarly as usual, but rather inanimate. It is a strict profile, Holbeinesque in style and technique, with a fine nose and mouth. The opposite wall and picture to which the accustomed visitor generally looks for the next work of the year, has F. D. Millet's "Piping Times of Peace" (454), a work of undoubted excellence, depth of tone, and finished execution—the interior of an inn, in which a merry-making musician, with broad-brimmed hat and collar, is piping to a customer and the comely-looking hostess. There is much that reminds us of the minuteness and chiaroscuro of the Dutch painter—a softness of colouring, and an accurate drawing of detail, as in the fine flat-pointed arched stone chimney-piece and the massive dark polished table. John Fulleylove shows almost as much skill with his oils as he does with the water-colour pencil; but there is a difference which does not as yet enable one to say that the master of architectural landscapes and stately garden scenes succeeds so well in oil. The delicate handling is lost in the heavier medium, and much of the architectural interest also. His "Hampton Court Palace," showing the majestic walk and statuary and the rounded foliage, is characteristic of the artist's work; and the same praise can be awarded to the view of "Blenheim Park and Palace" (477). "A Contrast," by Hugh Cameron, R.S.A. (222), is a telling incident; the atmosphere and sea in Gustave de Breanski's "Storm Clearing Off" (231), the delicate tone and sentiment in Jas. E. Grace's "Under Hanging Boughs," David Murray's clever little bit of sunlit meadow, "A Bait" (210), "Sir Roger de Coverley and the Beautiful Widow," by W. P. Frith, R.A., the fine luminous colour in Miss Hilda Montalba's "Grey Day, Venice" (268), F. Roe's "Old Sun Inn, Ipswich" (314), with its plaster ornamentation between casements, are interesting. Dexterous handling and broad effect are qualities in Alfred East's work, "The Gate of the Trossachs," and in two other works.

J. J. Shannon's studies of portraiture (178) and "Florence" (328), are examples of graceful dignity and refined colour. His portrait of Mrs. Thornton, to which we have referred, is a contrast in colour to Lady Maude Hooper in a slate-coloured satin; the former lady is extremely young and girl-like. The three portraits raise high expectations of this artist's talent as a painter. "Une Matinée Musicale," by E. Blair Leighton (337), is a scholarly work, in which the costumes and

ceremonious habits of the 18th century have been painted with dexterous minutiæ and regard to detail. Frank W. Topham's "Two's Company, Three's None" (338) is also a cleverly-told story. James Hayllar, in his young girl, seated on a couch, attired in lace dress and silk stockings, aptly illustrates the lines—

"Ribbons and laces, and sweet pretty faces,
And that's what young ladies are made of."

"The Fortune Teller," by G. Hare, is weird, but not pleasant. Ernest Bucknall's landscape, "Autumn Days" (367), is broad and well painted; after which we come to W. Dendy Sadler's "The Private Secretary" (383), in which the painter has depicted an incident with great skill and with much of the comedy element about it. Equally successful is "In Summer Time" (403)—two jovial priests dining together under a verandah. John White has three subjects in his usual pathetic mood, and warmth of colour. "Home," a cottage scene, with its glow of evening sun on the faces of the three figures at the doorsteps, is full of pathos.

The East Gallery is generally one of the strongest. The first picture to strike us is the bright green seascape of Edwd. F. Brewtnall (529); the curling wave, as it is coming in, with the receding water is cleverly painted, and the lights and reflected lights are well managed. Humorous and clever is Arthur Dodd's "An Idle Threat," a magpie seated on a tub amongst a lot of dogs, threateningly holding a whip in his beak. Clegg Wilkinson's "Spring—Piccadilly" (538) is a large grey picture, powerful in its pathetic interest, though very simple in its elements. Henry J. Stock's "Satan Dead at the Foot of the Cross (557) is a bold conception, if we cannot say the painter has done the best in its presentment. T. B. Kennington is less happy in his "Pleasure and Pain" (571), a rather commonplace composition—a lady in ball-dress attire in her drawing-room, listening to the sad tale of a sister in woe, who sits beside her in deep black, weeping. "A Modern Sibyl" (707) is clear in its light and shadow. The chief work in this gallery is, without doubt, Solomon J. Solomon's "Remorse," a very powerful picture representing (if we may surmise from the type of Eastern beauty who leans back upon a leopard's skin with a half-scowling look on her well-chiselled features) Delilah, and intended as a companion picture to Mr. Solomon's great work of "Samson" in last year's Academy. Here, at least, we find similar accompaniments—a glistening robe, long black tresses of hair, restless penetrating eyes, and surroundings that bear the same idea. The painting is tragical in the extreme, and its qualities of depth of tone and harmony of colouring and technical resources considerable. J. Haynes Williams' fine study, "The King's Page," is a delightful contrast to the last picture—a sleek-looking young man, satin-shoed with striped satin tucked-in tunic, carrying a flagon on a silver waiter. John R. Reid's strange study of "Old Batten's Farm," a harmony in reds, in which the trees, cottage, and faces are glowing in warm colour, hangs in a prominent place. More pleasant and natural in colour is Keeley Halswelle's "Autumn" (650)—a sequestered brook shaded by woods in autumnal shades, a little out of this painter's beaten track. We look in vain for another Halswelle this year. Owen Dalziel's "The Sands"—a crowd of holiday-makers on the beach, full of bright colour and life; and Arthur Hacker's "Returning from the Cockle Grounds" (630)—a grey-toned picture—are both noteworthy as opposite ideals of seaside life—one pleasure-seeking, the other of hard labour. Cyrus Johnson's "Catechism" is a clever piece of church detail, the carved pulpit and bench ends are of more interest than the subject proper; the portrait of Mrs. Cuthbert Williams is light and graceful, by Miss F. White. Ernest Parton's "Autumn's Sunshine"; R. Gallon's "Rising Mists" (687); E. M. Wimperis's fine landscape in the New Forest (709); Adam E. Procter's "Tide Waiter"; Edwin Haye's large and fresh "South-West Wind and Ebb Tide" (718), admirable in colour and atmosphere; G. Chester's vigorous "River Farm" (722); Edward Hargitt's large landscape, "Parkstone, Dorset" (750); H. R. Steers's "Indecision and Interest" are works of decided merit, to say nothing of many lesser works of *genre* and interest which adorn the walls.

THE SOCIETY OF ARCHITECTS.

THE second meeting for the present session was held on Tuesday evening at the Society's rooms, St. James's Hall, Piccadilly, S.W., Mr. C. H. Searle occupying the chair. The following thirty-nine gentlemen were elected as members:—Thomas Henry Baker, Walbrook House, Clacton-on-Sea; Alfred Joseph Beesley, 9, Buckingham-street, Adelphi, W.C.; John Brockbank, City Architect, Norwich; Joseph Cardona, jun., Gibraltar; William Crozier, jun., Old Elvet, Durham; Adolphus Curry, "The Retreat," and 21, Halkett-place, Jersey; John Richard Davison, Elmdale, Frances-road, Windsor; William Drew, 22, Victoria-street, Swindon; Owen Edwards, Alpha Villa, Rhyll, and Llewelly Chambers, Llandudno; Frederic Foster, Euston-place, Leamington Spa; Edwin James Hamilton, 70, Ship-street, and 13, Wellington-road, Brighton; Jacob Emlyn Harvey, 15, Clifton-hill, Exeter; Charles Joseph Higgins, 9, Buckingham-street, Adelphi, W.C.; Frederick Henry Holdsworth, Florence-road Chambers, New Cross, S.E.; Percy Holland, Fairstead Cottage, Newmarket; John Jackson, Woodland-place, Long-row West, Nottingham; Richard Thomas Johnson, 129, Darlington-street East, Wigan; Sydney Herbert Meyers, The Lindens, Brentford, Middlesex, and 83, Queen-street, Cheapside, E.C.; Frederick Morley, Commercial-buildings, Dublin; John Philip Mumford, Llanrug, Carnarvon; Philip Munro, 2, St. Stephen's Chambers, Baldwin-street, Bristol; William John Musgrove, 6, Flora-place, Union-street, Plymouth; William Bayne Parnell, Chalton Cottage, Arundel-place, Landport; Henry Walter Phillips, 10, Thomas-street, Horsely-down, S.E.; Sydney Kelway Pope, 1, High-street, Lymington, Hants; Henry Goodall Quartermain, The Oriels, Kingston-road, Merton; John Rhind, Inverness; William Rickwood, 243, Burrage-road, Plumstead; John Murray Robertson, 33, Albert-square, Dundee; Thomas Frederick Shaw, 1, Fortune Gate-terrace, Harlesden, N.W.; John Simpson, 8, The Quadrant, Buxton; Douglas Stewart, Dunkeld, Dean Park, Bournemouth; John Walden Stroud, Elm Grove, Southsea; Benjamin Turner, 10, Pitt-street, Barnsley; Robert Walker, Windermere; Joseph Frederick Walsh, Waterhouse Chambers, Crossley-street, Halifax; Walter Albert Williams, 51, High-street, Bromley, Kent, and Budge-row, E.C.; William Williamson, 3, Low-pavement, Nottingham; and Joseph Yeardye, 108, High-street, Ilfracombe.

TECHNICAL EXAMINATIONS.

The following paper was read by Mr. G. A. T. Middleton, A.R.I.B.A., secretary:—All examinations divide themselves naturally into two groups—those in which a certain proportion of the total number of marks has to be obtained in order to secure a "pass," and those in which a certain position among the candidates (first, second, third, or fourth, as the case may be) has to be reached in order to secure a "post." We have examples of both these classes in the examinations relating to architecture. On the one hand, we find those of the Science and Art Department, the Associates' Examination of the R.I.B.A., those to qualify for district and local surveyorships conducted by the same body, the entrance examinations of the Surveyors' Institution, those for local surveyors and inspectors of nuisances held by the Sanitary Institute, and those for municipal surveyorships held by the Association of Municipal and Sanitary Engineers and Surveyors; while, on the other hand, are all the examinations of a technical nature which are conducted by the Civil Service Commissioners. When commencing his studies an aspirant who intends to become an architect cannot do better than join the classes which are held throughout the country under the Science and Art Department. Before entering the office of an architect at all he would do well to become sufficiently accustomed to the use of his pencil to be able to pass the second grade examinations in freehand and model drawing, geometry and perspective. The first two of these subjects can be easily taken up by a boy who has been at school under a good drawing master before he is 17 years of age. The geometry is also very simple; but it is to be doubted whether the system of perspective drawing taught under the Science and Art Department is the best. To understand it properly, a very considerable knowledge of solid geometry is required, while all architects know that for practical purposes it is much easier to do a perspective by projecting from the plans than according to the theoretical rules. During his first year of articles a pupil should, and generally does, attend elementary classes in building construction and solid geometry, and these are followed up later on by passing in the advanced and honours stages. By these means a really sound knowledge, both of ordinary construction and of the materials used upon building works, can be obtained, for, in order to pass, it is not only necessary that the candidate should read books bearing upon the subject, but he must have visited works in progress, and must have become a neat and accurate draughtsman. For the honours stage in building construction, it is also necessary that a small design should be got out, together with a specification of estimate. Here, however, there is a decided flaw in the syllabus, for the design is allowed to be done at home, and consequently, while one candidate is able to spend the whole three weeks which are allowed upon the drawing, another would only be able to give to it one or two hours each evening. The result naturally is that the best man does not always succeed the best; while most of the candidates being employed in the daytime have to hurry their work, and the specification, at least, is generally sent in in a very rough form. Would it not be better to hold a second exam. in design for this, to pass in which some simple building would have to be pencilled out in the course of the four hours that would be allowed? It is not wise for an architectural student to remain in the art classes for the 3rd grade exams. The work done there is generally of too precise and mechanical a type for anyone who has real artistic ability, and the time is very much better spent in gradually preparing for the Associates' exam. for the R.I.B.A. This should be taken as soon as possible after the expiring of the articles, as before the student has entered the office of an architect as a paid assistant he has generally more time for study than afterwards. The amount of study required is considerable, and the exam. is, in some subjects at least, severe. The idea of attempting probationary drawing before the candidate is admitted to the exam. is a very good one. Here, above all other places, is the opportunity to test a candidate's ability as a designer and draughtsman. The papers upon Architectural History and Ornament are generally difficult to answer; still, they should not be beyond the capacity of anyone who really means to make architecture his profession. Ths subject set for the design is usually too large and complex to be worked out in the six hours that are allowed for its execution. In the Civil Service examinations it is a common thing to allow four hours for some such subject as a small stable, or a cottage hospital, of which the plans and elevations are required in pencil; but this is much more easy of accomplishment in the time, difficult as it is, than is the planning of a large board school to accommodate 300 children in six hours. The papers upon Material and Construction are simple, and should be easily answered by any who have previously gone through the advanced stage of the South Kensington Building Construction examination; in fact, no more is asked for than it is absolutely necessary that every architect should know. The same may be said of the Specification paper, and the questions upon Professional Practice; but those

set upon Strains are, to use a mild expression, absolutely valueless. It would be much better to leave the subject alone altogether than to set questions which any boy of 14 years of age, with the smallest knowledge of algebra, could answer. The examiners seem to have an idea that the subject is merely one of formulæ, which architects can find by looking up in their hand-books, instead of its being a branch of statical science, founded upon the closest mathematical reasoning combined with a knowledge of the strength of the different materials to be employed. It may be said generally that the R.I.B.A. examination is one which all architects should be able to pass whether or not they be naturally artists. It is, however, certain that the artist stands a much better chance of success than the purely practical man. No one, in fact, should be allowed to practise unless he pass. A great deal of credit must be given to those who inaugurated the exam., both for the lines upon which it was originally drawn, and for the great improvements which have taken place in it during the last few years. As a general rule the failures amount to about 25 per cent. of the candidates, a proportion which sufficiently shows the amount of work which the junior members of our profession voluntarily go through in order to qualify themselves for the examinations which are held by the R.I.B.A. For the examinations to prove the qualifications of candidates for district and local surveyorships, two very different sets of particulars are issued. One of these consists of some four or five heads and is issued to candidates on application, while the other consists of twenty heads, and is published in the R.I.B.A. Kalendar. This is a great mistake, for candidates hardly know what to read. As a matter of fact, the exam. is of a most miscellaneous character. The different Acts of Parliament relating to surveyors' duties in London and in the provinces supply the greatest number of questions; but beyond this, a knowledge of almost every branch of a house surveyor's business is requisite, while architecture is very properly not touched upon at all. These may well be considered the most severe qualifying examinations that are held, especially when we consider that the number of failures ure very far indeed in excess of the number of passes. The Surveyors' Institution has a very complete scheme of entrance examinations in three sub-divisions, so that candidates may enter by either passing in Land Agency, Valuation, or Building. There is also a preliminary examination for the admission of students; but this is not of a technical nature, and it is not necessary to go through it before entering the class of Professional Associates. The examination throughout is of a very practical and searching character. Land surveying and book-keeping have to be taken up in all three sections; but beyond this they vary very much, those taking up land agency being expected to be proficient in the law of landlord and tenant, in agriculture, in the construction of farm buildings, land drainage, and geology; those who take up valuation, in the law of landlord and tenant, and several legal subjects; and those who take up building, in construction, quantity surveying, measuring, working drawings, and the law of fixtures, dilapidations, and easements. A large number of candidates enter for this examination annually; but the proportion of passes is by no means great, while very few proceed further for admission into the class of Fellows, for which there is another examination of a considerably severer character, upon much the same lines. In every way these examinations reflect the greatest possible credit upon those who manage them, and no better qualifying examination for gentlemen entering the surveying profession could possibly be found. The examinations held by the Sanitary Institute for local surveyors and inspectors of nuisances draw but a small number of candidates. In all probability it is because small value is attached to the diploma gained by the members of local boards, consisting of non-professional men, who have the eventual filling of these posts, rather than to the character of the examination, although the latter is too short to properly test a candidate's qualifications. A great deal of study has to be done, however, before candidates can pass, as the field covered is a large one; but, still, it is not possible to test a man's knowledge of a large subject by giving him one question thereon, and this, if not absolutely the fact, is something like what is done by the Sanitary Institute. A similar examination, held by the Association of Municipal and Sanitary Engineers, is drawn up on much better lines. The subjects are: (1) Engineering as applied to municipal work, including land surveying and levelling, hydraulics, drainage, and sewerage, water supply, and road making; (2) Building Construction and Strength of Materials, including a knowledge of materials, the construction of public and private buildings, and of building by-laws; (3) Sanitary Science, as applied to towns and buildings, including ventilation, sewerage, and house drainage; and (4) Public Health Acts and the Rivers Pollution Acts. This examination has not been established for many years, nor has it been very widely advertised, and, therefore, is not so well known or appreciated as it deserves to be. It is held in the rooms of the Institute of Civil Engineers, and to this fact is most likely due the erroneous idea that examinations are held for admission into that Institute. This is an entire mistake, for there is at the present time no examination whatever, of a qualifying character, by which young engineers can test their qualifications, and in preparing for which they can find incentives to study, such as young architects have in the R.I.B.A. examination. The second great class of examinations appeal to a much smaller circle than those of which we have been speaking. Posts in the Civil Service are only sought by gentlemen who cannot succeed well as architects or surveyors, or who have not the means to start a practice. A certain competency and very passable social position is to be gained in the Civil Service with a fair income for life; but against this is to be set the "red tapeism" to which anyone of an independent spirit would not submit. When clever and naturally independent men enter the Civil Service, as they sometimes do from the easy life which it appears can be led in the Civil Service as compared with the hard work of making a living in the outside world, they soon either throw it up in disgust or else become mere machines like those around them. There are exceptions, of course, but they are rare. One great distinction between the Civil Service examinations and those instituted by professional bodies, besides it being not only necessary to pass, but to be sufficiently high amongst those who pass to obtain a vacancy, is the fact of there being a preliminary examination to go through. Although this is limited to such subjects as elementary arithmetic, handwriting, dictation, and composition, yet by the time that candidates have obtained a sufficient technical knowledge to enable them to compete, they have forgotten so much of their general education that it is quite a common thing for 50 per cent. of the candidates to fail, and it is also noticeable that the best and most artistic men are found to be the least successful. Several instances can be cited of gentlemen failing in their Civil Service Prelim. who have done well and gained high honours in their profession. The most popular examinations are those for Assistant Surveyorships in the Royal Engineers. Before entering for this examination it is necessary that candidates should have spent at least three years in the office of an architect, civil engineer, or builder, and some similar qualification is generally required in all the other departments. The subjects include (1) either architectural drawing, engineering drawing, or builders' details, at the option of the candidate; (2) theory of construction; (3) knowledge of materials, description of workmanship, tools, and plant; (4) quantities; (5) analysis of prices; together with algebra, Euclid, trigonometry, geometry, freehand, and chemistry of building materials, which it is in the candidate's option to take up or leave alone. As at the last examination, there were but three marks between the 8th man, who obtained a place, and the 9th, who did not, so that it is very evident that all the subjects should be taken, if possible. It will be remarked that a great deal more attention is paid to quantities and to mathematical matters than to anything directly connected with architecture, and it is usual to find that the best places are taken by men of a mathematical turn of mind. Next in popularity to the above are the examinations for assistant surveyors in the Office of Works, and for draughtsmen in the Admiralty. A strange injustice in this examination has just been brought forward. The limits of age in the Admiralty are 24 to 30; those for assistant surveyors in the Office of Works 21 to 30. The subjects of examination are identical; but the Admiralty posts are considerably more valuable than those in the Office of Works. It is, therefore, quite possible, and, in fact, it has happened, that a man whose age is between 21 and 24 has come out high in the list, when examinations have been held for vacancies in both departments at the same time, but on account of his being too young for the Admiralty he is obliged to put up with a post in the Office of Works, those who have done worse than himself in the examination thus obtaining better posts. The examination differs from that of the R. E. in the architectural and engineering drawing and builders' details being compulsory, together with specification writing and sanitation; but the mathematical subjects are not so severe. To the voluntary subjects are added a knowledge of surveying instruments, and one modern language. Vacancies in other branches besides these are both few and very far between; but junior examiners of builders' accounts are occasionally wanted in the Office of Works, for which post the examination is by no means a difficult one, though its very ease draws a very large number of candidates together, and the result is a most severe competition. Occasional vacancies also occur in some Irish offices, and an examination will be held shortly for one of the best appointments ever offered in public competition—viz., that for a surveyor of buildings in the Public Works Office, Ireland, commencing at £400 a year. The age limit is high (30 to 35), and it is necessary that candidates should have been engaged seven years in some profession connected with building operations—five of which must have been served in the office of an architect of acknowledged reputation, and three of these have been passed in Ireland. The examination itself is of a most satisfactory nature, so far as can be judged by the syllabus issued, comprising as it does design, construction, strains, quantities, specifications, sanitation, geometry, algebra, mechanics, surveying, and a modern language. Of course, it is not necessary that a candidate should qualify in all these, but he must do so in the majority of them. There are some other valuable appointments, and among the best are the county surveyorships in Ireland. The age limit is from 26 to 40; the subjects of examination are so exceptionally severe that none save first-rate mathematicians should enter. They include the construction of heavy engineering works, both on land and by the sea, with a thorough knowledge of mathematics, including the integral and differential calculus, and of physics generally. In all these Civil Service examinations it is to be noticed that the work to be done in the office by the successful candidate is of a most elementary description, compared with the work he has had to do in making himself efficient. Good men are certainly secured to the Government by the system; but it is much to be doubted whether before they are called upon in comparatively old age to take a responsible position or important work upon their shoulders they have not forgotten all they learnt in earlier years, which would have enabled them to have undertaken it. It may be considered a general maxim that while the pass examinations held by professional bodies tend to a healthy and gradually acquired knowledge, the various competitive examinations of the Civil Service Commissioners lead to over-strain, and a system of rapid cramming which is a disadvantage both to the candidate's mental growth and to the service which he eventually enters, especially if he does not think of entering until the post is advertised. Of course, those who wisely enter upon a long course of study stand a much better chance of success than those who attempt to crowd into a few weeks as much reading as should properly occupy a year, and then enter the examination with a feeling of confidence in their knowledge to which the others are perfect strangers, besides having laid up for themselves, even in the event of failure, a mass of information which is certain to prove of the utmost benefit to them in after life.

The Chairman urged that in an architectural examination far more importance should be

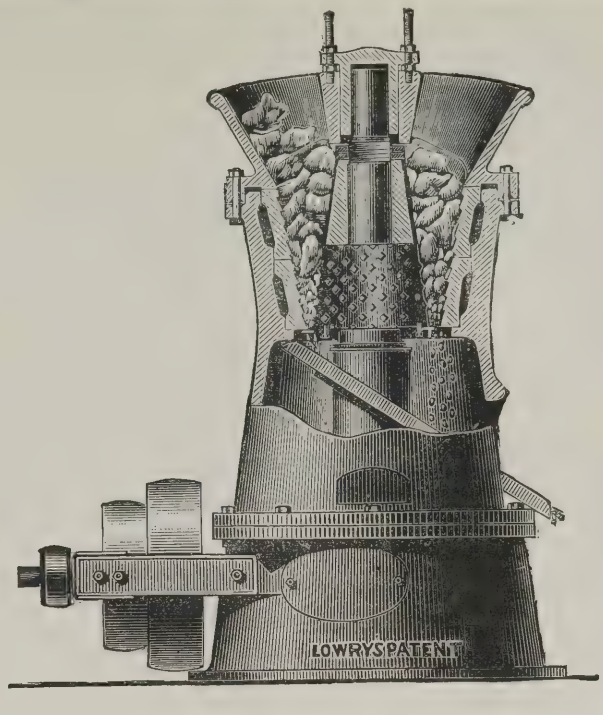
given to construction than to design. The system of training architects' pupils adopted a quarter of a century since of sending them for two or three years into a builder's workshop had great practical advantages, but there was no time to spare for such a course in the present day.

Mr. Alexander Pilbeam proposed a vote of thanks to Mr. Middleton, and added that if a pupil could get a year or two in a builder's workshop it would be most beneficial. For a youth who contemplated an all-round practice the joiner's bench would be the best department, while one who intended to do church work should go as a mason's banker.

Mr. G. H. Guillaume seconded the motion, and observed that the chief benefit of workshop training was that it gave the future architect a practical acquaintance with tools and methods of working, and a power to detect whether work was well or ill done and where a fault had been committed.

Mr. Middleton briefly replied, observing that it was to be regretted that in the R.I.B.A. examinations candidates were expected to answer every question, and not as at South Kensington, directed to answer only a certain proportion of those set. By the latter plan a candidate concentrated his attention on those in which he was most proficient. This system could not in fairness be adopted in competitive examinations, as it favoured the specialist rather than the all-round student, but he thought as a test of qualification it was the better plan. It was to be regretted that at the R.I.B.A. examination the artistic side was severe, while the constructional, and especially the mathematical, questions were so easy that hardly anyone could avoid passing. He held that it was better for an architect's pupil to remain in the office and visit works in progress as often as possible, than to spend some years in one branch of a builder's workshop.

LOWRY'S CONTINUOUS GYRATORY-ACTION STONE BREAKER.



We feel quite sure that Lowry's continuous gyratory-action stone breaker, of which we give an illustration, will entirely supersede the ordinary jaw-crusher machines now in use, whether the efficiency of the machine, the power required to drive it, the cost of labour to work it, or the cost of repairs are considered. These machines have extraordinary crushing power, and are simple in construction; and although neither ponderous nor unsightly, are very substantial in appearance, and possess every mechanical feature to render them both powerful and durable. They are not subject to the strains of crushers with flat crushing faces, as their circular form causes the stone or other material to bear on its outside edges, leaving a hollow behind when the impact or blow is given, thus realising a proper distribution and consequent reduction of strain. The shaft does not revolve or vibrate, but gyrates; and by means of this gyratory motion and the circular form of the crusher surfaces, the principal feature—i.e., the cracking action of the machine—is obtained, and the stone is broken without the tendency to split or flake as in all classes of jaw crushers; and a far better quality of production is the necessary result. Although the wearing parts are few, and the framework strong, the machine is designed with all due consideration to future repairs, and every part is easily accessible, and can be readily duplicated or renewed as time and circumstances may require. The machine while in motion may be adjusted to break larger or smaller stones as required. In comparing the gyratory crusher with the older types of machines it is evident that the efficiency or output of the machine will depend upon the quantity of material which can be operated upon in any period of time, and as it is evident the machine will be the most efficient which brings into action the largest effective crushing surface in that time, it is necessary to compare the two systems in this respect. A No. 4 Lowry breaker (size 10in. by 20in.), having a circular crushing head with an external surface of 1,303sq.in., and corresponding annular crusher block with an internal surface of 1,971sq.in., has a total of crushing surface of 3,274sq. in., and making 120 gyrations per minute, will bring into contact an actual crushing surface of 392,880sq.in. per minute. A jaw-crusher taking same sized stone with square-head 16in. by 18in. and a corresponding square crusher block of 16in. by 18in. has a total crushing surface of 576in., and making 250 strokes per minute, will bring into contact an actual crushing surface of 144,000 per minute, thus leaving a proportion (of nearly) 3 to 1 of continuous effective crushing surface in favour of the Lowry gyratory machine. Next as regards the power required to drive the machine. In the Lowry gyratory machine the moving parts are continually going forward in one direction, and by doing work all the time no power is wasted. In a jaw crusher, the motion being intermittent, a large amount of power is absorbed in overcoming the inertia and friction in bringing back and restarting the head for the succeeding stroke; and a machine of this description with a head weighing 15cwt., and making 250 strokes a minute, will necessitate the moving of 187½ tons per minute, or 11,250 tons per hour, the length of the stroke, which is an enormous waste of power. With respect to the cost of labour to work the machine, in the Lowry gyratory machine the material can be tipped into the hopper from the waggon or cart up to several tons; but the jaw crusher requires feeding by hand or spade, which makes a great difference in the cost of working. With the new elevator and screen a cart can be loaded in 4½ minutes without manual labour. And last, but by no means least, we must consider the cost of repairs. This will be greatest when the inherent construction of the machine tends to its own destruction, or the number of parts is so large as to make the same costly; the Lowry gyratory machine not only has the advantage of less than one-half the number of parts of the jaw crusher, but is altogether free from the incessant pounding which is common to these machines, and is essentially destructive to them and their surroundings.

Clerks and surveyors of local authorities are, of course, especially interested in stone-breaking machines, and they are apparently fast adopting the Lowry. At a recent inspection by the members of the Worsbro' Local Board and others at the Old Foundry, Barnsley, the breaking of dross from ironstone furnaces was proceeded with, and it was found that 27cwt. 1qr. were broken in eleven minutes with 3cwt. 3qr. 8lb. of small; while 26cwt. 2qr. 14lb. went through a similar process in thirteen minutes. The results of the experiments were generally considered satisfactory. At another trial, conducted before the Streets Committee of the Barnsley Town Council, hard dross from the works of Messrs. Newton, Chambers, and Company was used, and whilst the first ton was broken in eight minutes, the second ton only occupied five minutes in breakage. This was with hand feeding, and as the machine, in permanent use, is fed in bulk, it is easy to see how a much larger quantity than even 12 tons an hour may be broken.

We recommend all users of stone-crushing machines to send for prices and particulars to the makers, Messrs. James Farrar and Co., Old Foundry, Barnsley.

CHIPS.

A new organ was opened on Sunday which has been placed in St. Mary's Church, Stratford-le-Bow, in memory of the late Mr. William Bangs, builder, of Bow. This is the gift of his widow, and has been erected by Messrs. Walker and Sons, of Tottenham Court-road, London, under the supervision of Mr. Henry Poston, of 39, Lombard-street, who for many years was connected with the late Mr. Bangs in many large and important contracts.

Mr. Waddell, the contractor for the execution of the Mersey Tunnel Railway, has accepted an estimate from Mr. T. W. Helliwell, to do the whole of the glazing and zinc roofing required on Park Station, Birkenhead. Mr. Helliwell did the whole of the glazing on Green-lane, Borough-road, and Shore-road stations, when this railway was opened two years ago.

Mr. Alfred Gilbert, A.R.A., is now at work at the model of the Shaftesbury memorial fountain for Shaftesbury-avenue.

The Kent county magistrates have given Mr. James Hill the order for 450 special locks with master key arrangements for the Barming Heath Lunatic Asylum.

At the weekly meeting of the Metropolitan Board of Works a long discussion arose concerning the Works Committee's recommendation that Mr. Edward Bazalgette be assistant engineer to superintend the works of the Blackwall Tunnel. In reply to the charge of favouritism raised, it was explained that Mr. Bazalgette had prepared the tunnel scheme, and that the present assistant-engineers of the Board were men over 60 years of age, who could not be expected to spend their time in the foul atmosphere of a tunnel. The recommendation was adopted by 30 to 2.

A Bill will be introduced to Parliament next session authorising the pulling down and the sale of the materials, fittings, &c., of St. John's Church, Epping, and the erection of a new church on an enlarged site adjoining.

The marble statue of the seventh Earl of Shaftesbury for Westminster Abbey is now well advanced, and will, Mr. Boehm thinks, be ready for placing in the Abbey some time in January. The likeness is said to be a very striking one, and will be recognised by many as he appeared at the Guildhall on his 80th birthday or a little earlier. Mr. Boehm is now arranging with Mr. Pearson, R.A., the architect to the Abbey, about the foundation for the statue.

A massive drinking fountain and horse-trough, in polished grey granite, has just been erected as a memorial to the late David Kidd, opposite the cab rank at the east end of St. Clement Danes' Church.

CONTENTS.

Employers' Liability for Unused Quantities... 817
The Royal Society of British Artists 817
Institute of Painters in Oil Colours 818
The Society of Architects 819
Lowry's Continuous Gyratory-Action Stone Breaker... 821
Our Lithographic Illustrations 822
St. Peter Port Church, Guernsey 823
Second Manchester Rifle Volunteers: the new Headquarters 823
Competitions 823
Architectural and Archæological Societies 823
Wayside Notes 842
Public Works Examinations 843
Notes on the Psychological Basis of Fine Art 843
The late Mr. Edmund Woodthorpe 843
Building Intelligence 844
Engineering Notes... 844
Correspondence 845
Intercommunication 846
Stained Glass 847
Legal Intelligence... 848
Our Office Table 848
Meetings for the Ensuing Week 849
Trade News 849
Tenders 849

ILLUSTRATIONS.

CITY CHURCHES. — ST. GILES' CHURCH, WREXHAM. — WILLS' TOBACCO WAREHOUSE, BRISTOL. — CORNISH BENCH ENDS.—HOUSE AT TOTLAND BAY.—THE PADDOCKS, LEOPARDSTOWN PARK.—WOODWORK IN ST. PETER PORT CHURCH, GUERNSEY.—VOLUNTEER DRILL HALL, ARDWICK-GREEN, MANCHESTER.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CITY CHURCHES.

To-day we give illustrations of four of the more interesting of the City churches—viz., All Hallows, Lombard-street; St. Olave, Hart-street; St. Bartholomew the Great, Smithfield; and All Hallows' Church, Barking. These views are from a very fine series of photographs taken by Mr. S. H. R. Salmon, architectural photographer, of Regent-street, showing all the churches in the City, and forming together a valuable record of these historic buildings. All Hallows, Lombard-street, has been called "the Invisible Church," so completely is it concealed by buildings, and, so far as its exterior is concerned, this is but little loss. The tower, which rises 85ft. and measures 21ft. at the base, is exceedingly plain, and is thin and weak in design, though in composition, it is but fair to add, the structure is better than some other of Wren's buildings. The church was erected in 1694. Its exquisitely carved white marble font, which we illustrate, is well worthy of note, and the church contains some rich woodwork, carved figures of Time and Death, besides a carved curtain, which seems to hide foliage behind it. The stall work is partly seen in the accompanying view. St. Olave, Hart-street, escaped the Great Fire, and comprises work of Norman, Early English, Decorated, and Perpendicular periods. The interior, consequently, is very interesting, with an arcade of pointed arches and clustered columns. Pepys, who lived in Seething-lane in a house belonging to the Navy Office, he being Naval Secretary (temp. Charles II. and James II.), and subsequently resided in Hart-street, makes several mentions of it as "our owne church." He was buried here at nine at night "by ye Communion Table," June 4, 1703, "just under my mother's pew"; and there is a monument to his beautiful but troublesome wife in the chancel. There are also several figure tombs and brasses, and a marble figure of Sir Andrew Riccard (d. 1672), who bequeathed the advowson of the living to the parish. John Orgone and Ellyne his wife have a monumental brass, with the quaint verse—

> "As I was so be ye,
> As I am you shall be;
> That I gave that I have,
> That I spent that I had.
> Thus I ende all my cost,
> That I left that I loste."—1584.

St. Olave's was repaired in 1863, and Sir G. G. Scott, R.A., erected a poorly-designed Caen stone reredos with panels of alabaster. There are six bells in the tower, which date from 1662 and 1694. The dedication is to a Norwegian, who came to England and fought on behalf of Etheldred II. against the Danes. Being himself afterwards made King of Norway, he became a Christian, which irritated his subjects, who invited Canute to supplant him, by whom he was defeated and slain in 1028. Several churches are dedicated to him in England, and three in London, on account of the assistance he had given to the Saxons against the Danes. The view here given shows the new altar rail, above which to the left of the holy table is the curious monument of Andrew Bayninge, 1610, and Paul Bayninge, 1616, aldermen, with an epitaph, which tells how—

> "The happy summe and end of their affaires,
> Provided well both for their soules and heires."

The gateway leading to the church looks out upon Seething-lane, and is surmounted by a singular chevaux-de-frise of ancient ironwork. It is often called the "Gate of the Dead." St. Bartholomew the Great, Smithfield, is too well known to need description. The founder's tomb (Rahere, the first Prior) is seen in our photograph, with its beautifully-groined canopy. At the foot of his sleeping figure stands a crowned angel, and on either side kneels a monk with a Bible open at Isaiah li., and the words "The Lord shall comfort Zion: He will comfort all her waste places: and He will make her wilderness like Eden, and her desert like the garden of the Lord; joy and gladness shall be found therein, thanksgiving and the voice of melody." The structure is of 15th-century date. All Hallows, Barking, at the east end of Great Tower-street, is so called from having belonged to the abbot and convent of Barking, in Essex. The church contains a curiously-carved altar, font-cover by Gibbons, and screen, with altar wreaths, and some fine brasses of early date, among the best in London. Much of the building, which escaped the fire, is Perpendicular in date, with earlier re-insertions; but the church was founded by the nuns of Barking Abbey before the reign of Richard I., who added a chantry in honour of the Blessed Virgin north of the chancel aisle, and called "Berking Chapel." The celebrated sword-rests of three Lord Mayors, the last 1727, fixed over the Corporation pew, are seen in our view, and so is the pulpit. The tombs of this church are of special interest.

ST. GILES, WREXHAM.

The church, dedicated, according to some authorities, to St. Giles, but according to others to St. Silin, was rebuilt, with the exception of the tower, in the reign of Edward IV., and again restored in the year 1867. Of the earlier edifice, its style and character, little is known, but that it stood on the site of the present one and terminated where the chancel arch proves, by the remains of its ancient tracery, the old east window to have been. "In some old accounts I have seen of this town in the Welsh chronicles," writes Brown Willis, "the steeple is said to have been cast down on Nov. 25, 1330, and the market day changed next year, anno 1331, from Sunday to Thursday, as it now continues, and that the town was burnt anno 1463." Other authorities state the church to have been burnt down in 1457, and in order to promote the rebuilding of it an indulgence of forty days for five years was granted by the Pope. The family of Llwyn Onn, whose chapel, with its altar, shrines, and piscina, stood at the south-east angle, are said to have been the first to respond to the call, and their teams to have carried the first loads of stone. It is most likely that the chancel was thrown out, and the work finished about 1480; but the beautiful tower, the gem of the whole building, and one of the seven enumerated wonders of Wales, was not completed until 1506. Further improvements are said to have been made in the time of Bishop Birkhead, 1513-18, who is stated by Edwards, the editor of Brown Willis, and a former curate of this parish, to have been a great promoter of it. A subsequent bishop, Parfew (or Wharton), resided much of his time here, and endeavoured to procure "a licence for to remove his see or cathedral church" to this place, of which Leland wrote about this same time, that "Wrexham hath a goodlie church collegiate, as one of the fairest of all North Wales, but there longeth no prebends to it." In Queen Elizabeth's reign the church was enlarged by the addition of the south aisle, the roof run along the north side. During the Commonwealth it was desecrated into a prison according to Brown Willis, and into a stable according to others. A peal of ten bells, by Rudhall, of Gloucester, was set up in 1726, their total cost being £450 17s. 8d. In 1779 an organ, by Green, of London, was purchased for £360, and was reckoned the finest at that time in the diocese, with the exception of that in the cathedral. In 1789-90 the pavement was levelled, the pews made more regular, and a new pulpit and desk inserted. In 1820-21 two large galleries were erected, running the whole length of the north and south aisles. In 1853 the organ at the west end was reconstructed, so as to expose the fine west window through the tower, and, finally, in 1867, the whole church was thoroughly and effectively restored from the plans of the late Mr. B. Ferry, F.S.A. On this occasion the north and south galleries were removed, the old pews and floors replaced by open seats of oak, and encaustic tiles in the aisles and chancel, the latter being of rich design, the wall cleaned, the stonework repaired, and a beautiful new pulpit presented by the mayor, Mr. Peter Walker, at a cost of two hundred guineas; a handsome reading desk of carved oak was added by a subsequent mayor, Mr. John Beale. The cost of the restoration was £4,345, which was defrayed by subscriptions, and the church was reopened for Divine worship on the 16th October, 1867. After this summary of the past history, there will naturally follow some account of it as it is, and the first place must still be given to its fine handsome tower, which Churchyard so quaintly describes:—

> "The steeple there in forme is full foure square
> Yet every way, five pinnacles appeere;
> Trim pictures fayre in stone on outside are
> Made all like waxe, as stone were nothing deere.
> The height so great, the breadth so bigge withall,
> No peece thereof is likely long to fall;
> A worke that stands to stayne a number more
> In any age that hath been buylt before."

By these "five pinnackles" must evidently be understood, not the hexagonal turrets which crown the angles (for of these there are only four); but the finials which top the buttresses, whilst the "trim pictures fayre" point to the numerous statues of the kings, bishops, and saints which ornamented its canopied shrines. Above the door of the porch at the west end of the north aisle there is also still standing an image of the Virgin and Child, and inside the porch two memorials of the long past—a monumental effigy of a mailed knight, whose shield is distinguished by a lion rampant, with a legend, "Hic Jacet Keneverike ap Hovel," and a portion of an early mural painting illustrative of the Crucifixion, whilst another has been brought to light over the chancel arch of similar character; but depicting the Last Judgment. The tower, which is 135ft. in height, is of six stories, divided by bands of ornamental panelling, and surmounted by pinnacled battlements and hexagonal turrets. The walls of the nave and aisles are likewise battlemented, and set off with pinnacles. Mr. Wm. Sydney Jones is the author of our illustration.

WILLS' NEW FACTORY, BRISTOL.

This new factory with its frontage of 300ft. has been erected for the great Bristol firm of tobacco manufacturers, from the designs of Mr. Frank Wills, of Bristol. Mr. A. J. Beaven, of Bedminster, was the builder. The St. Pancras Iron Company supplied the staircases. Mr. E. Sheppard executed the carving. The wood-block flooring throughout is Hawksley's.

CORNISH BENCH ENDS.

The accompanying sketches are a few examples of the rich store of interesting emblematical designs which are to be found carved on the ancient bench ends of the Cornish churches. The labour expended on this particular point of church decoration is very remarkable in the West Country, and although time and vandalism have made havoc of much, there are still many specimens remaining which bear witness to the devotion of the workmen of Catholic days. In the churches of Alternon and Laneast, from which most of these designs are taken, will be seen emblems of our Lord's passion, treated with almost endless variety of inventiveness. Here we have an angel bearing the sudarium of St. Veronica, a shield with dice, lance, and instrument for breaking the legs of those crucified, besides such representations as the Cross, the Crown of Thorns, the Pillar of Scourging, the Rope, &c. What these oft-recurring heads were intended for, whether, as some say, for Druids, or Pontius Pilate, or Judas, who can tell? The antiquarian will find further scope for his speculation in conjecturing the meaning attached to the curious stiff sheep, sword dances, and other almost incomprehensible subjects depicted on the bench end of Alternon. N.B.—The two end examples on the top line are from Sandford, near Crediton, Devon. The drawings given are by Mr. Arthur G. Langdon.

THE PADDOCKS, LEOPARDSTOWN PARK.

In reply to the usual request for information made to the author of this design, we have received no particulars.

HOUSE, TOTLAND BAY, ISLE OF WIGHT.

Totland Bay is a rapidly-developing watering-place situated between Yarmouth and Alum Bay, Isle of Wight. The climate is very equable—mild in winter, bracing in summer. There is a good and copious water supply derived from the singular geological formation known as "Headon Hill." The railway communication to London (*viâ* Lymington) is good, and will be improved when the new line to Bournemouth is opened. A new local railway is approaching completion, connecting Totland Bay and Freshwater with Newport, I.W. (the capital and chief market town), and by it rapid access will be obtained to all parts of the island. There is an excellent hotel with well-appointed stable, and the sea-bathing and boating facilities are unusually satisfactory. Several good villas have been built, and one now in course of erection from the design of Mr. Ernest Turner we illustrate in our present number.

ST. PETER PORT CHURCH, GUERNSEY.

ON June 10 we gave a sheet of furniture from the above church, and we supplement it to-day by other sketches of the same work, all of which has been designed by Mr. John Trollope, and made by Mr. Harry Hems. The choir-stall, intended to seat six choirmen, is well designed for such a purpose. The Litany-desk is French in character. The misereres embody incidents in St. Peter's life, with few exceptions, one of which is herewith given, commemorative of Jubilee year. The oak panel next it illustrates the scene in St. Peter's life where he denies Our Lord; and the soldier roughly gripping the Apostle, and the maid with a ewer on her shoulder, form an effective background.

SECOND MANCHESTER RIFLE VOLUNTEERS—THE NEW HEADQUARTERS.

THE drill hall is situate at the rear, and is lighted from the roof. It is approached from Ardwick Green through an archway of 12ft. in width, and also through an ordinary doorway from the side passage. The front portion of the building, which serves as a screen to the drill hall, is as follows: The basement contains store cellars for camp equipments, coals, warming apparatus, &c. On the ground-floor are the men's room, the sergeants' room, the bar, the main entrance, the staff-sergeant's office, the staircase leading to the upper rooms, and the armoury, the latter having no cellar underneath it; the commanding officer's room, adjutant's room, officers' room, committee room, clothing store, lavatory, &c., are on the first-floor; and over them are the large shooting gallery, a band-room, and a store room in connection with it. The staff-sergeant's residential quarters are situate in the upper part of the great tower. The drill hall is paved with wooden blocks, and some of the other floors are formed of concrete on iron joists; the front of the building is faced with Yorkshire parpoints, and has freestone dressings. The style of architecture is Gothic, beginning with Norman, boldly treated as a ground-work, and finishing with castellated parapets; there are open fireplaces in all the rooms, in addition to a system of warming by hot water. Mr. Lawrence Booth, F.R.I.B.A., of Manchester, designed the building and superintended its erection; and Messrs. Robert Neill and Sons, of Manchester, were the contractors for the principal works.

The Manchester City Art Gallery Committee have purchased, for their permanent collection, from the art treasures of the late Royal Jubilee Exhibition at Old Trafford, "Glen Muich, Aberdeenshire," by the late J. W. Oakes, A.R.A.

In the course of the excavations now in progress in the Dean's Field, at the back of the North Wall, Chester, with the object of laying bare the wall for further inspection by the British Archæological Association, a number of other interesting Roman sepulchral and sculptured stones have been discovered.

COMPETITIONS.

West Ham.—The committee for promoting the erection of a hospital at West Ham, E., in reply to an advertisement inviting competition designs, have received twenty-two sets of plans. Mr. Lewis Angell, a member of the committee, was requested to report on the merits of such plans, but declined, and the reference was made to Prof. Roger Smith, surveyor to the Carpenters' Company, who made a report upon the merits of the various plans submitted, and, in the result, the committee, on Friday last, adopted the design with the motto "Hygeia." Upon opening the sealed letter it was found that Messrs. Houston, of 28, Essex-street, Strand, were the authors, and the premium of £50 was awarded accordingly.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Architectural Association.—The second ordinary meeting of the current session was held at Queen's College on Tuesday evening last, Mr. W. Doubleday, vice-president, in the chair. The following gentlemen were elected members of the Association:—Messrs. S. Harris, J. Goode, G. Cox, B. Walker, H. Wigley, C. Lea, G. Ward, H. Bewlay, John Ward, A. Harrison, and T. Keys. A paper on "German Romanesque" was read by Mr. A. Reading, and at the close a vote of thanks, proposed by Mr. H. H. McConnal, and supported by Messrs. Newton and Victor Scruton (hon. sec.), was unanimously accorded the author.

Civil and Mechanical Engineers' Society.—The opening meeting for the present session will take place on Wednesday next at the Town Hall, Westminster, when an address will be given at 7 p.m. by the President, Mr. R. E. Middleton, M.I.C.E., M.I.M.E. The following is the syllabus for the ensuing session, when the meetings will be held at the Town Hall, Westminster, on Wednesday evenings:—

December 21.—Paper on "The Roof of the National Agricultural Hall, Kensington." A. T. Walmisley, A.K.C., M.I.C.E.
January 4, 1888.—General Meeting for the Presentation of Accounts.
January 4.—Paper on "Salmon Passes." A. Fairlie Bruce, A.M.I.C.E.
January 18.—Paper on "Steel Sleepers," H. T. Munday, A.M.I.C.E.
February 1.—Paper on "The Use of Ammonia as a Refrigerating Agent." T. B. Lightfoot, M.I.C.E., M.I.M.E.
February 15.—Paper on "Sea Water for Street Watering." S. Harding Terry, A.M.I.C.E., M.I.M.E.
February 29.—Paper on "Our National Defences." William C. Street, A.R.I.B.A.
March 14.—Paper on "The Construction and Use of the Hopper Dredger. A. C. Schonberg, A.M.I.C.E.
March 28.—Paper on "The Development of Machinery in Relation to Hand Labour." Ambrose A. Myall, A.M.I.C.E.
April 11.—Paper on "Theatres and other Public Buildings." Walter Emden.
April 25.—Paper on "Railways for Rural and Undeveloped Districts." James B. Walton, M.I.C.E.
May 9.—General Meeting for the Presentation of Report, Election of Council, &c., &c.
May 23.—Annual Dinner at Holborn Restaurant.

Edinburgh Architectural Association.—The usual fortnightly meeting of the Association was held on Thursday, the 24th inst., in the Architectural Hall, 42, George-street, Mr. Hippolyte J. Blanc, president, in the chair. Mr. David MacGibbon, architect, read a paper entitled "The Architecture of the South of France—Gothic Period." After referring to the characteristics of the Early Romanesque architecture of Provence, it was pointed out how these were superseded in the 14th century by the introduction of Gothic details from the North, which were gradually ingrafted on the native style; while in many cases designs in Northern Gothic were imported wholesale. These changes were illustrated with sketches from most of the towns of Southern France. Attention was then drawn to the important specimens of Mediæval military architecture still preserved in the towns of Carcassonne and Aigues Mortes, the walls and gates of which remained unchanged from the thirteenth century. The peculiar keep towers of the Rivièra, similar in many respects to those of our own country, were explained and illustrated. The lecture concluded with a description of the island and fortified monastery of St. Honorat in the Bay of Cannes, a place of great interest from its containing examples of every period of Provençal Art.

Glasgow Architectural Association.—Thethird of a series of lectures was delivered on Tuesday week by Mr. G. Washington Browne, architect, Edinburgh, his subject being "The Monastic Orders and Buildings in Scotland"—the honorary president, Mr. T. L. Watson, occupying the chair. The importance to the architectural student of a knowledge of the origin and development of the monastic system was not, the lecturer feared, sufficiently recognised. That in studying its architecture, the interest of knowing what causes, social and religious, led to the results everyone admires might be deepened, a brief history was given of the rise and of the various orders, their spread over Europe—and in Scotland specially—the routine life of the monks, and the canonical rules they professed, particularly as these affected either the arrangements or decorations of their religious house. By a comparison of numerous examples of the abbeys and priories of the different orders in Scotland it was shown that considerable latitude was taken in their interpretation of these rules. Thus Melrose, a Cistercian foundation, violates the prohibition against figure sculpture. This and other variations were caused by artistic feelings and practical exigencies, resulting in a character peculiar to Scotch monastic buildings. Numerous illustrative drawings were referred to in the course of the lecture, at the close of which a hearty vote of thanks was awarded to Mr. Browne.

Proposed Yorkshire Association of Sanitary Inspectors.—On Saturday afternoon a general meeting of Sanitary Inspectors was held in the Leeds Town Hall, when it was resolved unanimously to form a Yorkshire Association of Sanitary Inspectors. The objects of the association are—(*a*) The promotion and interchange among its members of knowledge and information bearing upon the various duties of sanitary inspectors. (*b*) The general promotion of the objects of sanitary science in connection therewith. Mr. T. Pridgin Teale, M.A., was unanimously elected president of the association, Mr. John Newhouse chairman of council, and Mr. Joseph Lindley hon. sec. A code of rules was framed and the inaugural meeting arranged. The following Yorkshire towns and places were represented at the meeting:—Altofts, Bradford, Darton, Keighley, Leeds, Otley, Pontefract, Pudsey, Rothwell, Thornhill, Tadcaster, Wharfedale, and York City.

CHIPS.

The recently opened college at Denstone, near Uttoxeter, built from the designs of Messrs. Carpenter and Ingelow, was damaged to the extent of £2,000 by a fire which broke out in the north wing on Saturday.

A memorial altar has just been completed in the Young chantry of St. Mary's R.C. Church, Great Grimsby. The reredos contains five almost life-size figures of saints represented with their traditional emblems, and standing in niches with canopies and pinnacles. The altar was erected by Messrs. Boulton, of Cheltenham, in Bath and Caen stone, with Devonshire marble shafts and panels, from the designs of Messrs. Pugin and Pugin.

In excavating the foundations of the public library at Edinburgh, now in course of erection from Mr. G. Washington Browne's designs, the workmen came upon a carved segment of tracery from a Gothic window, which is believed to be a relic of the town-house of the Monks of Cambuskenneth, which before the Reformation stood on a site a little up the hill.

New Wesleyan Sunday schools are in course of erection at Villa Cross, near Birmingham, from designs by Mr. J. G. Bland, of Temple-street, Birmingham. The public stone-laying took place last week.

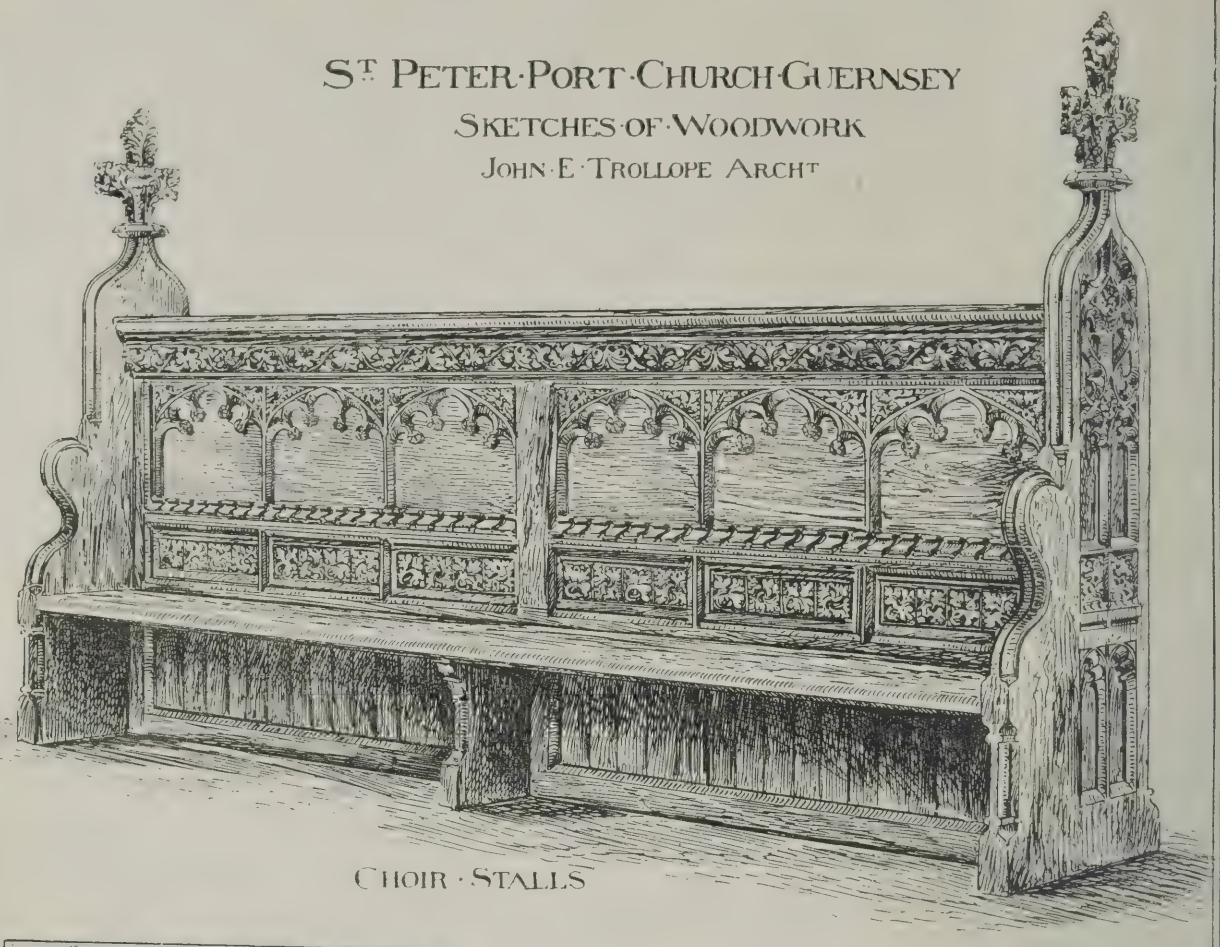
Foundation-stones of a new Wesleyan chapel were laid at Little Budworth, Cheshire, last week. The chapel is of red brick, and will seat 150 persons. Mr. Richard Beckett, of Hartford, is the builder.

The Glasgow exhibition of next year will contain ten galleries for the section of fine art, the largest being assigned to the loan collection of British pictures. Other galleries will be devoted to water-colours, photographs, Scottish art, the Continental schools, and English art. The plan adopted at Manchester of separating the galleries by fireproof doors on Chubb's principle will also be availed of, and the electric light used.

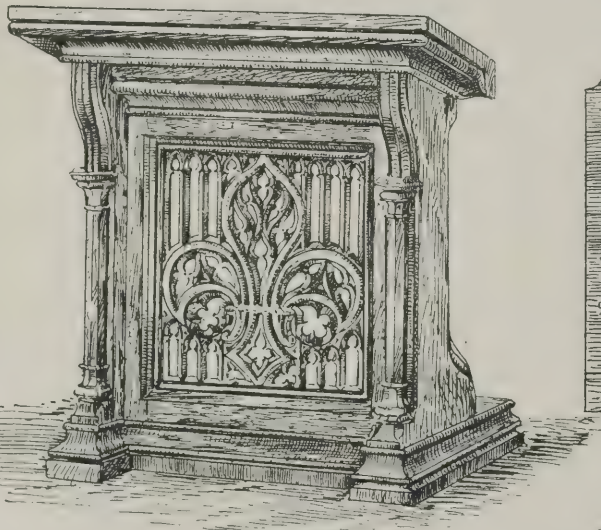
St. Peter-Port Church Guernsey

Sketches of Woodwork

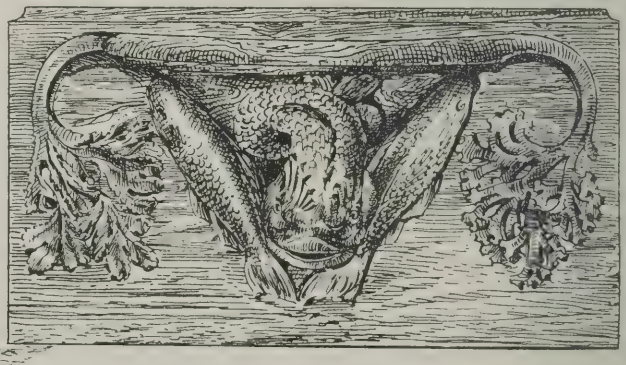
John E. Trollope Archt



Choir Stalls



Litany Desk



Misereres for Stalls



Misereres for Stalls
Commemorating Jubilee Year



Carved Oak Panel

W. F. Young del.


House Totland Bay
Ernest Turner Archt

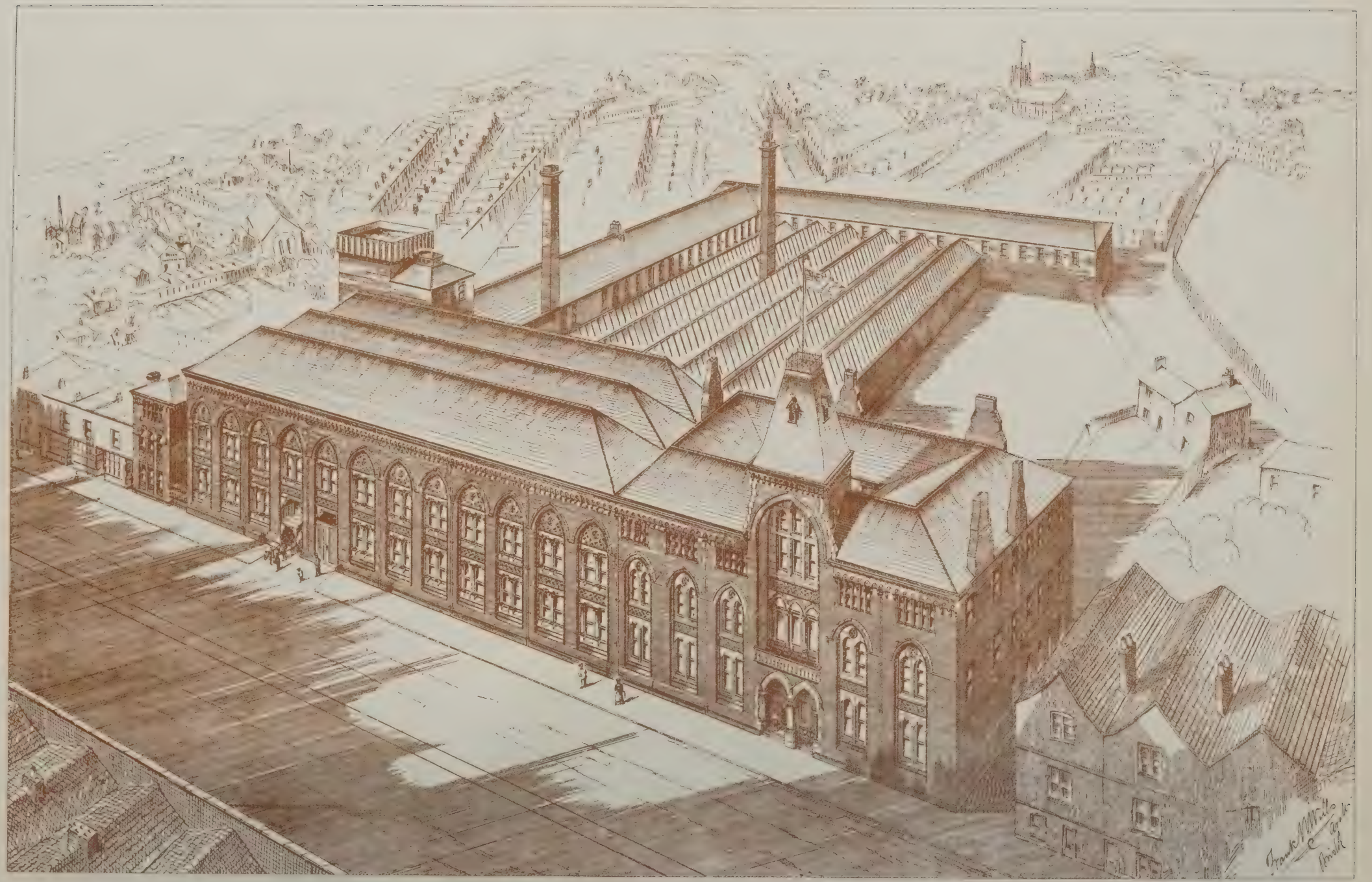
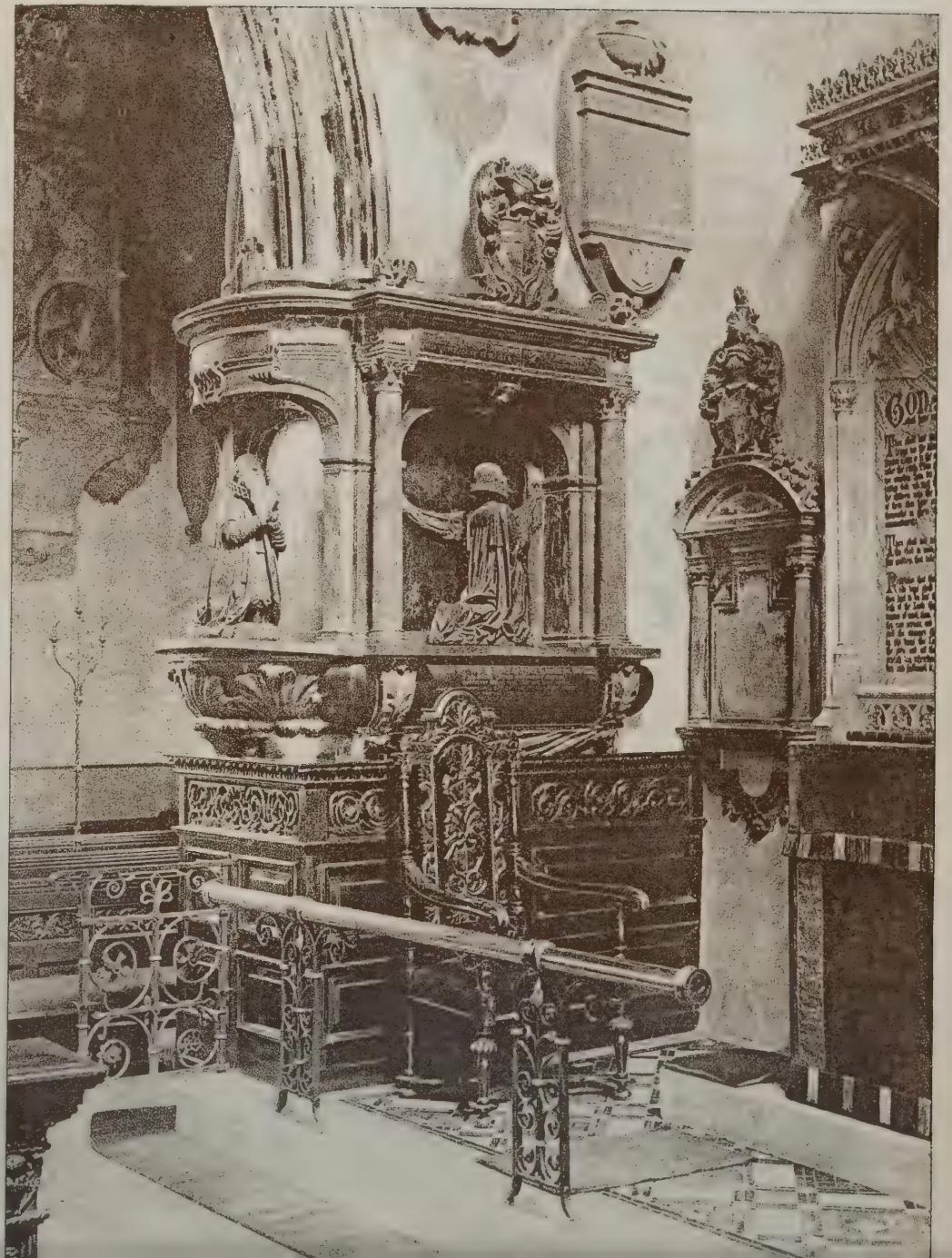
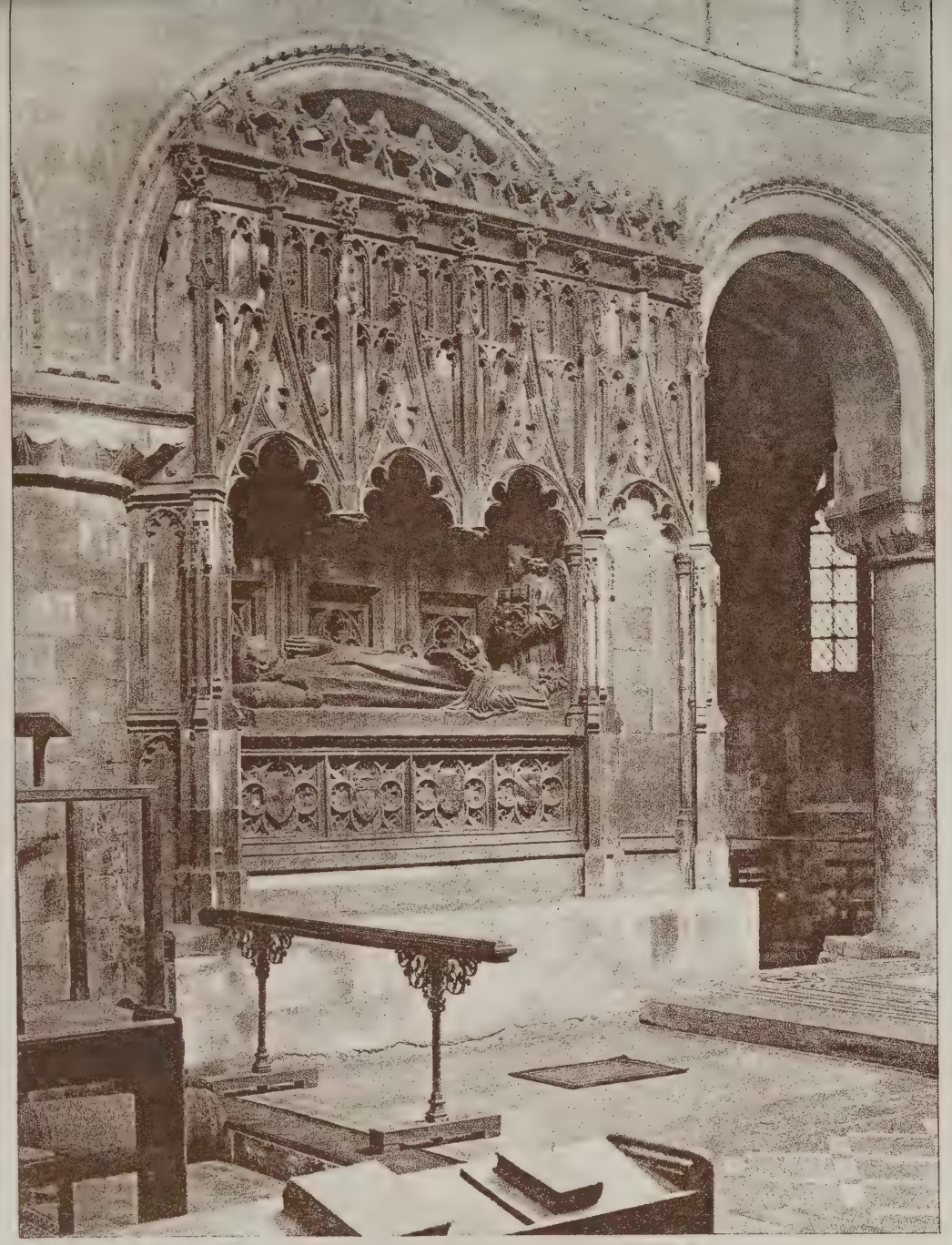


Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.







FOUNDERS TOMB S. BARTHOLOMEW THE GREAT

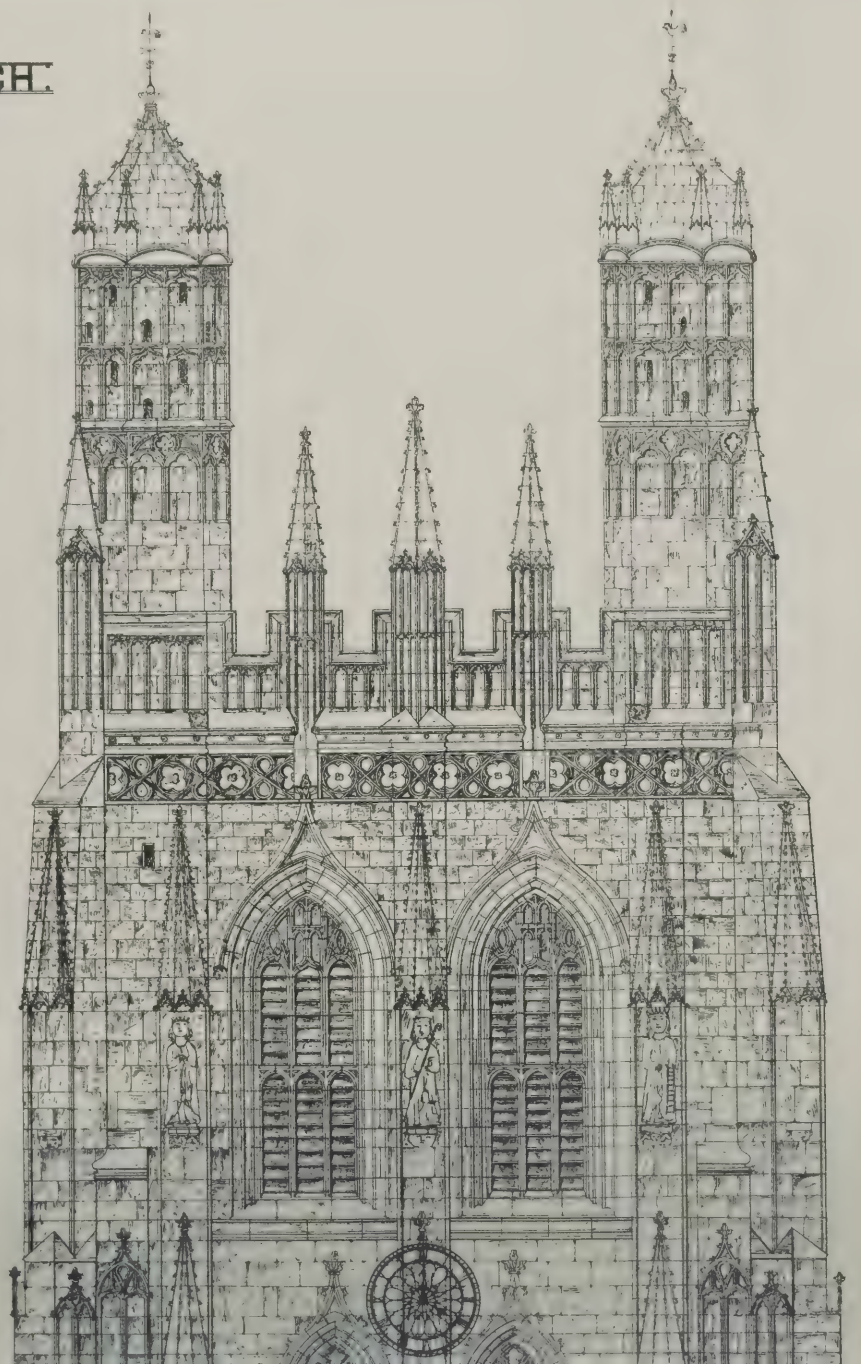


"PHOTO-TINT," by James Akerman 6 Queen Square London W.C.

PULPIT ALL HALLOWS CHURCH BARKING.

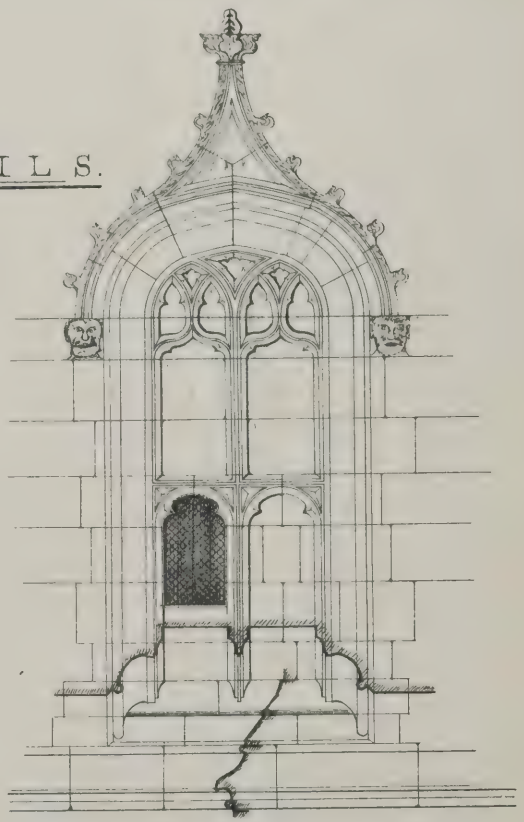
PHOTOGRAPHED BY S.H.R. SALMON

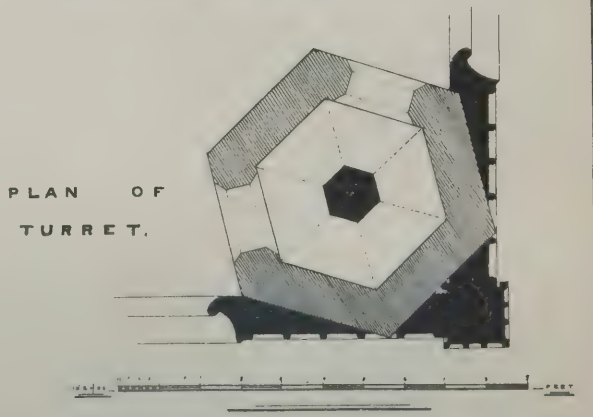
ST GILES' CHURCH, WREXHAM.





DETAILS.





PLAN OF TURRET.



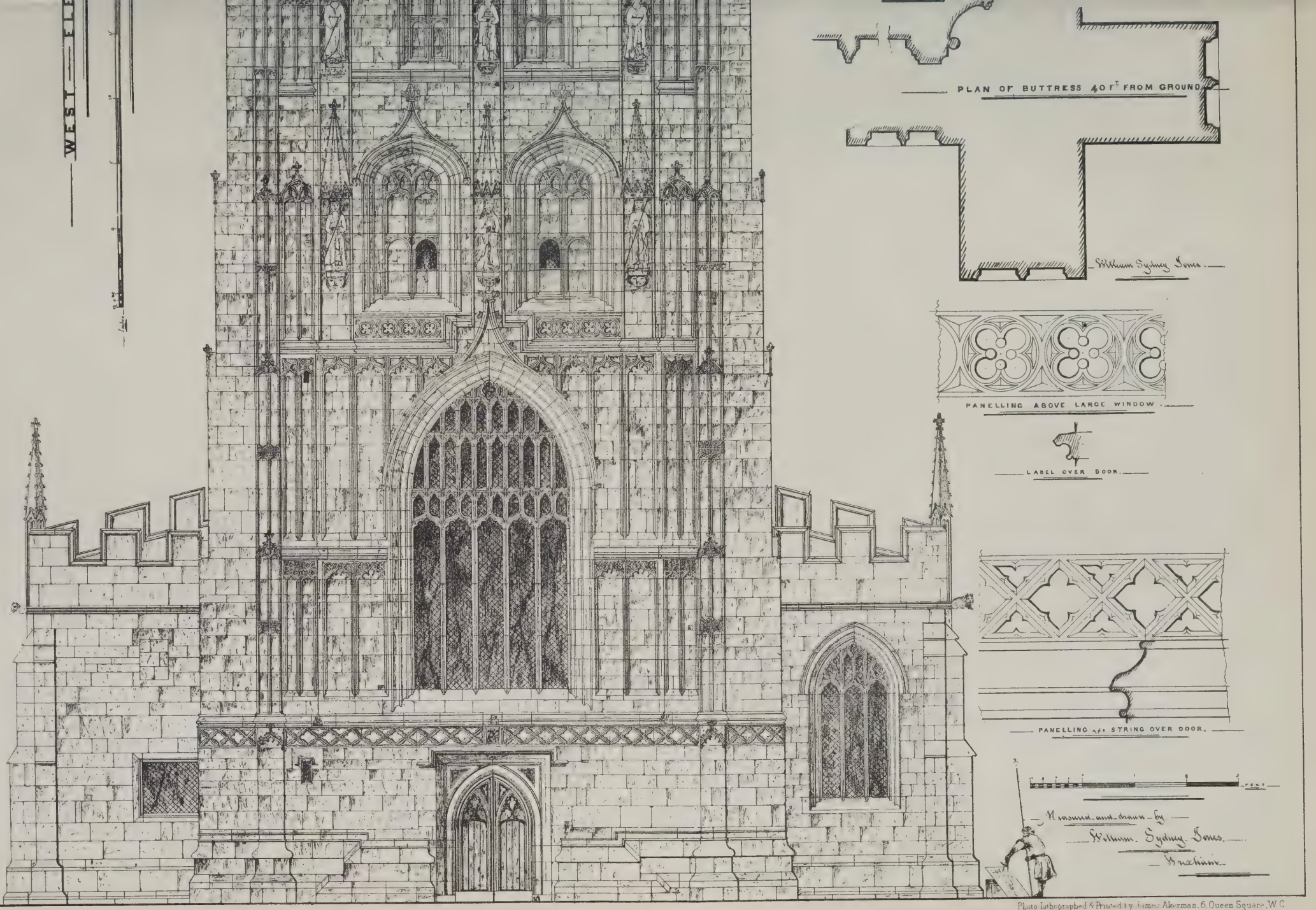
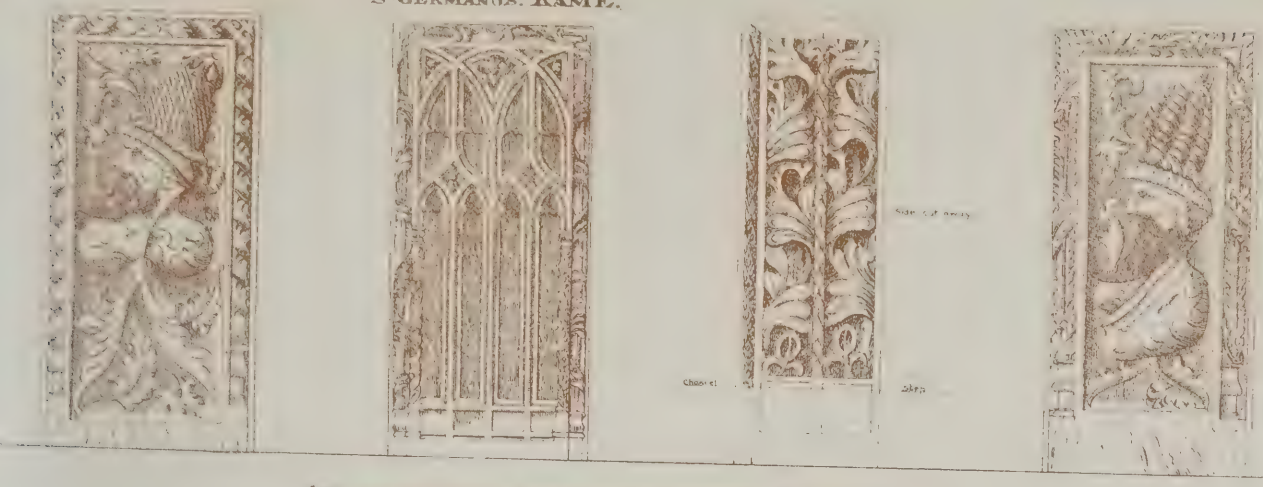


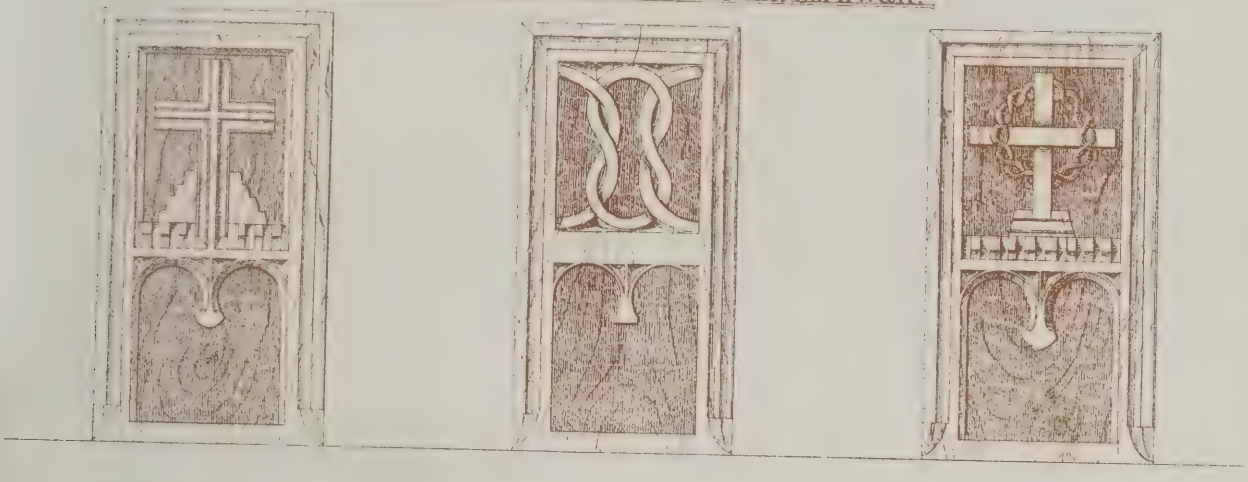
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S·SWITHAN·SANDFORD·

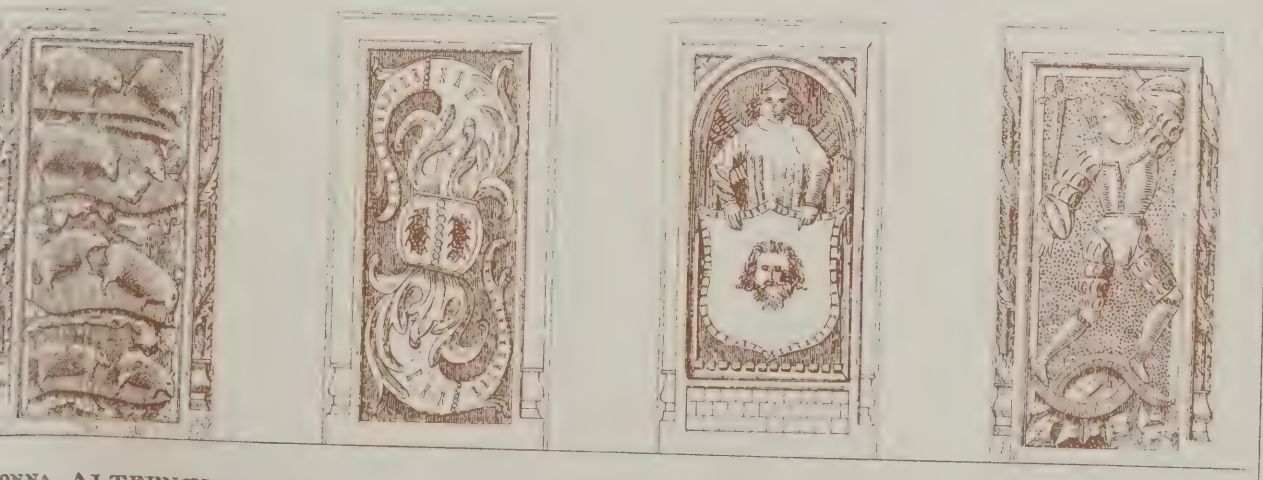
S·GERMANUS. RAME.



SS Welveta & Salivola, Laneast, Cornwall.







ONNA. ALTERNON.

Archer & Langdon

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

A SHEET OF CORNISH BENCH ENDS.

THE PADDOCKS

LEOPARDSTOWN PARK

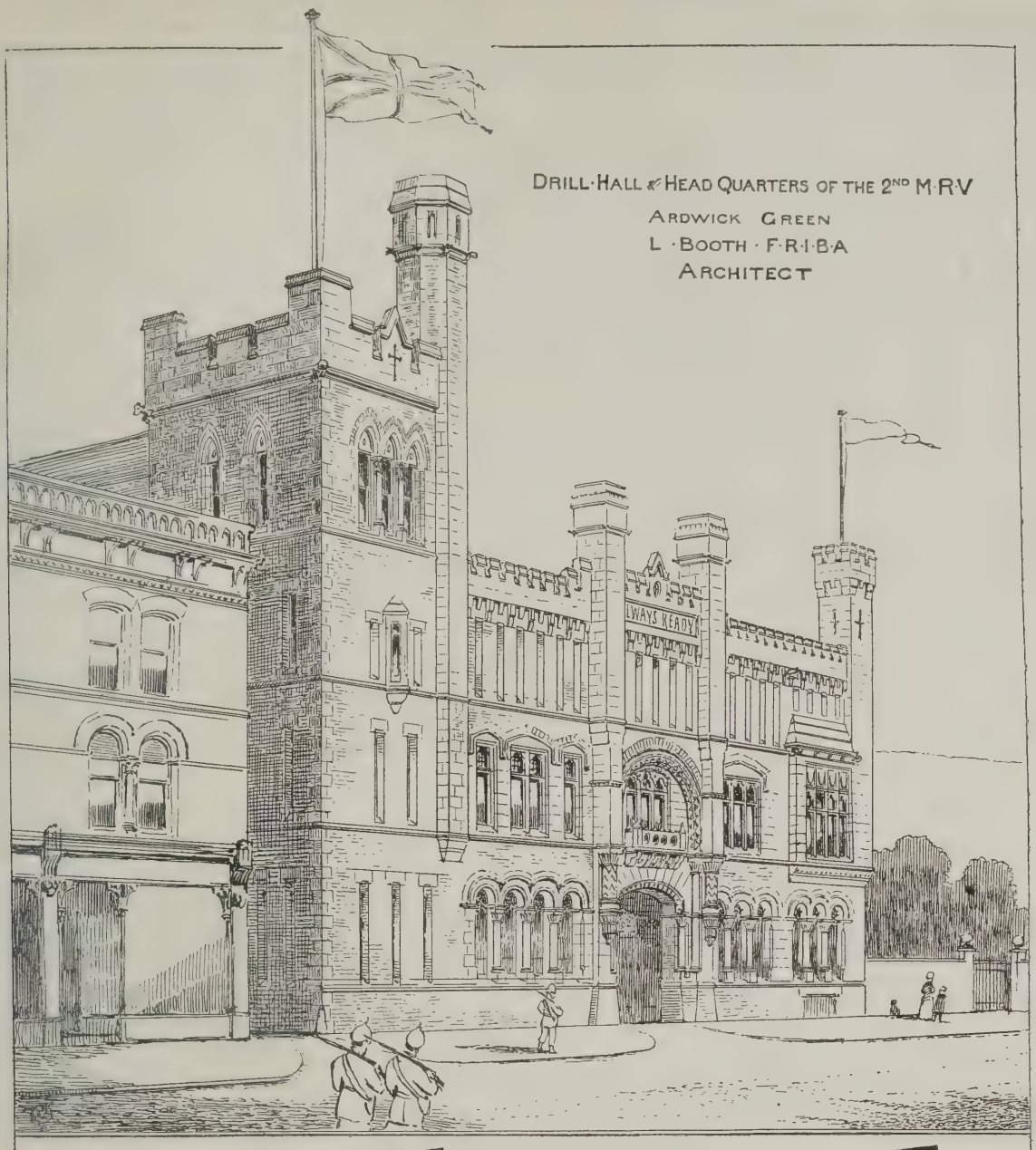
W. D. CARÖE M.A. ARCHITECT.

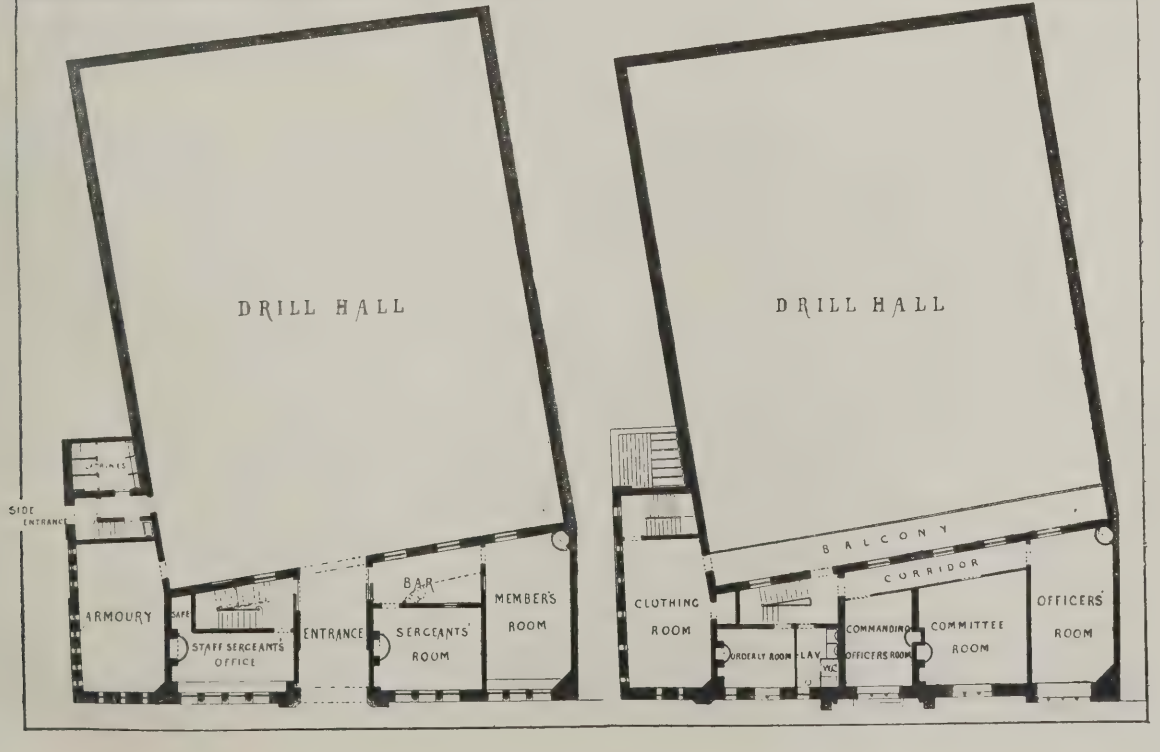


PLAN

Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

DRILL HALL & HEAD QUARTERS OF THE 2ND M.R.V.
ARDWICK GREEN
L. BOOTH. F.R.I.B.A.
ARCHITECT





WAYSIDE NOTES.

LORD SALISBURY, in a recent speech at Oxford, touched upon a subject which, while of great moment to all, is of especial interest to the architect. Referring to the question of land taxation, and the many other proposals for throwing burdens upon the landowner, he very strongly urged upon his audience the nature of the evil that would assuredly result from the passing of such measures as have been advocated by many short-sighted, if well-intentioned, persons. Said his Lordship:—"If you want to increase the number of small owners in the land you must not bully the landlords. The more you increase the burdens on land, the more you treat it as a kind of parish investment, the more you inflict upon it, as many of our legislators are prepared to do, every kind of exceptional disability and inconvenience, the more do you drive it into the hands of the rich men. Land, in proportion as land is an advantageous investment favoured by the State, or not injured by the State, will find its way according to economical laws into the hands of small owners; but directly you affix to it any disability, directly you attach to it any laws or disability peculiar to it, then it becomes a thing in which only those can indulge who have surplus money to throw away, and, therefore, in that direction you diminish the chance of what we all profess to desire, the increase of the occupiers who are the owners of their own land . . . and if you wish—as I hope you wish, and I most earnestly wish—to multiply the owners of land, you must resist to the utmost any proposition to treat land in any more unfavourable manner than any other investment."

It is to be presumed that most architects will be of opinion that it would not be to the advantage of the profession to have land become "a thing in which only those can indulge who have surplus money to throw away." A gentleman member of the building trade, whom I believe I have before mentioned, would, however, be glad enough, as houses must be built, and if fewer are erected by private persons, the more must be built by him and his *co-frères*. Lord Salisbury's arguments refer, directly, to the farming interests and agriculture; but they apply with equal force to the relations between the building public and building-land, as it would be affected by that taxation of ground-rents which is threatened in certain quarters. The policy of every architect with regard to the land question should be towards simplification of transfer, the keeping of land free from all obligations that would discourage its purchase, and towards all such measures as would encourage the public to invest freely in real estate.

Affairs in Ireland remain about as cheerful as ever. How far the unsettled, turbulent state of the country affects the building trade I neither know nor pretend to; but it would seem to me that with the wholesale want of confidence that must be felt on the other side of St. George's Channel, there can be but a poor spirit amongst those who find the wherewithal to build. The land question, and all the gush about confiscation and other theories of revolutionary agitators, are harmful enough here, and drive capital into every other source but that which would benefit the architect; but in Ireland there is the question of Home Rule ever hanging, like the sword of Damocles, above the heads of the Loyalists, and it cannot but inevitably quench many of the contemplated speculations of the capitalist. Besides, by reason of the destruction of trade, by the ruin of the country gentleman, and by the slackness of business in general, there can be but little call for mansion-house-building from our friend the Hibernian architect.

It is curious to reflect upon the proceedings of many of the besieged "no-renters" in Irish provinces. If the war between the tenant and the bailiff is to continue a feature in the land, we may see the Irish homestead develop into a peculiar sort of fortress and stronghold! How useful would a besieged Land Leaguer find the machicolated principle of wall-building! He might then pour down hot tar, boiling metal, or what-not, in the most comfortable manner conceivable. Or perhaps he might revert to the old custom of constructing "murthering holes," which, as I believe, were breaches, constructed for purposes of offence, in the vaulting of the inner porches of old Irish towers.

The *battering-ram* is to become quite a fashionable implement at evictions! Last Monday evening a force of police arrived at New Ross to assist the Sheriff in taking possession of the second holding of one David Foley, of Ballykerogue. This gentleman was evicted from his first holding at the end of October. Upon this occasion, we read, the Sheriff hoped "to be able to keep his men out of danger from boiling water by using a battering-ram—a pole 25ft. long, tipped with iron, and suspended by a chain from a triangle. The men working it will be able at a safe distance to swing the ram against doors and windows and effect a breach with comparative ease." Well, history certainly does repeat itself!

On the Wednesday following we learned what happened. After preliminaries, "the emergency-men began vigorously to work the *battering-ram*, which in about five minutes had brought down nearly the whole end of the house." The besieged replied with hot water and *stones*. But "the Sheriff's men were protected by *wicker shields* covered with canvas." Excepting for the employment of a fire-engine, this little episode quite reads like a piece of old history.

The last paper read at the Institute appears to have been an interesting one. We most of us only wish we could get our clients to indulge in porphyry to some extent. £5 per centum upon a material costing £8 per foot cube would be paying work, not to mention the "com." on the labour. Porphyry is an exceedingly beautiful substance, and, as Mr. Waterhouse said, a gem amongst building materials. The student will, doubtless, find specimens of it at the Jermyn-street museum, besides the practical applications referred to by the lecturer at Conduit-street. In the recently-erected monument to M. A. Thiers, at Paris, there is a tablet of green porphyry bearing in gold letters the legend "*Patriam dilexit veritatem coluit.*" Let us hope that Mr. Brindley will be successful in selling porphyry at £3 per foot cube, though even that is no small price to pay for a building material.

Best and hearty wishes for the success of the A. A. Cyling Club and the sketching scheme. But, to be candid, I must confess to feeling a sort of regret at the idea of all our old national architecture being thus sketched and measured. To think that every dear little, out-of-the-way nook and cranny, every ivy-covered church and ruined chapel, and every thing of archæological interest, "from the pre-historic boat discovered at Brigg, down even to post-Reformation work," should be tabulated by the London A.A., and that we should have chapter and verse for every moulding, cap, or boss in the kingdom, goes decidedly against the grain in this secluded corner of the globe. And, if I mistake not, there are very many more who, like myself, find joy unspeakable when they think they have discovered some piece of old architecture—some hidden-away remnant of the past which they believe has not been measured to a joint, or otherwise hackneyed. How much of the pleasure of travelling through our country towns and villages would be destroyed were every old building therein as familiar to us from illustrations as the houses and shops in the Strand or Cheapside.

Touching the cycling part of the scheme, I trust that it will be a great success, since nothing is more enjoyable than running about the country on the "wheel" in search of old architecture, as I can testify from experience. And under Mr. Appleton's energetic captainship it will doubtless be successful. I would suggest that the club affiliate with the C.T.C., who now number some 20,000 members.

What next? A builder advertises a competition amongst "architects and others." A "£25 prize will be given for the best plan, elevation, &c., for erection of hotel and boarding-house in Broadway, Douglas, Isle of Man." Full particulars, it is said, will be supplied by a builder of Douglas. Mark the to "architects *and others*." It is to be expected that the "others" will win the day, as it is unlikely that any genuine architect will answer such an advertisement.

"If," said the *Echo* at the beginning of the week, "Alderman Saunders, who was elected for Coleman-street Ward on Saturday, succeeds to the Mayoralty, he will be the first architect that has filled the office of Lord Mayor of London."

I note that there will be shortly completed a building in England in the French Flamboyant style. As things go it will be rather a novelty. Many English architects borrow hints as to detail from the Flamboyant architecture of France, and, with commendable zeal, endeavour to fit it into our own Perpendicular style. But few boldly produce a purely Flamboyant design. Not that the building referred to—the Mausoleum at Farnborough, erected by the Empress Eugenie for the reception of the remains of Napoleon III. and the Prince Imperial—has been designed by an Englishman. The architect is reported to be M. Destelleiur, President of the Society of Architects of Paris, who appears to have adopted a rather fashionable plan in his work—viz., the provision of a crypt in the 12th-century style.

Your correspondent's, Mr. E. L. Garbett, suggestion as to the likeness between celery and Early Gothic foliage, reminds me that a certain variety of *endive* bears a most striking resemblance to Flamboyant carving. I remember last August being served in the *salle-à-manger* of a certain quaint old Norman hotel with some of this vegetable, which ridiculously resembled, in line and form, much of the carving in the cathedral hard by. At the time I had the pleasure of meeting, and sojourning with, an English architect, and I remember how we joked about our devouring the prototype of Flamboyant foliage. So, if the carving of this period of French architecture resemble the endive plant, there may be likewise a resemblance between celery and our Old English work. Personally, I have never noticed the latter likeness; but, possibly, this is through want of observation, so I intend to make a critical examination of the celery plant; while, for the present, I hold to my original theory.

I am glad you and the Institute and Mr Lawrence Harvey are moving in the matter of the prizes for masonry. I am sure this is a step in the right direction—not so much as regards the particular subject Mr. Harvey teaches, but because it is the first real attempt at *bonâ fide* "technical instruction" as far as architecture is concerned. More power and much perseverance to Mr. Harvey! May scores more imitate him, and may classes for artisans in all branches of the trades be formed for the benefit not only of architects but of artisans.

GOTH.

Mr. James Ebenezer Saunders, J.P., F.S.A, F.R.I.B.A., of 9, Finsbury-circus, was elected an Alderman of the City of London on Saturday. Mr. Saunders, who is 55 years of age, has, it was mentioned by the seconder of the proposal, represented the ward in the Court of Common Council since 1856 and had been deputy alderman since 1875; he has served during the last 30 years on nearly all the committees of the Corporation, and has been chairman of many of them, and he has also represented the City of London on the Metropolitan Board of Works for a great many years. He is in politics a Liberal, and he unsuccessfully contested the Dartford Division of Kent against Sir W. Hart Dyke at the last two elections. For many years he was a member of the London School Board. He is a Congregationalist. In the ordinary course of succession by rota, Alderman Saunders will probably be Lord Mayor in 1895-6.

The ceremony of turning on the new water supply to the burghs of East and West Anstruther was performed last week. The scheme consists of the old works used by Pittenweem, extended and improved to a great extent. The new reservoir holds 3,000,000 gallons, while the two filters are 39ft. long, 42ft. broad, and 8ft. deep, and are capable of passing 150,000 gallons per day. The clear-water well is 30ft. diameter and 9ft. deep. The engineer of the works was Mr. Buchanan, C.E., Edinburgh, and the contractors were Messrs. Mackay and Son, Broughty Ferry. The total cost was £4,500.

* Mr. Buggins.

PUBLIC WORKS EXAMINATIONS.

TABLE showing result of an open competitive examination held on the 11th and following days of October, in year 1887, of candidates for one situation as Assistant Surveyor of Buildings, Public Works Office, Ireland :—

		Arithmetic.	Orthography.	Handwriting.	English Composition.	Geometrical Drawing.	Freehand sketching in outline.	Knowledge of Materials.	Designing simple buildings, &c	Taking out quantities from plans, &c.	Surveying, levelling, and valuing lands.	Totals.
	Maximum.	250	200	200	150	300	150	300	300	300	200	2350
1	Millward, J.	231	196	125	95	160	72	150	230	226	95	1580
2		149	140	130	123	210	107	150	180	165	50	1404
3		207	184	130	60	90	58	233	[0]	150	105	1217
4		[0]	160	115	100	[0]	133	162	241	182	50	1143
5		[0]	140	110	95	115	125	[0]	270	195	60	1110
6		130	[0]	100	70	165	105	[0]	170	187	50	979
7		[0]	[0]	[0]	[0]	100	[0]	[0]	[0]	[0]	[0]	100

The ciphers inclosed within brackets thus [0] indicate the obligatory subjects in which the candidates failed to qualify.

Table showing the results of an open competitive examination held on the 25th and following days of October, in the year 1887, of candidates for four situations as Admiralty Draughtsmen at Outports, and two as Assistant Surveyors, Office of Works :—

		Drawing, and designing of civil engineering and architectural works.	Details of construction in foundations, &c.	Rudimentary calculations of strength of materials of construction.	Measurement of quantities in building works and estimate of cost.	Specification for Building Works.	Modern Sanitation.	Practical Geometry.	Algebra, including quadratic equations.	Rudimentary mechanics.	Use of surveying instruments.	French.	Totals.
	Maximum.	400	200	200	200	100	200	100	100	100	100	100	1800
1	Cropper, E.	288	147	175	178	69	154	50	47	43	71	48	1270
2	Wenborn, S. T.	262	176	130	180	86	100	65	19	32	64	20	1134
3	Hunt, J. B.	296	132	140	137	83	123	47	21	27	65	32	1103
4	Parr, L.	207	143	145	126	75	123	57	35	43	67	67	1088
5	Barnard, E. A. W.	287	111	145	115	74	146	55	37	27	77	10	1084
6	Millard, E.	266	139	115	110	58	120	48	40	—	83	55	1034
7		284	112	140	163	66	107	43	15	38	63	—	1031
8		285	139	[0]	174	81	125	58	22	44	63	38	1029
9		237	101	125	129	63	106	65	42	46	43	48	1005
10		241	110	140	111	54	127	53	22	30	65	—	953
11		251	124	80	181	51	125	38	23	14	41	22	950
12		257	144	150	[0]	73	124	42	10	32	64	27	923
13		230	118	[0]	165	65	134	63	20	24	50	36	910
14		219	187	100	120	50	141	62	—	—	52	—	881
15		239	[0]	95	92	67	127	46	5	23	72	—	766
16		252	128	[0]	144	76	[0]	36	—	2	36	9	683
17		236	[0]	[0]	72	59	134	38	34	18	49	41	681
18		223	110	[0]	[0]	42	114	56	12	15	58	—	630
19		[0]	[0]	110	115	47	114	54	40	13	56	58	607
20		247	113	[0]	123	66	[0]	—	13	—	19	—	581
21		[0]	[0]	[0]	170	72	126	25	38	27	62	34	554
22		223	[0]	[0]	[0]	62	119	44	5	3	58	—	514
23		[0]	[0]	[0]	128	45	116	43	21	12	54	21	440

NOTES ON THE PSYCHOLOGICAL BASIS OF FINE ART.*

THOUGH a work of fine art is appreciated by nearly every person in whom the perceptive faculties are developed, very few persons care to inquire how, or in what manner, the sense of pleasure in contemplating it is awakened. These are inquiries left for theorists and philosophers, like Lessing, Alison, Dugald Stewart, and Mr. Herbert Spencer. It is well and proper that the artist should know something of the conditions upon which the pleasure derived from works of art depends. Mr. Frank Stephen Granger, M.A., the author of a work under the above title, has done service in throwing his philosophical reading and reflection into shape in these "Notes." They are, as he says, rather fragmentary, and have been put together at intervals ; but they fairly sum up the abstract principles which underlie the fine arts. Mr. Granger is clearly a deep reader and student of Mr. Herbert Spencer, whose principles of psychology and essays on the fine arts can very largely be traced. Chapter I. deals with the nature of the pleasure received from works of art. We have here, in distinct sections, an attempt to enunciate the kind of feelings which are called æsthetic, and their bearing upon art. Lessing's definition that "pleasure is the end to which fine arts are directed, and that the law of beauty is the law of all noble art" is accepted. We cannot here refer to any of the propositions laid down, though the author seems to have satisfactorily deduced them from the primal conditions. It will be generally allowed that works of art very much depend for their pleasure-giving effect on the associations aroused by them. It is true, as Mr. Granger says, that as Scott's novels supplied the memories with which the Gothic revival in architecture was associated, the works of Thackeray and Dickens paved the way for the Queen Anne revival. So it is indisputable that there is a connection between beauty with pleasant associations and feelings and between ugliness with the opposite class of impressions.

In Chapter II. the author enters into the results of the inquiry. He defines the terms used in relation to art, such as "idealism," "realism," "caricature," and gives numerous examples from literature, painting, and sculpture. Thus the value of the unseen or *indefinite* in works of the imagination is dwelt on. Practically, there must be a certain want of finish in the picture to raise it to this frame of mind. Too great accuracy in painting hampers the imagination by leaving the infinite out of the question. In this distinction lies the immeasurable superiority of the painting over the photograph : the latter is an accurate impression of but one instant of time, it does not give the idea of shifting lights and shadows. The painter, on the other hand, merely seeks to suggest, leaving the imagination to fill up ideas and voids ; so also the poet selects words which conjure up ideas and sentiments of the soul. A scientific terminology is out of place.

In the last chapter Mr. Granger applies the principles enunciated to the fine arts. Foremost he places religious worship and the æsthetic emotions they awaken. He instances the deep emotions aroused at the sacrifice of the Mass, when accompanied by gorgeous vestments, fine architecture, and the strains of music. But these accessorial arts should be used for what they suggest, not for what they are. As the author says, it was the inability of Rome to pierce through its symbols that caused the Protestant revolt. Yet there are some who will always need the symbol to grasp religious truths.

There is little application made to architecture, which stands in the same relation to painting and sculpture as music does to poetry. This last chapter is worth reading, and the author has at least succeeded in bringing into something like a comprehensible connection the relations of the arts. We should have liked to have seen architecture treated more fully than it is ; but of course this would have been impossible in a work dealing only with principles and abstract ideas. Mr. Granger's little book ought, however, to be read.

* Notes on the Psychological Basis of Fine Art. By FRANK STEPHEN GRANGER, M.A., &c. Nottingham : James Bell

THE LATE MR. EDMUND WOODTHORPE.

BY the sudden death, early on Saturday morning, of Mr. Edmund Woodthorpe, F.R.I.B.A., of Coleman-street-buildings, E.C., the district surveyors of London have lost their senior member, and a widely known and much respected architect and surveyor, enjoying an extensive City practice, has passed away. Mr. Woodthorpe had been in his usual health, and was at his office throughout the week until Friday afternoon, when, with Mrs. Woodthorpe, he visited some friends at Hornsey. During the night he was seized with illness, and died at half-past 1 a.m. from heart disease, within a few days of completing his 75th year.

Mr. Woodthorpe bore a name long honoured in the City, insomuch as his grandfather, father, and brother held, in direct succession, the office of Town Clerk of London. He was the son of the late Mr. Henry Woodthorpe, LL.D., and a pupil of the late Philip Hardwick, R.A., whom he assisted in the erection of Goldsmiths' Hall. After the termination of his articles, Mr. Woodthorpe commenced practice in the City, his chief work consisting of mercantile premises and warehouses, and in later years, the planning of industrial and artisans' dwellings. He also erected many schools, rectories, and country residences, and carried out several church restorations, including those of St. Giles, Cripplegate, St. Mary, Aldermanbury, and St. Swithin, Cannon-street, and designed the new English Presbyterian Church at Hammersmith. Where not restricted, as in workmen's dwellings, to the minimum of cost for the required accommodation, or in works of restoration, his work was generally based on some phase of the Renaissance, the Italian development of that style having the preference. Among Mr. Woodthorpe's works may be mentioned the following :—The market, museum, and mansions, Wellesley-terrace, Dover ; Messrs. Courtauld's crape warehouse, Aldermanbury ; Messrs. Rendell's tea warehouse, Eastcheap ; Messrs. Borwick's warehouses, Bunhill-row ; the Lodge, Kegworth, Leicestershire ; additions to the mansion of Stoke Pogis, Berks ; the Knoll, Kingston, Surrey ; the completion of, and decorations to, mansion, Angley Park, Cranbrook ; new drawing-room, kitchen, clerk's offices, and quadrangle at the Girdlers' Hall, Basinghall-street ; Cornhill Chambers ; Messrs. Webster Bros.'s premises, Lombard-street ; new bullion vaults and fittings, Bank of London ; Messrs. Harmer and Pearson's distillery, Red Cross-street, E.C. ; workhouse for the Hartley Whitney Union, Hants ; Beeston's and also Palyn's almshouses, Peckham ; Sir William Staines' almshouses, Tottenham ; schools at Lambeth (St. Andrew's national), Witley, Red Hill, Binstead, Odiham (endowed grammar), Hants ; Red Cross-street, E.C., Lady Holle's (endowed), and Mare-street, Hackney (middle class girls). He laid out and developed large estates at Hammersmith, Richmond, Brook Green, and Stoke Newington, and was largely engaged in valuations of City property during the formation of the Metropolitan Railway system. The following, among other important works, have been carried out in conjunction with Mr. Frederic Hammond, A.R.I.B.A., his

partner and former pupil — viz., Bleyton's industrial dwellings (£50,000), Nile-street, Hoxton, opened by the Prince and Princess of Wales in 1886; large blocks of industrial dwellings, East-street, Walworth (£65,000); the St. John's gymnasium, Upper Holloway; the St. John's Institute, Holloway; St. John's Mission Church, Highgate; very extensive works in erecting magazines, mills, engine house, corning houses, and other buildings for the Chilworth Gunpowder Company, Limited, Surrey; warehouses, Fore-street, City, for Mr. W. Brass; the restoration of the south side of St. Giles's Church, Cripplegate; and the erection of the Jubilee Memorial drinking fountain in Criplegate churchyard.

In 1839 he joined the Royal Institute as an Associate, and in the same year was appointed by the Middlesex magistrates district surveyor for St. Anne, Limehouse; St. John, Wapping; the precinct of St. Katherine; and the Hamlet of Ratcliff; and in 1853 he also received from the Court of Aldermen the appointment of the Northern Division of the City of London, both of which posts he retained until his death. He recently served as President of the Association of District Surveyors. He was also architect to the Girdlers' Company and surveyor to the parish and joint trustees of Cripplegate. He became a Fellow of the Institute in 1846, and some years since served on the Council. Mr. Woodthorpe was one of the most constant attendants at the Institute meetings, and indeed, was present at the meeting of Monday in last week; he was a reformer and a supporter of the examination movement, and his tersely expressed and vigorous ejaculations from the corner seat of the front bench to the President's right hand, often enlivened the dull decorum of an evening at Conduit-street. He was also a Fellow of the Surveyors' Institute, having been elected in March, 1875, and an active member of the London and Middlesex Archæological Society, to which latter body he occasionally contributed papers. He lived at Grayshott, near Liphook, Hants, and leaves a widow, one son (Mr. Edmund Woodthorpe, M.A., A.R.I.B.A.), and a daughter. The funeral took place in the village churchyard of Headley, Hants, on Wednesday, when many members of the profession were present.

CHIPS.

Drapers' Gardens, London Wall, E.C., is about to be thrown open to the public.

The town council of Edinburgh have selected as the site for the statue to Dr. William Chambers the centre of Chambers-street, opposite the entrance to the Industrial Museum.

The Wolverhampton council have raised the salary of their borough surveyor, Mr. R. E. W. Berrington, from £220 to £300 a year.

Workmen are being employed this week in removing the stones of Temple Bar from the open space in Farringdon-street, where they have lain since the demolition of the ancient gateway. The stones are being taken to Theobald's Park, Cheshunt, the residence of Sir Henry Meux, who will re-erect the gateway at his own cost, the materials, which weigh some 400 tons, having been given him by the City Corporation.

Mr. W. St. Chad Boscawen will deliver, at the British Museum, a special series of lectures on the history and civilisation of Babylonia, on Wednesday afternoons, at half-past two. The subject of the present course of four lectures will be "The History and Civilisation of the Early Babylonian Empire," dealing with the period from B.C. 4000 until the consolidation of the Empire in B.C. 2200. The lectures will be specially illustrated by the discoveries made by M. de Sarze in Chaldea and Mr. Rassam at Sippara.

St. Mary's parish church, Nonington, Kent, was reopened yesterday (Thursday), after restoration from plans by Mr. Ewan Christian, at a cost of £2,000. A new roof of deal has been placed over the nave, the north aisle roof has been repaired, a south porch of flint, stone, and oak erected, and the west door opened out. The windows have been restored, and the nave and north aisle reseated in oak, while the base of the tower has been fitted up as a vestry.

Lieut.-Gen. Alexander, late Bengal Staff Corps, and for many years superintending engineer in the Department of Public Works at Hyderabad, and secretary to the Resident in the same Department, died on Friday, aged 64 years.

Building Intelligence.

LEEDS.—The building inspector of the Leeds Corporation (Mr. D. Hainsworth) has made a report of the work done by his department during the year ending August 31st last. The number of plans of houses approved was 323, upon which were shown 1,847 houses, including 18 villas, 16 semi-detached villas, 693 through houses, and 1,120 back-to-back houses. Plans were also passed for one church, two chapels, four mission-rooms, six schools, one arcade, the Museum and Fine Art Gallery, and additions to one chapel and four schools. The total number of buildings approved was 4,289, and plans for 573 were rejected. During the year 1,208 houses were completed, and certified for occupation, including ten villas, two semi-detached villas, 413 through houses, and 783 back-to-back houses, while 672 miscellaneous buildings and 621 ashpits, &c., were completed and certified.

PENTNEY, NORFOLK.—On the 17th ult. the Bishop of Norwich reopened this church, which has been closed for restoration. The works consist of taking up the old flooring and relaying a solid deal wood block floor by Mr. Roger Lowe, of Farnworth, near Bolton; setting back the chancel to its original line and raising it one step above the nave floor; reseating with pitch pine the whole of the nave and chancel, and putting a screen across the west end to form a vestry in the same position as the old deal one. The organ, formerly at the west end, has been placed in the chancel on the north side. The pulpit, reading-desk, and lectern are in oak, and with the entire fittings of the church, have been designed in the characteristic Perpendicular style prevalent in this part of Norfolk. The fabric of the church has not been touched in any way beyond making it watertight. The carving to the pulpit was done by Mr. J. E. Knox, of Doris-street, Lambeth. The works have been executed by Mr. W. H. Brown, the builder, of King's Lynn, from the designs and under the superintendence of Mr. E. Guy Dawber, architect, of 36, South-street, Park-lane, W.

Engineering Notes.

ABERDEEN.—THE CHEMICAL ACTION OF SEAWATER ON CONCRETE.—A meeting of the special committee appointed by the Aberdeen Harbour Board to consider the question of the condition of the graving dock was held on Saturday. Mr. Messent, engineer to the Tyne Commissioners, who was requested to make a special survey of the work, presented a long report in draft form, which bears out the conclusions of Dr. Brazier, Professor of Chemistry in Aberdeen University, and Mr. Smith, the harbour engineer, regarding the chemical action of the seawater on the concrete used in the construction of the dock. It was discovered by the harbour engineer some time ago that the Portland cement concrete walls had expanded 2¾in. on the height of the walls, their surfaces had cracked and bulged, and the joints of the caisson quoin stones had opened up, causing considerable leakage. Discussion on the expert's report was deferred for a few days.

HYDRAULIC PASSENGER LIFTS.—A lecture was delivered on Friday night before the Midland Scientific Society, Birmingham, by Mr. G. C. Marks, C.E., on "Hydraulic Lifts for Passenger Service." The lecturer reviewed the various systems of "elevating" passengers, by describing in detail the rack and pinion, the multiple chain, the direct-acting ram, the hydraulic-balanced ram, and the suspended or standard type of the American Elevator Company. The many dangers and pitfalls that intending hoist-owners make for themselves by considering the cheapness of the machine, rather than its safety, efficiency, and economy of maintenance, were pointed out, and it was mentioned that out of eleven recently reported hoist accidents, only two were unprovided with so-called safety catches. The use of cheap single-chain hoists was condemned, the users of such were cautioned against the evil day sooner or later to meet them. The American standard elevator or Otis hoists in the city of New York alone, numbering, goods and passengers together, some sixteen hundred, carry daily over 400,000 passengers and 10,000 tons of merchandise, or far more than the underground railways of London. It was mentioned that speeds varying from 350 to 500ft. per minute were quite common in America, while the recent lifts erected at the Mersey Tunnel were considered quite fast enough at 120ft. per minute. The system of safety catches employed in this description of hoist was described, and the possibility of all four ropes breaking shown to be a contingency, though utterly impossible, yet of no cause for alarm, seeing that the wedges would instantly prevent the cage falling.

CHIPS.

The committee for the erection of the East Memorial window in St. Andrew's Church, Newcastle-on-Tyne, adopted on Friday a design and estimate by Mr. W. H. Atkinson, of that city.

Dancill church, near Uckfield, Sussex, caught fire from the over-heating of a stove on Monday week, the result being that the nave was gutted, its roof destroyed, and the tower greatly injured.

The committee for the erection of a technical school at Dewsbury having received £5,000, have purchased a site near the vicarage grounds, now the district infirmary, for £1,000, and have decided to institute a competition for plans for the building, which will cover 5,400sq.ft. of ground, to be limited to architects practising within the limits of the municipal borough.

Mr. Selwyn Image will deliver four lectures on "Art," at Willis's Rooms, the first on Saturday in next week, the 10th inst., being on "Literature in Connection with the Pictorial and Plastic Arts" and on "Literary Art Criticism."

At the Central Criminal Court on Monday, Henry George Muggeridge, 50, described as a builder, was sentenced to 15 months' hard labour for forging and uttering receipts for the sums of £5 12s. 10d. and £3 1s. with intent to defraud. The prisoner had made the acquaintance of persons in financial difficulties, and had offered to arrange with their creditors. In two cases he represented that upon paying 4s. in the pound the creditors would release the debtors; but in each case the prisoner forged the receipts of the creditors and himself appropriated the money.

The annual dinner of the Institute of Painters in Oil took place last evening, Sir James Linton, the president, in the chair. After the usual loyal toasts, Mr. Hamilton Macallum proposed the toast of "The Institute," to which Sir James Linton responded. The president proposed "The Honorary Officers," to which Mr. Greville Chester replied. Mr. Orrock then gave the toast of "The Guests," which was responded to by Sir Edward Sieveking, Mr. Frederick Wedmore, Mr. John Pettie, R.A., and Mr. William Agnew.

The mausoleum at Farnborough, erected by the Empress Eugenie for the reception of the remains of Napoleon III. and the Prince Imperial, will be completed in a few weeks, and the re-interment, which it is expected will be attended by some members of the Royal Family, will then take place. The church, which is close to the Empress's residence at Farnborough, is built in the Famboyant style of French architecture, while the crypt is of the 12th-century style. The floor of the crypt is laid in solid marble, and the two sarcophagi are of red granite, supplied by Messrs. Fraser and Co., Aberdeen. That for the reception of the late Emperor's remains was presented by the Queen. The tombs are placed on either side of the crypt, and there is a white stone altar at the head of the sepulchre. Adjoining the church is the Priory, which has just been completed. The architect was M. Destelleiur, President of the Society of Architects of Paris.

At the meeting of Convocation of Oxford University on Tuesday, grants of £730 were made for extension of accommodation at the Bodleian Library; £250 for transfer of the Arundel Marbles to the University Galleries, where they will be under the care of the Professor of Classical Archæology; and £500 for building a lodge for the caretaker of the Clarendon Laboratory. A proposal to grant £1,200 for continuing the arrangement and cataloguing of the Pitt-Rivers collection was recommended by the President of Corpus, on the ground that the catalogue would be of the highest educational value, and that without it the collection would be useless, and the University would have expended £9,000 on the gift to no purpose. The vote was carried by 47 to 10.

A receiving order in bankruptcy has been granted in the case of Philip Harrison Dawes, of Great George-street, Westminster, and King's Lynn, builder and contractor.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., and XII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—S. and Co.—T. H. B.—B. and P.—F. and B.—St. P. I. Co.—J. L.—F. M. and Co.—D. E. S.—J. S.—H. T. and Co.—C. S. and Co.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED FOR SUBJECTS A AND B.

"HERMANI," "Dutch Clinker," "Sapphire," "Huz," "Lancashire Lad," "Exonia," "Compta," "Leodiensis," "A Student," "Pupil," "Gilbert," "Design," "Aidan," "W. H. L." in circle," "Frost," "Mancunium," "Use," "Mumps," "Power," "Samivel," "Rusticus," "Celt," "Lawton," "Janitor," "Henery," "Arry," "Veritas," "Veritas Vincit."

F. M. R. (Yes, the name and address of the author must be written on the back of each drawing.)—SIDNEY BARRY. (The sections and elevations should be drawn one way on the sheet. If the space is too limited, make the perspective sketch smaller.)—GEORGE GODWIN. (Read the rules and follow them. The scale in each case should be drawn on the sheet.)

SECOND LIST OF SUBJECTS.

C.—A village smithy, with a coachhouse for four carriages or carts by the side, a little office, and a small store for nails and other smith's stock in trade; all contrived under one roof, with a grindle-stone under pent roof at one end. The smithery to have two forges, and running at right angles with it a wheelwright's shop, 20ft. wide by 30ft. long, is to be placed, having a frontage along the return road, the building standing on an angle site. Style suitable for stone and timber. Scale, 8ft. to the inch. View, elevation, section, and plans.

D.—A china cabinet in walnut, 4ft. wide and 6ft. high, with glazed fronted cupboards suitable for the display of art objects, and fitted with shelves. Style, Old English, end of 18th century. Elevation, section, plans, and sketch, inch scale.

TO PRACTICAL MASONS.—The President and several members of the council of the Royal Institute of British Architects and the proprietors of the BUILDING NEWS offer prizes of Ten Guineas, Five Guineas, and Certificates for the best models of vaulting at the angle of a cloister. For lessons, inquire Class of Masonry, Guilds Institute, South Kensington, Monday evening, between 8 and 9 o'clock.

Correspondence.

ARCHITECTS' AND ENGINEERS' REGISTRATION ACT.

To the Editor of the BUILDING NEWS.

SIR,—The negotiations that have been carried on for some time past with reference to the presentation of the above Bill to the House of Commons have been now concluded by the Architects' and Engineers' Registration Act Committee.

I shall be obliged, therefore, if you will allow me to make it known through your columns that the Bill will be presented early next session by Colonel Duncan, R.A., C.B., M.P., who met a deputation of the committee at St. James's Hall last week, and has kindly undertaken the care of the Bill, supported by leading members of the House.

It is hoped that a ready response will be given to the appeal now being made for subscriptions to carry out the object in view, and I would call the attention of all interested in this movement to the advertisement on the subject appearing in another part of this Journal.—I am, &c.,

EDGAR FARMAN, Hon. Sec.

39, King-street, Cheapside, E.C., Nov. 30.

SIR,—It is a pleasure to many of your readers to notice that the Registration Bill Committee has come to life again, and intends to carry the work, which it has so well commenced, to its logical conclusion at an early opportunity. The appeal which has been made for volunteers to act as local hon. secs. should be well responded to, for none know so well as provincial men how necessary to the future of architecture the Bill has become. A little vigour shown just at this crisis will be of immense service to the profession.

Many will have been amused by the way in which the matter has been treated in the *Journal of Proceedings* of the R.I.B.A., and by the presidents of various provincial societies who are led by the nose by that august body. Having woke up at last to the importance and necessity of compulsory registration, they enter upon a long and tedious discussion as to the method of bringing it about, the majority being in favour of obtaining Parliamentary powers (some few going so far as to declare that without them registration would be a dead letter; but by no means all), and a small minority stating that the Institute already possesses sufficient power to accomplish the object in view. All the time the Registration Bill is in existence, and its provisions are known to all—provisions which secure Registration by the best and the only possible way.—I am, &c. A.R.I.B.A.

SIR, —A remark in a letter by the late Mr. Viollet-le-Duc, which I happened to meet with to-day, and which related to the question of a government diploma for architects, struck me that one point in connection with the proposed Registration Bill has not been canvassed.

Will the Registration Bill compel the public to employ none but qualified practitioners? If it does, the public will undoubtedly have a good case against the Government in the event of any mistake or any want of capacity on the part of the architect in any branch of his profession.

While in favour of the Bill, I should like to know to what extent the architect's responsibility will be increased.—I am, &c.,

EDWARD W. JENNINGS.

Swansea, Nov. 29.

[What case has the public against the Government in the cases of incompetent or dishonest lawyers or physicians?—ED. "B. N."]

"DRAUGHTSMEN'S PROVIDENT FUND."

SIR,—Permit me to suggest through your columns that all draughtsmen in the architectural, surveying, and engineering professions who have read or heard of this movement, should make a point of speaking of it to their friends and acquaintances in any of the above-referred-to professions, in case it has not been noticed or heard of by them, and let their friends in their turn spread the news to others; also that all should make a point of consulting the columns of the BUILDING NEWS carefully every week for any notices, &c., that may appear from time to time, or for the notice of the next public meeting that will be held, when the rules, &c., are completed. Furthermore, let all who are in favour of the movement write to the hon. secretary, Mr. G. A. T. Middleton, St. James's Hall, Piccadilly, intimating the same. By the above suggestion assistants will help greatly to lighten the labours of the committee. Will assistants kindly note this? If they wish to become known to the committee, they must communicate with them, as there are no known means of finding them out—their names do not find any place in directories. In conclusion, I trust that every draughtsman engaged in any of the above professions, without exception, and without regard to the state of the atmosphere or condition of the weather, will attend the next public meeting. I inclose my card, and beg to subscribe myself a believer in "a long pull, a strong pull, and a pull altogether."—I am, &c., R. W. C. D.

SIR,—As you remarked in your "Office Table" notes last week, there have been several efforts to start a Draughtsmen's Provident Fund of recent years; but, like most things taken up by either architects or their assistants until recently, they have been entered upon in only a half-hearted spirit, and have borne within them the seeds of failure, from being confined to architectural draughtsmen only. This mistake is not likely to be repeated, and all who heard Mr. Chambers at St. James' Hall must have been satisfied that a leader has appeared at last with energy and ability to carry the matter to a successful conclusion. There was one slight error in your report of his opening speech, however, which I trust you will allow me to correct. The letter which he read from the secretary to the Architects' Benevolent Society merely stated his inability to be present at the meeting, and gave no opinion about the Society, whether favourable or otherwise.—I am, &c.,

ONE WHO WAS PRESENT.

SCARBOROUGH CONSTITUTIONAL CLUB COMPETITION.

SIR,—My attention has been called to a letter in your last issue signed "A Lover of Fair Play and Competitor," which, in justice to Mr. Cheers, requires a brief reply.

Although certain modifications have been made in the original plan, yet the author's main conception remains unaltered.

After the premiums had been awarded, the directors were pressed to provide a reading-room on the first floor front. To effect this the architect was compelled to omit three of the offices shown in his first design, while to gain access to the room it became necessary to reverse the position of the principal staircase, and of several rooms from the north of the building to the south; other minor alterations were also unavoidable.

With regard to cost, the directors have considerably amplified and elaborated the original plan. Notwithstanding your correspondent's assertion, the area of the buildings has been extended and the height raised from 2ft. to 5ft. throughout. A handsome oriel window has been introduced, whilst a large proportion of the increased cost is owing to certain items of furniture having been included in the tenders. —I am, &c., S. W. FISHER, Hon. Sec.

Scarborough Constitutional Club Company, Limited, Scarborough, Nov. 28.

SIR,—As the letter *re* the above in your last issue is most unfair and misleading, I must beg in self-vindication to correct the assertions therein contained, merely premising that when one architect attacks another in print, he should give his name, and not hide his identity behind such a worn-out *nom de plume* as a "Lover of Fair Play."

The competition and working drawings for the Club are nearly identical save in size of rooms, though the plan has been reversed from north to south, the principal rooms facing the latter point as an afterthought simply for the sake of quiet and retirement from the noise of the printing-offices on the north side, and not from any fancied improved approach, as your correspondent imagines. Again, more ground *is* covered than originally shown, despite his assertion to the contrary. The assembly-room, a large and lofty apartment, is now 60ft. by 30ft. in place of 52ft. by 30ft. as formerly—a substantial difference in cubing a building. The entire front has been raised 5ft., and the ground-floor story over the whole site made 2ft. higher. Increased accommodation has been given the caretaker on top floor, and much more extended basement; likewise a large oriel window projected out from reading-room, which was not shown in the perspective view published.

These alterations, additions, and improvements, made at the committee's suggestion, more than account for the difference in the original estimate and the accepted tender, and I fairly warned the committee before making the alterations of the increased cost entailed thereby, and since they are satisfied I do not see why an unsuccessful competitor should make so great an outcry, reminding one so much of the old fable of the Fox and Grapes. Perhaps another time he will be more careful in compiling his statements. Your correspondent seems to imagine that a competition set of drawings must be carried out line for line: otherwise, he evidently thinks gross injustice will be done to unsuccessful competitors. Fortunately, committees have not such narrow views, and I trust he will learn more wisdom with further practice.—I am, &c.,

Henry A. Cheers.

Sir,—Referring to your correspondent's remarks on the Scarborough Club Competition, perhaps I may be allowed, as one of the competitors, to relate my experience in the matter. Finding from my preliminary rough sketches that the building could not be carried out for the money to which architects were limited, I wrote to the secretary stating that it was quite impossible to provide all the accommodation desired for that sum. He advised me, notwithstanding this, to submit my designs and state the amount for which they could be executed. I did so; but I infer from your correspondent's letter that the same amount of liberty was not accorded to other competitors.

I fear it is too much the practice for building committees to name haphazard sums as their limit of expenditure, trusting that architects may be able to conjure buildings into existence by some occult faculty they are supposed to possess.

Other things being equal, certain classes of buildings, such as churches and hospitals, *may* have limits of outlay assigned them beforehand; but this is not the case with buildings like the Scarborough Club, and my point is this: that competing architects, on finding at the outset of their labours that they cannot carry out their scheme for the money, should frankly tell the committee so.—I am, &c.,

A. S. G.

ARBROATH ABBEY.

Sir,—I observe in last week's issue of one of your contemporaries a view of the south transept of Arbroath Abbey. The accompanying letterpress, which describes it as the Chapel of St. Catherine, is, however, in error. Even if it had been the practice—which it was not—to place chapels in the transepts, they could not in that position have had their "orientation" carried out.

In the instance of Arbroath, the mistake about the dedication of the south transept to St. Catherine is a popular one, perpetuated by the worthy keeper of the ancient fabric in his description to visitors.

In Arbroath Abbey there were six chapels with their altars, in addition to the high altar in the presbytery. These chapels were in the aisles of the presbytery and transepts. The only one which can be localised is that of St. Mary, which was in the south aisle of the presbytery.

Any of your readers interested in the valuable ruin will find a plan of it in one of the back volumes of the Building News (1885) reproduced from my work on "Three Scottish Abbeys."—I am, &c.,

Tooting, Nov. 28th. G. S. Aitken.

ARCHITECTURAL POLITICS.

Sir,—Your correspondent, "G. H. G.," has made a series of statements in his communication of last week which, with but few exceptions, are more or less inaccurate, some absolutely; and as two or three of these apply to and affect the subject of my letter upon "Professors of Sanitation," I cannot possibly allow them to pass unchallenged.

In his opening remarks we are informed that there is something *special* about sanitation. We object to such a statement. Drainage, like water supply, ventilation, warming, &c., is part and parcel of the building, and the architect who has designed every inch of and erected the building is *par excellence the* man competent by virtue of the position, above all others, to superintend it. To this we adhere, and certainly pay no attention to the financially interested argument of the "sanitary *expert*," which latter term, applied to house drainage or sanitation, is equally absurd as that of *professor*.

The following statements, "that, among other correspondents, one has defended the profession from the charge of ignorance in sanitary matters; that another has *boldly* denied their attainments; that this controversy has risen from misapprehension; that it has been assumed that architects are acquainted with sanitary principles because few and simple; and lastly, that because a few individuals have mastered the science others must not be assumed by us to have done so," are all misapprehensions proceeding from one person only—your correspondent, "G. H. G." We do not defend the profession from the charge stated, but *do*, and have, defended it from the remarks of Mr. Hugh Roumieu Gough, whose arguments by no means *hold* respecting "so-called architects," which in principle is simply to state that incompetent men are not competent men; that "quacks" are not qualified doctors; we thank him for the information—colloquially worded and sufficiently equivocal to afford a loophole of escape—leaving the damaging impression upon the public mind that architects as a body are utterly ignorant of sanitary science. It is simply absurd. We have not remained, and *shall not* remain, passive while Grimthorpean hands are being laid upon the profession. In all of this we cannot but discover a lamentable absence of that *professional etiquette* which is found so efficacious in maintaining public confidence in other professions. The assumption following this was never made; nor were we so illogical as to generalise from our own attainments in sanitary science to other members of the profession.

The Public Health Act is in active operation where in large towns sanitary science is of importance to the community, and within such area 100 per cent. (!) of the houses now erected are in perfect sanitary condition, for no vestry will allow any house-drain to be laid down without being properly disconnected and ventilated. Therefore, I regard the statement "of 70 per cent. at least (!) of the houses now built being as regards sanitation in a fever-breeding condition—that is, the laying on of sewer gas," a pure mental fabrication, which, to support your correspondent, has made a totally irrelevant allusion to the exploits of the suburban "jerry-builder." What has *that* to do with the sanitary knowledge of architects?

We do not consider the profession as going through anything, or anything approaching thereto, of a revolutionary character. On the contrary, a steady progressive development. Nor can civil engineers who have assisted architects in iron construction—but who will assist them much less in future, if not altogether be dispensed with—be considered as "specialists," for from this point of view an architect is also a specialist.

With the last paragraph of "G. H. G.'s" letter I wholly concur.

Lord Grimthorpe's suggestion in the *Times* is as ridiculous as usual. I have served articles to one of the largest builders in London, and therefore do not speak empirically.

I think, Mr. Editor, that something practical should be the upshot of this controversy. I suggest, therefore, that a class be formed at the Association for the study of Sanitary Science, including the ventilation and warming of buildings, water supply and sanitary appliances, which are of more importance than stereotomy, colour decoration, and graphic statics combined.—I am, &c.,

Chas. R. Guy Hall.

15, High-street, Kensington.

ASSISTANT SURVEYORS R.E. DEPARTMENT EXAMINATIONS.

Sir,—I find in the list of subjects set for examination of candidates for the situation of Assistant Surveyors R.E.D., there is not a single subject on surveying, save quantities. Now, probably, the first duty that a surveyor on entering service may have to perform, is that of making a survey of some land, or of a rifle range. To do this it is absolutely necessary, therefore, that an acquaintance should be possessed by the surveyors, while in dealing with work connected with a rifle range, it is imperative they should have a sound knowledge of levelling. Instead of this, a surveyor may enter the service and be totally ignorant of what a theodolite is, or even a Gunter's chain.

What I would suggest is that subjects on the "Use of Surveying Instruments," and "Modern Sanitation" be added, and either trigonometry or Euclid could well be dispensed with. This change would greatly benefit the surveyors, and they could then enter with confidence on their duties. Prospero.

Intercommunication.

QUESTIONS.

[9481.]—**Geometry.**—Which is the best and simplest treatise on geometry in order to get up for an examination (architectural) comprising elementary, plane, and solid geometry? I have been accustomed to architectural drawings, &c., for some time, but have no knowledge of the terms or regular problems.—F. R.

[9482.]—**Products of Gas Combustion.**—Carbonic acid = $C . O^2$ = carbon dioxide. I think that is right, but am not quite certain. Carbonic oxide = C . O. Is that correct? Which of the two is the result of combustion by the atmospheric or "Bunsen" flame, and which the result of the ordinary illuminating flame? Which is the most poisonous by inhalation?—W.

[9483.]—**Cast-Iron Columns.**—Is there any simple formula for calculating the strength of these? Barlow, on the "Strength of Materials," 1867, says, "The only experiments that have been made upon cast-iron columns are those by Mr. Hodgkinson," and afterwards gives the formula, which is complicated. A simple method would be a boon to architects, including—A. Bearer.

[9484.]—**Chesterfield Churches.**—In a journey from London recently on the Midland Railway I noticed this remarkable spire seems to be more twisted than ever. What is the primary reason for the ugly warping of its timbers?—G. C.

[9485.]—**Old Irish Fonts.**—Where can good examples be seen?—G. C.

[9486.]—**Earl Strongbow.**—Is the tomb of this celebrated warrior still preserved in Christ Church Cathedral, Dublin? It was there before the late Mr. Street's restoration some ten years ago.—G. C.

[9487.]—**Mounting Water-Colour Sketches.**—Will some reader kindly inform me of the best method and description of material to use in mounting water-colour sketches on cardboard mounts so as to prevent the colours from running if the backs are wetted in the process, and for them and the mount to remain perfectly flat when finished? Also the mode of strengthening sketches for fixing to the backs of mounts having an opening for the subject.—Art.

[9488.]—**Gate and Right of Way.**—A man has a gate opening upon a right of way. I should be pleased to know if he can remove the gate to a different position in the same wall.—G. Wyborn.

[9489.]—**Billiard-Room Light.**—Wanted one for oil, which will give less trouble than an ordinary six-armed one, and not cast any shadow? Have heard of a room lamp in use in America in the form of a gasalier, the oil container being in centre and the oil conducted along arms to wicks as gas to burners. Has this principle been applied to above?—J. M. H.

[9490.]—**Measurement of Shafts.**—Will some experienced reader kindly give an opinion as to the following query? In the erection of a large building of the warehouse type, a chimney-shaft 5ft. 5in. square and 60ft. high, and having a circular flue, is built on the side of the said factory. In the architect's quantities the brickwork of shaft is not separated from that of the main building, but included in the bulk, and one price is allowed by the contractor for the whole. The only extra in quantities is as follows: "Wire-cut bricks in gauged mortar lining to flue of shafts." On completion of contract the brickwork is measured, and the architect deducts the flue of shaft (diameter of which is 2ft. 6in.) from the bulk of brickwork. The contractor argues that this ought not to be, as nothing is allowed in quantities for extra labour in erecting shaft. Ought the flue to be deducted? If so, should not an extra price per rod be allowed for erection of shaft?—Q.

[9491.]—**Valuation.**—The value of house and ground rent being assumed to be correct, should the ground rent be deducted from the valuation—in valuing for mortgagee, or not, in case of leasehold? I put a hypothetical case. Thus, a house cost, and is worth, say, £2,300. Standing on land ground-rented at £35 per annum, with option of purchase of freehold, at 25 years = £875, will the value for mortgagee be £2,300, or less the capitalised ground-rent—viz., £1,425? Clearly, if it were freehold, the value is £2,300 × £875 = £3,175; or, if the house is let at, say, £150, should the ground-rent of £35 be deducted? Thus, £150 − £35 = £115 × 14½ years' purchase, to pay 7 per cent. = value £1,639. Or should the rent £150 be × 14½ = value £2,137 10s. 4d.—Mortgagee.

[9492.]—**Architectural Perspective.**—Will any of my professional brethren kindly inform me if a knowledge of second-grade linear perspective of the Science and Art department is sufficient for architectural drawing? Or, if not, are any handbooks published that are useful to architectural draughtsmen, and if London assistants are expected, as a rule, to know the subject?—Station Point.

REPLIES.

[9450.]—**Masonry and Stonecutting.**—Referring to the respective methods (see p. 643, Figs. 3 and 7), I invite the readers of the Building News to test them. Cut a templet similar to the section of the prism, and taking two rough pieces of suitable material, proceed to

"dress" them to the required form, following respectively each method. Both agreeing as to first dressing, setting bed, then one of the ends of prism; cut these on both models. With No. 1 model proceed by marking templet on the squared end, and working in rotation from the setting bed each of the sides of prism by repeatedly squaring and "taking out of twist" the drafts at the rough end, completing the model by "measuring off" the required length and "squaring up" the rough end. With Model No. 2 (already partially dressed) continue by "measuring off" and "squaring up" the rough end, applying the templet to both ends similarly; mark off, or rather cut in each angular corner, completing model by bringing each surface in rotation to a plane, using only the straight-edge. The value of the latter method—always adopted for mouldings, &c.—is obvious; while the rough end of the former method in practice depends on (1) the extreme accuracy of long-bladed and too-often ill-used squares; (2) their just application; and (3) a series of accurate twistings; but these operations, unneeded by second method, involve a loss of time, sometimes a loss of material, or worse, bad work. I was pleased to learn that the latter method (see Lesson II. p. 751) is the one Mr. Harvey adopts. I may remark it is general in practice, and that I taught it in '82, before the subject was added to the City and Guilds list. Mr. Harvey states, "archstone applies only to arches." Read article on "Metropolitan Railway Bridges," p. 774, and discriminate between vault and arch in principle. Mr. Roger Smith, in his work on "Gothic and Renaissance," defines "vault" as "an arched ceiling," &c.; Newland as "a continued arch or an arched roof." Dobson (in the work referred to by Mr. Harvey), under "Vaulting," states:—"Arched vaults being found amongst the ruins of Nineveh," &c. Alluding to the principle of dome vaulting that it was "evaded by making the beds horizontal throughout," and, again, "the introduction of the arch as a leading principle in composition," Mr. Harvey states, "Voussoir applies to the stones which form the surface of any vault, whatever its shape may be." I submit the soffit is no criterion. The soffit of an archstone is not necessarily a rectangle; and, further, I am not aware of any stone to which the term "voussoir" applies, whose right section in the plane of the "line of resistance" is not of the arch or wedge form. Mr. Harvey rightly stated (see page 642) "the intrados, but more commonly the soffit." He might have continued, "the extrados or back" (see back on oblique arches), and following in the same wake "Voussoir," but more commonly "springer" or "archstone," for the former in each of these instances are rare indeed in the workshop, "bank," or building; and while Mr. Harvey is not responsible, except for sustenance, I submit there was no necessity for the importation. In conclusion, while thanking Mr. Harvey for the kind manner he has accepted my criticisms, I trust my object is apparent, that now the City and Guilds and other munificent bodies are using their exertions to open the doors of technology to all, we shall not find the architects have designed the steps of the main staircase; that all are invited, nay, urged to ascend 11in. risers and 24in. treads; for while I admit there are those to whom "strictures" should not be necessary, there are others who, if such terms must first be mastered before they can apply themselves to a study of principles, will be doubly handicapped. — JOHN POWELL.

[9466.]—**Early Churches.**—I am obliged for "H. D. W.'s" reply. My question had reference to parish churches rather than to cathedrals. The latter churches named by "H. D. W.," especially Wing, Bucks, St. Michael, St. Alban's, Repton, and Brassington, are unknown to me, and I should like to know if they have been published.—STUDENT.

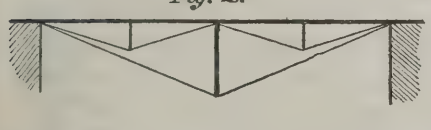
[9469.]—**Fink and Bollman Trusses.**—A Fink truss is one in which the diagonals or tension-bars are inverted, forming a series of inverted trusses below a compressive horizontal member or chord. In the Bollman truss the same arrangement of tension members exist, the diagonals proceeding from each end of the chord becoming longer and longer till the farthest vertical is reached. The stress in the upper chord is constant in this case. For finding stresses consult Bold's work, or Rankine's manual.—G. H. G.

[9469.]—**Fink and Bollman Trusses.**—Sketches show the forms of these trusses. Fig. 1, Bollman; Fig. 2,

Fig. 1.



Fig. 2.



Fink. It would require too much space to explain methods of finding stresses. Better consult Trautwine's "Pocket Book" (J. Wiley and Sons, New York, 21s.) and Graham's "Graphic and Analytic Statics" (Crosby Lockwood and Co., 16s.)—PHOS.

[9474.]—**Ordnance Maps.**—The undermentioned book, published at the Ordnance Survey Office, Southampton, will give "P." the information he requires—"Descriptions of Scales, Characters of Writing, and Boundary Symbols, Abbreviations, &c., used on the Ordnance Survey Plans of $\frac{1}{500}$, $\frac{1}{2,500}$, and 6in. to 1 Mile, Past and Present."—C. W. GREY.

[9470.]—**Gas-Lighting for Draughtsmen.**—Use the "Welsbach" light made by the Incandescent Light Company, 15, Leadenhall-street, E.C., which gives a white and steady light, and saves smoke and dirt—very essential conditions to all who have to draw on white paper. Indeed, I do not know any steadier or more economical light for night work.—G. H. G.

[9476.]—**Symbols.**—If Mr. W. Jones will expend a few shillings in a useful little well-known book called "The Calendar of the Prayer-Book," by Parker, he will have at his finger's end a good deal of information relative to Saints and their Symbols. The emblems of the Four Evangelists, as quoted by him, were used from an early age, and are derived from the visions of Ezekiel and St. John, recorded in Holy Writ as follows:—"As for the likeness of their faces, they four had the face of a man, and the face of a lion on the right side; and they four had the face of an ox on the left side; they four also had the face of an eagle." "In the midst of the throne, and round about the throne, were four beasts, full of eyes before and behind. And the first beast was like a lion, and the second beast like a calf, and the third beast had a face as a man, and the fourth beast was like a flying eagle." "The Calendar of the Prayer-Book" says the significations generally applied to them are as follows:—"The Angel, or human form, to St. Matthew, because his Gospel seems to dwell most particularly upon the human nature of Our Lord, and commences with His human generation and descent; The Lion to St. Mark, because he is termed the historian of the Resurrection, of which doctrine the Lion was considered the emblem, from the legend that it was always born dead, and after some days licked into life by its parents; The Ox or Calf to St. Luke, because, being the emblem of sacrifice, it is the sign of a priest or victim; and St. Luke especially dwells upon the priestly character of Our Blessed Lord; The Eagle to St. John because, as the eagle soars highest amongst birds, and looks undimmed at the sun, so St. John soared upwards beyond all the other inspired writers in setting forth the divine nature of Our Lord, and contemplating the glory of His godhead; and for this reason St. John is often represented soaring upwards mounted on the back of an eagle." Mr. Jones will find much more information upon the same subject in the book just quoted from; but the matter is so generally known that I forbear to reproduce it in extenso. In Mrs. Jameson's "Sacred and Legendary Art," Vol. I., he will find exactly fifty pages devoted to the subject. Therein the gifted authoress says the earliest type under which the Four Evangelists are figured is simply by four scrolls placed in the four angles of a Greek cross. The second type chosen was the four rivers which had their source in Paradise. Representations of this kind, in which the Saviour, as a lamb holding a cross, stands on an eminence, from which gush four rivers, are to be met with in the Catacombs, and in some old 2nd to 5th century churches. The Jewish doctors originally interpreted the creatures Ezekiel saw as the four archangels—Michael, Raphael, Gabriel, and Uriel; and afterwards as the Prophets—Isaiah, Jeremiah, Ezekiel, and Daniel. At what precise period the quartette of mysterious emblems were first adopted as significant symbols of the Four Evangelists, Mrs. Jameson does not venture an opinion. It was certainly as early as the 5th century.—HARRY HEMS.

[9476.]—**Symbols.**—The four living creatures mentioned in Ezek. i. 10, x. 14, and Rev. iv. 7, have been applied to the Four Evangelists from very early times, though I believe representations of them are not found earlier than the 5th century. Their symbolism is variously explained by different writers. SS. Jerome and Augustine refer the Man (the man is drawn with wings, hence it is sometimes called an angel) to St. Matthew, because his Gospel commences with the human genealogy; the Lion to St. Mark, in reference to his opening with the cry in the wilderness; the Ox to St. Luke, from his beginning with the sacrifice of Zacharias; and the Eagle to St. John, whose first words were, "In the beginning was the Word." Others have attributed the Man to St. Matthew, because he treats of the humanity of Christ; the Ox to St. Luke, because he dwells on the priesthood and passion of Our Lord; the Lion to St. Mark on account of the rapid and abrupt style in which his Gospel is written; and the Eagle to St. John from his lofty and far-reaching flight of inspired thought. The symbols are all drawn with the nimbus or "glory," and they are often represented as holding books of the Gospels. No precise rule or order of arrangement is observed, and their design and application is constantly varied. They are frequently placed at the ends of the cross, where they are intended to bear witness to the Godhead and humanity of Christ.—A. C. W.

[9477.]—**Lime-Washed Walls.**—In answer to the query by "Limewash," I send the following recipe:—To every 25 or 30 gallons of run lime, add one gallon of boiled or linseed oil and one pound of Russian tallow, the whole to be thoroughly incorporated, and must be applied while hot.—R. W. C. D.

A special meeting of the Margate town council was held on Tuesday, when it was decided to adopt a new system of drainage for the borough, and that the work should be carried out with all possible despatch. It was stated by the borough surveyor that if a system of drainage by gravitation was adopted, the work of draining the low levels of the town could be completed before the commencement of next season. A committee was appointed to visit Eastbourne, Henley-on-Thames, and Southampton to inspect the Shone system, as well as other towns where other drainage schemes have been satisfactorily adopted.

The mason-work of the model dwellings in course of erection for the Glasgow Corporation in Saltmarket was completed by the contractors, Messrs. Webster, Walker, and Webster, on Saturday.

A south transept has just been added to the Chapel of Ipswich Grammar School, at a cost of £400. It is built, in keeping with the chapel, of red brick with stone dressings, the style being Late Perpendicular. Mr. Brightwen Binyon, F.S.A., of Ipswich, was the architect; and Mr. F. Bennett, of the same town, the builder.

STAINED GLASS.

ECCLESTON.—Two single-light memorial windows have just been placed in Christ Church, Eccleston, near Prescot, Lancs, by Mr. Douglas Herman, of St. Ann's, St. Helen's, in memory of his father and mother. Each window consists mainly of a full-length figure, the lower portions being occupied by groups illustrating incidents in the lives of the personages depicted above. The subject of the western window is "Dorcas," represented as a young woman. At the base is shown the distribution of garments to the widows, and at the head is a group typifying Charity. The subject treated in the second window is St. Luke, represented as the Evangelist, with pen and inkhorn, and below as an artist painting a picture of the Virgin with the Infant Saviour. The subject of St. Luke is peculiarly appropriate in a memorial of the late Mr. R. W. Herman, who from early manhood took an active interest in the movement for developing art training in Great Britain, having been instrumental, in company with a few other earnest students in the Government School of Design, Somerset House, in securing some very necessary reforms in the mode of training, which resulted in his being placed on the staff when the school, by gracious permission of Her Majesty, was established at Marlborough House in 1852. On the removal of the National Art Training School to South Kensington Mr. Herman was appointed deputy head master and lecturer on the principles of ornamental construction. Subsequently, as registrar, he took an active part in organising the vast establishment at South Kensington. The windows are from the studio of Mr. A. W. Hunt (Shrigley and Hunt, Lancaster and London), who was himself a student at South Kensington during the later period of Mr. R. W. Herman's connection therewith.

CHIPS.

According to the *Staffordshire Advertiser*, the school board for West Cannock, having considered the overcrowding at the West Hill Schools, it was resolved that the present infant school be added to the girls' department, and a new infant school to accommodate 300 children be built, the cost not to exceed £4 per head. Mr. F. W. Evans, architect, of Birmingham, was engaged to carry out this scheme for £26 5s., "with an additional £10 if the work is done to the satisfaction of the board."

A new town hall is approaching completion at Maybole, N.B. It is Scottish Baronial in style, and will cost £3,000. The chief apartments are the council council, 38ft. by 16ft., and the concert-room, 70ft. by 33ft. and 33ft. in height.

The construction of a marine promenade at Bridlington Quay has just been commenced. Since the tender of Messrs. Whitaker Bros., of Horsford, was accepted about a month ago, the work has been carried on night and day, and there is every probability of it being completed by June next. The wall forms a connecting link with the existing promenades on either side of it, and will be joined to the Alexandra Sea-wall, thus forming one continuous marine walk of nearly three-quarters of a mile in length, the greater portion of which will have a carriage drive 40ft. wide.

The International Exhibition at Melbourne is arranged to be opened on August 1st, 1888.

An addition to the churchyard of Stoke Poges was consecrated on Wednesday week. The iron rails which surrounded the graveyard, well-known to all visitors to Stoke, have been removed, and there is now instead a sunken fence of flint stones with ditch, while at the entrance has been erected a lych gate designed by Mr. J. Oldrid Scott.

Decoration, published since its first issue, more than seven years ago, by Messrs. Sampson Low, Marston, and Co., will, after the December number, be published by Mr. P. L. Deighton, late publishing manager to Messrs. Crosby Lockwood and Son. Mr. Deighton has recently relinquished his position with that firm, and taken offices at 6, York-street, Covent-garden, to which address all future communications should be forwarded. He promises a considerable enlargement of the journal and the addition to it of several new and interesting features early next year. Mr. Moyr Smith will continue to act as the art editor of *Decoration*.

At a meeting on Monday night of the Architectural section of the Philosophical Society of Glasgow, Mr. James Thomson, president, in the chair, an address on "The Training of Architectural Students" was delivered by Mr. F. H. Newbery, of the Glasgow School of Art.

An enormous circus of wood and brickwork is being constructed at Manchester at a cost of £10,000 for the reception of Buffalo Bill and his Wild West. The architects are Messrs. Mangnall and Littlewoods, of Manchester; and the contractors Messrs. R. Neill and Sons, of the same city, the builders of the late Royal Jubilee Exhibition.

LEGAL INTELLIGENCE.

In re Wm. Douglas.—(London Court of Bankruptcy, Nov. 28. Before Mr. Registrar Linklater.)—The debtor, described as of Queen's-gate-terrace, South Kensington, and elsewhere, builder and contractor, has presented his petition, and a receiving order has been made. The aggregate debts are estimated at £675,000, of which about £575,000 are covered by securities, the trade debts being returned at about £17,000. The amount of the assets did not transpire.

Dilapidations.—Battam v. Knight.—This case was heard before the official referee on Friday last. The plaintiff claimed £108, the defendant paid into court £15. The counsel engaged were Messrs. J. V. Austin and R. M. Bray. The surveyors for the plaintiff were Messrs. Kingwell Cole, Battam, and Delissa Josephs; for the defendant Messrs. H. J. Thurgood, E. H. P. Eason, and Banister Fletcher. Verdict for the defendant, with costs.

Novel Swindle on Builders.—James D'Arcy Phillips, described as a journalist, of Bath, was charged at Leamington on Friday with obtaining £1 by false pretences from Mr. John Fell, contractor, the mayor of the borough. Evidence was given showing that the prisoner advertised to the effect that the Boyle trustees, an imaginary body, purposed building villas in the locality where the advertisements appeared, and it was stated that plans and specifications would be supplied on £1 being deposited, to be returned if a genuine tender was received. This being an ordinary condition, Mr. Fell's manager sent the deposit money, but never received the plans or specifications. Inquiries were instituted through the Bath police, and then the prisoner returned the money, intimating that legal difficulties had suspended the project. When arrested, several postal orders and cheques were found in his possession. Numerous others had been returned. The prisoner's address in Bath was merely a room, and there were no traces of either plans or specifications. The bills of his advertisements were unpaid. Prisoner was remanded.

CHIPS.

Plans and specifications for the restoration of the "Muckle Cross," at Elgin, prepared by Mr. Sydney Mitchell, Edinburgh, were submitted to the town council of that burgh on Monday, and approved of. The cost will be over £300, to be defrayed by Mr. M'Andrew, Westwood House, Essex, a native of Elgin.

The corner stone of a new Church Sunday school and club for East Twerton, near Bath, was laid on Tuesday. The building will cost £3,000, and will comprise a schoolroom, 64ft. by 36ft., a reading-room, 24ft. by 31ft., a committee-room, 19ft. by 24ft., and three classrooms. Mr. E. W. Buckle is the architect.

The residuary legatees of the late Sir Joseph Whitworth have devoted £47,000 to the purchase of 20 acres of land between Oxford-street, Denmark-road, and Moss-grove, Manchester, for a city park, and the building of a technical school and art and commercial museum. Among the conditions allotted to the gift is one that a sufficient stipend be provided independently to enable Owens College to fill and maintain a Professorship of Art and Architecture, whose lecture-room and library shall be provided within the Museum of Art. Galleries for architectural illustrations are to be arranged for in this museum.

The *Court Circular* states that at Windsor Castle on Tuesday, Mr. Minton, of the firm of Minton and Company, was introduced to the Queen, and presented to her Majesty a vase illustrative of the principal events of her Majesty's reign during fifty years, manufactured at the works of the company, which her Majesty was graciously pleased to accept.

Mr. W. Holman Hunt was elected a member of the Royal Society of Painters in Water Colours on Wednesday.

The throne-chair of Queen Hatasu (xviii. Egyptian Dynasty, B.C. 1600), has been presented to the British Museum by the owner, Mr. Jesse Haworth, of Bowdon, Cheshire. The throne-chair is believed to be the only extant specimen of ancient royal Egyptian furniture, and is the most venerable piece of dated cabinetmaker's work in the world.

The prize of the Manchester Society of Architects for the best essay descriptive of the architecture of the Manchester Town-hall has been awarded to Mr. Percy Scott Worthington, of B.A., Corpus Christi College, Oxford, son of Mr. Thomas Worthington, of Manchester. The prize is the gift of Mr. Murgatroyd, the president of the Society. The Manchester Society of Architects' prize for the best collection of sketches has been awarded to Mr. Sidney M. Fairlie, Lansdowne-road, Didsbury.

Our Office Table.

Colonel Duncan, R.A., C.B., has consented to take charge of the Registration Bill next Session in the House of Commons, and all that is now wanted to insure its passage is the pecuniary support of the profession. The Society of Architects—which is a young society and not very rich yet—has already contributed quite as much as its finances warrant towards the preliminary expenses, and besides, it is only fit that the Registration Committee, which was appointed by the profession, should depend now on the profession for support, and not on any one society. The committee appeal elsewhere for subscriptions towards the necessary Parliamentary expenses, and if architects believe in Registration, now is the time to show their opinion. With a thousand pounds subscribed, and the zealous co-operation of the principal architectural societies, the Bill might be law this day six months.

The agitation for the reform of the Royal Academy, which has been smouldering right through the year ever since the unprecedented revolt of last autumn, has at length, says the *Magazine of Art*, reached an acute stage. It will be remembered that the first measure of reform demanded was that the total number of works that each artist might submit to the selecting committee for the purpose of exhibition should be reduced from eight to two in each class—oil and water-colour painting, sculpture, architecture, and black-and-white. The entire Press supported the proposal, and the Academy had just appointed a reform committee to consider it, when Mr. Holman Hunt, Mr. Walter Crane, and Mr. George Clausen arose in their wrath, and, after a defiant trumpet-blast, called upon the Academy to clear the way, and enunciated a plan for a "National Exhibition." Since that time Mr. Walter Crane has seceded from his less radical companions, and the others have wisely returned to a more moderate programme, consisting solely of the establishment and introduction of the democratic principle in the appointment of the Selecting Committee—the detail of the reduction of numbers being laid aside for a time in favour of the principle of suffrage. A memorial has been addressed to the President and Council of the Academy by Mr. Havard Thomas, the honorary secretary of the Provisional Committee, signed by 783 artists who have signified their adhesion to the principle "that the juries for selecting and placing works of art must be selected from and by the artists of the kingdom."

An exhibition of the Chinese and Japanese engravings belonging to Dr. Anderson, formerly of the British Legation in Japan, and author of a recent well-known work on the Piscatorial Arts of Japan, will shortly be on view at the Burlington Fine Arts Club. It is intended that the collection shall be the most complete ever yet exhibited in Europe, and that through it a new chapter shall be added to the history of engraving. The collection will include dated and authentic works belonging to the early part of the 14th century (the oldest European engravings known belonging to the 15th), and one nearly 100 years older, which is authentic, but not dated. The Japanese chromoxylographs in the collection form a complete series, from about A.D. 1700 down to the present year, of remarkable beauty and colour, and some of these in black and white are almost unrivalled for force and delicacy. The earlier specimens have never been seen before in this country, or, indeed, out of Japan. There are also some examples of engraving on copper, and a recent chromolithograph production of remarkable merit. The large collection of examples of the Japanese pictorial arts, which was purchased from Dr. Anderson by the nation a few years ago, is at last being arranged in the British Museum, and will probably be opened early in January next.

In the death of Dr. Thomas U. Walter, the late President of the American Institute of Architects, at the age of 83 years, the profession in the United States has lost the last tie which connected it with the traditions of the Classical Revival, and a member who had for sixty years maintained the dignity of the calling which he practised, and influenced for good not only his professional brethren, but the sentiment of the general public towards the art. Thomas U. Walter, LL.D., was born in Philadelphia, and was placed as a pupil with William Strickland, perhaps the most distinguished American architect of his time, under whom he studied the antique with such zeal and success as to make himself probably the best Classical architect who has ever lived in America. His first important opportunity came with his appointment as architect of the Philadelphia County Prison, begun in 1831, and two years later he won the first place in the competition for the Girard College buildings, and in 1851 he was appointed architect of the Capitol Extension at Washington, and succeeded in converting an insignificant building into an imposing edifice. Finding the old Capitol constructed of decaying sandstone, with what must be regarded as questionable taste he had it painted white, but constructed the new wings of white marble, of extraordinary hardness and durability. The dome, which completed Mr. Walter's additions to the building, although of iron, is of fairly good outline and proportion. Mr. Walter, while in Washington, also designed and executed the new front of the Treasury Department, the wings of the Patent Office, and the extension of the Post Office, besides a Government Hospital for the Insane. On returning to Philadelphia, after the inauguration of the new plan of committing the architecture of public buildings to an official at a small salary, Dr. Walter was appointed Professor of Architecture at the Franklin Institute, and was soon after chosen to co-operate with Mr. McArthur in the construction of the immense Public Building of Philadelphia, the tower of which, when completed, will be the loftiest in the world. On the death of Mr. Richard Upjohn, the first President of the American Institute of Architects, he was appointed his successor, and held that office until the present autumn, when he retired.

The election of two pensioners on the funds of the Builders' Benevolent Institution took place at Willis's Rooms, St. James's, on Thursday, Nov. 24th, Mr. Herbert H. Bartlett, the president, in the chair. There were only four candidates for the two vacancies—viz., three men and one woman. The poll was open from 2 to 4 p.m., shortly after which the scrutineers, Messrs. Thomas Stirling and S. F. Rider, announced the following results:—James Pickering, 25, Shillington-street, Clapham Junction, aged 61, builder (fourth application), 1,018 votes; G. N. Cott, 12, Mordaunt-street, Brixton, aged 69, builder (third application), 1,497 votes; J. B. Axford, 2, Brosley-terrace, Stroud Green, aged 63, builder (first application), 2,306 votes, including 300 added in respect of former contributions; and Ann Winter, 47, Maygrove-road, Brondesbury, aged 62, widow of Benjamin Winter, builder (second application), 1,235 votes, including 210 added for her late husband's contributions. The successful candidates were, therefore, declared to be G. N. Cott and J. B. Axford.

The Rev. George Forrest Browne, B.D., of St. Catherine's College, was elected by the Vice Chancellor and Heads of Houses of Cambridge University (in succession to Mr. Ernest Gardner, now of the British School of Archæology at Athens), to the Disney Professorship of Archæology for a period of five years. Mr. Browne is best known as the secretary to the Cambridge local examinations, an office he has filled for many years. As an archæologist and antiquarian he has attained considerable reputation. He has been president of the Cambridge Antiquarian Society and a constant contributor to its proceedings. The value of the professorship is about £100 a year. The duties are to deliver six lectures at least during the academical year on the subject of Classical, Mediæval, or other antiquities, the fine arts, and all matters and things connected therewith.

Princess Christian will unveil on Friday, the 15th inst., the statue to the Queen which has been erected at the Royal Holloway College, Egham.

The deposit of plans for private Bills intended to be proceeded with next Session was completed on Wednesday night. The total number of plans deposited is 157, which are divided as follows:—Railways, 58; tramways, 15; provisional orders, 38; miscellaneous, 46. Last year the total was 132, consisting of 47 railways, 12 tramways, 40 provisional orders, and 33 miscellaneous.

MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Association of Public Sanitary Inspectors. "The Duties of Port Inspectors of Nuisances," by Dr. W. Collingridge. 6 p.m.

MONDAY.—Society of Engineers. "A new Formula for the Flow of Water in Pipes and Open Channels," by E. C. Thrupp. 7 30 p.m.

Royal Institute of British Architects. "The Auditorium of a Theatre," by Ralph Nevill, F.S.A. 8 p.m.

Surveyors' Institution. "Allotment Legislation," by R. Rich; "Allotments and Small Holdings," by M. Jeans. 8 p.m.

Clerk of Works' Association. "Groined Vaulting," by E. Moore, Carpenters' Hall. 8 p.m.

TUESDAY.—Institution of Civil Engineers. 8 p.m.

WEDNESDAY.—Civil and Mechanical Engineers' Society. Inaugural Address by the President, R. E. Middleton, Westminster Town Hall. 7 p.m.

Society of Arts. "Chemistry, Commerce, and Uses of Eggs," by P. L. Simmonds. 8 p.m.

THURSDAY. — Edinburgh Architectural Association. "Italian Monuments," by J. Wallace. 8 p.m.

ARCHITECTS' AND ENGINEERS' BILL.

The ARCHITECTS' and ENGINEERS' REGISTRATION ACT COMMITTEE invite all who are interested in the Passing of the above Bill to CONTRIBUTE towards the NECESSARY EXPENSES incidental thereto.

If this appeal is met with a ready response, the Bill will be presented to Parliament early next session by

COLONEL DUNCAN, R.A., C.B., M.P.,

who has kindly undertaken to pilot the Bill through the House, backed by other prominent members.

Subscriptions of all amounts, however small, will be acceptable. All subscriptions over £1 will be publicly acknowledged, and all subscribers will be supplied with a Copy of the Bill gratis.

EDGAR FARMAN, Hon. Sec.

J. WATSON MOYSES,
ROBERT WALKER, M.S.A., A.M.I.C.E.,
HUGH ROUMIEU GOUGH, M.S.A., F.R.I.B.A., } Treasurers.

39, King-street, Cheapside, London, E.C.

To Practical Masons.—The President and several members of the council of the Royal Institute of British Architects and the proprietors of the BUILDING NEWS offer prizes of Ten Guineas, Five Guineas, and Certificates for the best models of vaulting at the angle of a cloister. For lessons, inquire Class of Masonry, Guilds Institute, South Kensington, Monday evening, between 8 o'clock and 9 o'clock.

CHIPS.

For six weeks workmen have been engaged planting trees at Fintrie Bay, Cumbrae, at the expense of the Marquis of Bute, and now the town of Millport is beautified in the same way, planting operations having been begun this week in the West Bay, Millport, along the face of a hill extending nearly three-quarters of a mile in length.

The first section of the Loose Valley and Headcorn extension of the South Eastern Railway, that from Maidstone to Tovil, was formally opened last week.

St Thomas's Church, Pendleton, Manchester, a building erected 56 years since in the phase of Perpendicular then current, was opened on Friday after internal rearrangement and restoration from plans by Mr. Medland Taylor, of Manchester.

A new Wesleyan chapel at New Brompton, Kent, was opened on Wednesday week. It has been built by Mr. C. E. Skinner, of Chatham, from plans by Mr. Margetts, of the same town.

A memorial tablet has been placed in Windsor Presbyterian Church, Belfast, to commemorate Mr. Robert McQuiston, who bequeathed £6,000 for the erection of the building. The memorial takes the form of a brass of the 15th century, inclosed in a framework of black and green marbles, moulded and carved. The brass within is engraved with a Gothic border and upper panel, showing a shield with vine leaf enrichments. The design has been executed by Messrs. Purdy and Millard, Wellington-place, Belfast, from designs by Messrs. Young and Mackenzie, the architects of the church.

Out of 62 candidates, Mr. Hughes, inspector of nuisances under the Bangor Corporation, has been elected to a similar appointment under the Bridgnorth rural sanitary authority.

The town council of Glasgow unanimously adopted, on Monday, a proposition for erecting a new bridge across the Kelvin at Great Western-road, at an estimated cost of £30,000.

The Putney burial board have accepted the tender of Mr. A. Lucas, at £6,830, for the drainage, laying out, and fencing of their new cemetery about to be formed at Kingston Vale, from plans by Mr. J. C. Radford, C.E.

A mission-house has just been built in River-street, Ayr, in connection with Darlington-place United Presbyterian Church. The cost was about £1,400. The architect, Mr. Jardine, died a few weeks before its completion.

Trade News.

WAGES MOVEMENT.

EDINBURGH JOINERS.—The Committee of Joiners of Edinburgh held a meeting on Friday night, when it was reported that three out of the four employers who had notified a reduction had withdrawn their notice, and agreed to pay the standard wage—namely, 7d. per hour.

A new morning chapel, just added to St. Anne's Church, Manchester, was dedicated by the Bishop of the diocese on Friday.

At Sheffield on Tuesday the lessee of the Alexandra Theatre was granted a renewal of his license on condition that he provided a fireproof curtain, made all doors to open outwards and hang in two parts, so as to be available in case of panic, and provided two independent staircases to the galleries, both fireproof.

A new Congregational Church is about to be built at Accrington from plans by Messrs. Potts, Pickup, and Dixon, of Manchester, who are also the architects of a Swedenborgian Church to be built at Failsworth.

A greatly increased Catholic population on the north side of Preston has compelled a very considerable enlargement of the Church of the English Martyrs—a comparatively new edifice of stone. Dean Pyke placed the matter in the hands of the architects of the church, Messrs. Pugin and Pugin, of London, who have extended the body of the church about 80ft., and have added two transepts, each 28ft. by 18ft., giving a total additional accommodation of about 400 sittings. A choir-room, sacristies, strong-room, a room for heating apparatus, and two confessionals have also been built.

At Shrewsbury, J. Gethin, a builder, was summoned for having erected a number of houses at Greenfields, the drainage of which was not carried out as he had been required to do it according to the plans sanctioned by the sanitary committee. It was alleged that the original plan showed a fall of 1ft. in a hundred in the new drain, but this was not approved, 1ft. in 50 being ordered. The drain was made, however, according to the original plan. Mr. Gethin did not deny this fact, but said it was the result of a mistake, and now that the houses were built and let he did not see how he could alter it. He was fined £4, altogether, and costs, and ordered to pay 4s. per day till there was an alteration made to the satisfaction of the borough surveyor.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

Depression of Trade.—Complaints about the falling off in consumption of many articles are loud and universal, but there is one exception to the prevailing dulness, viz.: GRANT'S MORELLA CHERRY BRANDY, for this popular liqueur not only maintains its position, but continues to increase in favour notwithstanding the efforts to supplant it by rubbishy imitations. Observe our branded corks and capsules. Sold by Wine Merchants, and by THOMAS GRANT and SONS, Maidstone, and 46, Gresham-street, E.C. Makers of the delicious Morella Marmalade. Sold by Grocers.

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BELLAGIO.—For the erection of a bungalow at Furzefield Chase, Bellagio, for Mrs. Martinucci. Mr. W. J. Ebbetts, F.R.I.B.A., Savoy House, 115, Strand, W.C., architect:—

Baylis, H.	£365 0 0

BELLAGIO.—For the erection of a bungalow according to design No. 7, at Bellagio. Mr. W. J. Ebbets, F.R.I.B.A., Savoy House, 115, Strand, W.C., architect:—

Baylis, H. (accepted)	£310 0 5

BLENDON, NEAR BENLEY.—For alterations, &c., to the Three Blackbirds, Blendon, for Messrs. H. and V. Nicholl, Ltd. Mr. A. L. Grey, A.R.I.B.A., 78, High-street, Lewisham, architect:—

Jerrard, S. J.	£270 0 0
Hoare, J.	265 0 0
Knight, J. (accepted)	252 0 0

BOURN, LINCOLNSHIRE.—For works of water-supply, for the local authority:—

Isler and Co., London (accepted).

COLCHESTER.—For the alterations and additions to a Granary at the Hythe, Colchester, for Mr. S. L. Browne. Mr. J. W. Start, Cups Chambers, Colchester, architect:—

Day, Clacton	£348 0 0
Orfeur, Colchester	323 0 0
Chambers	300 0 0
Sluad	297 0 0
Dupont	273 0 0
Oldridge	260 0 0
Diss (accepted)	260 0 0

CORK.—For rebuilding St. Luke's Church, Cork. Mr. W. H. Hill, B.E., architect. Messrs. Gribbon and Butler, surveyors:—

Collen Bros., Portadown	£11,000 0 0
James, H., Belfast	10,900 0 0
Pemberton, J., and Son, Dublin	10,858 0 0
Hill, H., Cork	9,936 0 0
Fitzgerald, E., Cork	7,990 0 0
Lisk, J., Cork (accepted)	7,800 0 0

EALING.—For building two shops and entrance to Shaftesbury Hall, Uxbridge-road, for Mr. Sortwell. Mr. G. A. Lean, architect:—

Myring, B., Ealing (accepted)	£700 0 0

EALING.—For alterations and additions to Leslie Lodge, Harrow Green, and stable buildings, for Dr. Hogg. Mr. G. A. Lean, architect. Quantities by the architect:—

Shepherd, W.	£1,740 0 0
Nye, T.	1,649 0 0
Waters, W. H.	1,595 0 0
Jones, H. and A. J.	1,484 5 0
Penny and Co.	1,375 0 0

HUDDERSFIELD.—For dwelling house at Taylor Hill, for Mr. W. Beaumont. Mr. J. Berry, 9, Queen-street Huddersfield, architect:—

Accepted tenders:—
Excavators and masons:—
Dawson, J., and Sons, Newsome.
Carpenters and joiners:—
Atha and Lodge, Lockwood.
Plumbers and glaziers:—
Taylor, J. H., and Co., Huddersfield.
Plasterers:—
Jessop, W., and Son, Berry Brow.
Painter:—
Hodgson H., Lockwood.
Slater:—
Pickles Bros., Hudderfield.

KENDAL.—For the erection of a shop and dwelling, for Mr. G. E. Moser. Mr. J. Stalker, architect. Quantities by the architect:—

(Accepted tenders)
Excavator, walling, masonry, and seating:—
Hutton, E., Kendal.
Carpenter and joiner:—Benogles, T., Kendal.
Plumber:—Jackson, W., Kendal.
Painting and glazing:—Lyon, G., Kendal.
Plasterer:—Davis, B., Kendal.

KENDAL.—For new iron staircase for new exit from gallery of St. George's Hall, for Mr. G. E. Moser:—
Rishton, H., Stricklandgate Foundry Kendal (accepted).

KENDAL.—For alterations to Serpentine Cottage, Kendal, for Mr. J. Turner:—
Walling, masonry, and plastering:—
Hutton, E., Kendal (accepted).
Carpenter and joiner-work, glazing, and painting:—
Hutchinson, W., Kendal (accepted).

KILBURN.—For alterations to No. 8, Greville-road Kilburn, N.W. Mr. R. Willey, F.R.I.B.A., 66, Ludgate-hill, E.C., architect:—

Isaacs, E. J., Hampstead	£130 0 0
Myring, J., Kilburn	120 0 0
Jones Bros., Ealing (accepted) ...	99 10 0

LONDON, E.C.—For erection of warehouse, Phipps-street, Curtain-road, E.C. Mr. J. Groom, architect:—

	A.	B.	C.
Simpson and Son—	£4,994 0 0	£4,684 0 0	£595 0 0
Boyce, T.—	4,949 0 0	4,654 0 0	630 0 0
Harris and Wardrop—	4,888 0 0	4,628 0 0	593 0 0
Jackson and Todd—	4,700 0 0	4,390 0 0	590 0 0
Holloway—	4,562 0 0	4,300 0 0	590 0 0
Kilby and Gayford—	4,470 0 0	4,286 0 0	559 0 0
Grover, J., and Son—	4,450 0 0	4,264 0 0	600 0 0
Allen and Son—	4,498 0 0	4,240 0 0	576 0 0
Shurmur, W.—	4,545 0 0	4,186 0 0	594 0 0
Mattock Bros.—	4,371 0 0	4,177 0 0	577 0 0

A.—Building. B.—Amount if glazed bricks and iron sashes are omitted. C.—Fittings.

LONDON, W.—For the erection of a block of stables and residential flats, John's-place, West Kensington. Messrs. Lewen-Sharp and Arpin, 3, Duke-street, Adelphi, W.C., architects. Quantities by Messrs. M. Evans and Son, 7, John-street, Adelphi, W.C.:—

Belham and Co.	£7,135 9 4
Patrick and Son	6,925 0 0
Scrivener and Co.	6,838 0 0
Grover and Son	6,742 0 0
Peto Bros.	6,597 0 0
Leslie and Knight	6,570 0 0
Colls and Sons	6,320 0 0
Boyce, T.	6,250 0 0
Patman and Fotheringham, Theobalds-road, W.C. (accepted) ...	6,100 0 0

LONDON.—For alterations to No. 26, Chapel-street, Edgware-road, W. Mr. R. Willey, F.R.I.B.A., 66, Ludgate-hill, E.C., architect:—

Ashby Bros., City	£490 0 0
Rhodes, Hyde Park	373 0 0
Jones Bros., Ealing (accepted) ...	360 0 0

LONDON.—For alterations, additions, &c., to the Lord Belgrave p.h., Leicester-square, for Mr. W. Booker. Messrs. J. and A. E. Bull, architects and surveyors:—

Bywaters	£2,250 0 0
Patman and Fotheringham ...	2,120 0 0
Stevens...	2,055 0 0
Oldrey and Co.	1,994 0 5
Williams	1,957 0 0
Gould and Brand	1,797 0 0

NEW BARNET.—For erecting a bridge over Pymmes Brook, for the East Barnet Valley Local Board. Mr. F. J. Rumble, C.E., engineer:—

Brown and Sweetland	£522 0 0
Bell, G.	459 0 0
Pavey, W.	415 0 0
Dearle, W. H.	395 0 0
Lissamon	387 0 0
Jarvis, E., Banbury (accepted) ...	339 0 0

(Surveyor's estimate £420.)

OXFORD.—For the erection of a covered swimming bath at St. Edward's School, Oxford. Mr. W. Hanson, Oxford, architect. Quantities supplied:—

Symm and Co.	£1,497 0 0
Wilkins and Sons	1,332 0 0
Honour, J.	1,315 0 4
Wyatt and Son	1,268 5 10
Kingerlee, T. H. (accepted) ...	1,174 0 8

(Architect's estimate £1,250.) All of Oxford.

PAIGNTON.—For the erection of a confectioner's shop and dwelling-house on the Gerston Estate, Paignton, for Mr. H. Ching. Mr. S. Woodbridge, jun., 210, High-street, Brentford, architect:—

Bridgman, M., Paignton	£610 0 0
Rabbich, H. (accepted)	593 10 0

PIMLICO.—For alterations and additions to Nos. 77, 79, and 81, Cadogan-place, for Major-General Keith Fraser. Messrs. Godwin and Basley, architects. Quantities by Mr. I. Mason:—

	No. 77.	No. 79.	No. 81.	Total.
Lott and Co.—	£1,653	£1,710	£1,705	£5,068
Taylor and Co.—	1,270	1,256	1,253	3,778
Holliday and Greenwood—	1,159	1,227	1,222	3,608
Oldrey and Co.—	1,150	1,215	1,215	3,580
Stimpson and Co.—	1,080	1,240	1,240	3,560
Holloway—	1,120	1,112	1,108	3,340
Garlick—	1,050	1,085	1,085	3,220

RHYL, N. WALES.—For alterations and additions to Old Town Hall premises, for Mr. T. Smith. Mr. J. Adams, Warrington, architect:—

Foulkes, T., and Son, Colwyn Bay...	£525 0 0
Miller, L., Mostyn	464 18 0
Jones, A., Rhyl...	450 12 0
Forkington, A. W., Rhyl	399 12 0

(Architect's estimate £437.)

SANDIACRE.—For making, metalling, curbing, sewering, and paving new streets, on the Springfield Estate, Sandiacre, Derbyshire, for Mr. T. Hooley, J.P. Mr. J. Sheldon, Long Eaton, Derbyshire, surveyor. Quantities by the surveyor:—

Malabar, Exminster...	£4,680 14 2
Turner and Son, Bilston	4,575 0 0
Cordon, Burton Joyce	4,373 12 0
Green, Rotherham	4,323 0 0
Cordon, Newark	4,197 10 0
Holmes, Alfreton	4,150 0 0
Smith and Lunn, Newark	3,700 0 0
Todd, Derby	3,528 12 4
Bradley, Lincoln	3,390 10 0
Raynor, Nottingham	3,311 4 9
Hawley, Ilkeston	3,240 0 0
Beardsley and Pounder, Ilkeston...	3,000 0 0
Exclusive of boating filling up stuff:—	
Wheatley and Maule, Nottingham*	3,082 0 0

(Surveyors' estimate £3,744.)
* Accepted.

SHADWELL.—For sundry alterations and additions to the Kent and Essex Wharf, Lower Shadwell. Mr. C. Dunch, architect:—

Curtis and Son	£722 0 0
Hunt, J. R.	652 0 0
Morter, J.	620 0 0
Harris and Wardrop	600 0 0
Greenwood, J. and J.	598 0 0
Shurmur, W.	594 0 0

SOUTHEND.—For the works required in erection and completion of barracks buildings, Clarence-street, Southend, for the Salvation Army. Mr. E. J. Sherwood, 101, Queen Victoria-street, E.C., architect. Quantities by the architect:—

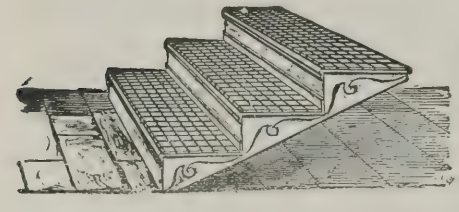
Scharien and Co., Chelsea	£1,538 0 0
Watson, W., Ilford	1,515 0 0
Baker and Wiseman, Southend ...	1,429 0 0
Munday, J., Wimbledon	1,420 0 0
Darke, S., and Son, Southend ...	1,380 0 0
Woodhams, F. E., Southend ...	1,360 0 0
Newton and Idle, Clapham Common	1,349 0 0
Steward, J. W., Southend	1,330 0 0
Stephenson, G., Bishopgate-street	1,324 0 0
Tout, W., Hendon	1,310 0 0
Multon and Wallis, Gravesend ...	1,248 0 0
Jarvis, E., Banbury...	1,185 0 0
Coxhead, F. J., Leytonstone ...	1,040 0 0

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Blackfriars
Blackfriars Bridge
BlakeStreet, Sutton Coldfield
Blaydon-on-Tyne
Bletchley
Bolton
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Bristol
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Burscough Junction
Burton
Bury
Borough Road, Merseytunnel
Canonbury
Camden Road
Chalk Farm
Charing Cross
Cheddington
Cheetham Hill Junction
Chequerbent
Clayton
Clifton
Clitheroe
Crewe
Crooked Billet Level Crossing
Cross Lane
Crumpsall
Cullercoates
Cannon Street
Dalston
Daubhill
Daybrook
Denholme
Derby
Droylesden
Drighington
Dudley
Dudley Port
Dundee
Ealing Common
Ealing Terminus
Earl's Court
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Failsworth
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Fenchurch Street
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Firsby
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Forest Road Level Crossing
Fulham
Geedley
Gloucester Road
Gower Street
Grantham
Greenwich
Hackney
Haggerston
Hammersmith
Heaton Park
Hereford, Barr's Court
Highbury
Highdraa Road, Wallsend
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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1718.
FRIDAY, DECEMBER 9, 1887.

UNPRACTICAL ARCHITECTS.

HOW many times in the course of the erection of a building the architect's notion of what something ought to be clashes with that of the builder! The finishings of a room or the details of a window or some other feature fall very short of the expectations of the designer, though from a purely practical point of view they are satisfactory, and fairly carry out the specification. The same thing has been looked at differently. The architect has imagined a certain result, or has drawn largely on his fancy; but the builder has gone steadily to work, looking at the possible means of economising material or labour, and with only a very bare or mechanical idea of the work. The result is disappointing, though there is not sufficient ground to require the work to be improved or amended. And this want of a proper interpretation of the architect's design is often owing to several causes. The drawings or details may not be explicit enough, or clear in their intention; the specification is ambiguous or not properly descriptive; the right thing has not been specified, or the technical knowledge or artistic sense of the workman is at fault. Now, it is very certain that the only way to eliminate all these factors of error, is to not only design, but execute with one's own hands. Of course this is impossible, and the nearest course to adopt is to try and educate the workman up to the ideas of the architect, to get him to understand why this or that is done—why this moulding or curve is preferred to another; and, in short, to make him a proficient in the interpretation of drawings. Nothing of the sort is ever attempted. We have heard builders tell their workmen, when they have questioned and proposed an improvement, not to trouble themselves about it; and one eminent architect used to say to his workmen, and even his own assistants, "You are not to think, but only to work." If the thinking is to be only done by the architect, the workman at once becomes a mere tool, a machinist, and the gulf between the thought and the work is widened. But a proficient in the interpretation of the architect's design the workman can never be, unless he is taught something more than to handle his tools, and sees a chance of being promoted for skill. In France the working mechanic is brought more into contact with the architect; the same hands are employed to carry out the architect's designs, the consequence of which is in course of time the workmen understand the architect's style, and begin to take a personal interest in their work, knowing that attention and skill will bring their reward. All this is knocked on the head by contract work. There is no association of handicrafts and artists; but each is striving in his own way to underbid the other. Under the contract rule, it is not politic to understand too well or to examine too closely the architect's design: men who can execute quickly rather than those who can suggest and improve, are they who get on and commend themselves to the contractor. Is it strange, therefore, that the work turned out is below the standard of the architect?

The absence of agreement between the architect's and the builder's notions is not altogether traceable to the want of not being able to interpret the ideas and methods of the architect: in part it proceeds from the failure of the latter to descend to the practical. The architect is unable to look at things in the same light, to understand the working conditions, or the methods adopted by the trades in converting materials or in execution. A drawing is given, we will say, for a roof or some piece of construction, in which the dimensions or the scantlings are not dictated by a practical knowledge of the market thicknesses of timber in use, and strict compliance with the architect's details would entail an addition to the cost of material and labour. In his priced tenders the builder has assumed that he can use any convenient scantlings, but the architect requires that his dimensions are worked to without abatement. Here is a hypothetical case. A builder takes a contract to build a church in which there are tie-beams across the nave. As he chances to have some baulks of timber of about the right length and depth, which cut into two lengthwise would be within a couple of inches of the required size, he puts a reduced price down, and obtains the contract. The architect's drawing of roof to a large scale with the dimensions figured thereon is sent in due course to the builder; but the builder proceeds to frame his own timbers together for the trusses, and the principals are made so much narrower to agree with the tie-beams. The trusses look thin and flimsy to the architect, who measures and finds they are narrower than specified. Explanation is of no avail. The architect is firm in his demands, and the timber trusses made are thrown upon the contractor's hands, of no use to anyone. It is needless to say the loss to him is serious. For all purposes of strength the scantlings are probably ample; but they do not suit the architect's ideas. Many church architects affect scantlings like those found in old churches, square in section: it is wasteful of timber; but then it looks better, and that is sufficient. The short of the matter is, economical conversion of materials does not enter into the architect's creed. Even in such matters as thickness of doors, the rule is to describe them of a certain thickness, which the contractor naturally thinks to mean "less sawing." Architects who understand this practical detail describe the work to be of such dimensions, "finished sizes." Mistakes are constantly being made about mouldings to framed work. The builder, of course, naturally thinks machine-made mouldings are good enough; but the architect all the time expects them to be according to detail, and "on solid." In stonework the same disagreement as to details and finish is common, if the architect is particular: many of course are not—any finishings will do for them. It is immaterial, argues the contractor, how a stone cornice is built up of small blocks if it economises stone, and in every kind of architectural masonry the architect's method of working and the builder's may be vastly different. In solidity and substantiality the architect's mode of working may be better than the builder's; but, as economy is the chief consideration with the latter, the point is to convert the materials to the greatest advantage, and with this object the architect ought to be prepared, by a practical acquaintance with the trades, to make the best compromise. Very much turns on the specification. The builder's interpretation of it is very unlike that of the architect. The quantities, taken from the latter document and by a surveyor who is practical first, suffer by the translation, and are considerably at variance with the spirit of the design—no doubt, a strong reason why architects should know something about quantity-taking and billing, and exercise some discretion in amending and correcting items which are often diametrically opposed to their ideas.

To write a good specification has not been one of the things which the modern architect has troubled himself about. The trades have been left to experts. Take plumbing, smith's work, hot-water supply, the decorator. Because these trades are sublet, the architect thinks it superfluous to describe the works in detail—the tradesmen themselves prefer it. All the greater reason, we should say, why the architect should be able to discriminate between good and bad work, and be able to select fittings and details that shall be in accord with the design and intention of the work. The profession have a better chance now than ever they had in becoming acquainted with new materials and manufactured articles for building. Trade advertisements and circulars draw attention to hundreds of improvements in construction, sanitation, and decoration. What is wanted now is for the architect, the artificer, and manufacturer to exchange their views by some kind of recognition of the merits of materials and goods on one hand, and of art principles on the other. An art-architect may say he has no time to study details; but it seems to be the only way in which his ideas can be diffused amongst workmen and manufacturers, and the greatest of modern architects have been men who have entered intently into the various trades and details of buildings. Did not the fine Gothic taste of the elder Pugin enter into every variety of fabric and manufactured article—woodwork, brasswork, glass, textiles, and paperhangings, for all of which he prepared designs? Awkward differences and conflicts between architects and the working artist can only be overcome when the details are more mastered, when the practical conversion of materials is understood, and an attempt is made to bridge over the gulf which now separates the two.

A RECENT DECISION AS TO RIGHT OF LIGHT.

A PRINCIPLE laid down by the late Sir G. Jessell in "Allen v. Taylor," to the effect "that where a man grants a house in which there are windows neither he nor anybody claiming under him can stop up the windows or destroy the lights," was sought to be applied the other day by a Banking Company at Birmingham against the erection of buildings demised by the Corporation of Birmingham to the defendant (Ross). From the report of the case in the Chancery Division, it appears that some years ago the Corporation demised to the predecessors in title of the plaintiffs a house overlooking Warwick-passage, 20ft. in width, on to land occupied by low buildings since pulled down. Later, the Corporation let to the defendant this land for the purpose of erecting buildings considerably higher. The light to the plaintiffs' premises was materially affected by the defendant's new lofty building, which reached 80ft. in height. Thereupon the plaintiffs claimed a mandatory injunction or damages against the defendant on the rule of law we have cited above.

In giving judgment, Mr. Justice Kekewich alluded to the decision of Sir G. Jessel. It was not competent to the Corporation to erect these new buildings which obstructed the plaintiffs' light; nor could it be asserted that the defendant had any better title than the corporation, his grantor, to do so. From this point of view, his Lordship said that the defendant is liable to pull down his new buildings to such an extent as to avoid obstruction, or to make compensation in damages. Before enforcing this liability, the Judge said it was necessary to investigate the circumstances under which it arises, and be careful that the rule of law is not stretched beyond its just limits. The facts of this case constituted, he thought, an exception to the rule. The learned Judge referred to several cases. The counsel for defendant, Mr. Barber, Q.C., said that the rule had never been applied, and could not be to any case in which the obstructing building stand

on land severed from the site of that containing the windows which are obstructed; but this argument was overruled, and several cases were quoted bearing on the subject.

Referring to the limitations and exceptions of Sir G. Jessel's rule, his Lordship took another view, which ought to have some weight. The case of "Rigby v. Bennett" offers such a limit as that which the merits of the case required. His Lordship said in connection with that case there was one point which was reserved, and he quoted Lord Justice Cotton's remarks as follows:—"It is not necessary, in my opinion, to consider what would be the consequence if the grantee knew that the grantor intended to use the adjoining land for a particular purpose, and the right claimed by the grantee is consistent with that purpose. That question may hereafter arise, and I give no opinion upon it." This question, Mr. Justice Kekewich said, had arisen here. Mr. Daniell, under whom the plaintiffs claim, must have known that the Corporation had acquired land for the purpose of constructing a new thoroughfare, and that this could only be done by selling or letting the land for building purposes; he must have known, his Lordship continued, what class of buildings were likely to be erected in a broad street, and that they would be lofty. With such ground rents as were demanded by the Corporation, the building must necessarily be high in order to be profitable, and, although Mr. Daniell did not apprehend this at the date of his lease or agreement for a lease, he might reasonably have done so. His Lordship said the difference between 48ft. and 80ft., the heights of the respective buildings, though large when considered with reference to the actual obstruction of light, was not large in comparison with neighbouring houses in such a locality. In conclusion, he said: "Compelled, as I think I am, to decide, not by laying down any general rule, but only with reference to the particular case, the question left open by 'Rigby v. Bennett,' I hold that the grantee of the plaintiffs' house knew that the grantor intended to use the land on the other side of Warwick-passage for the particular purpose of building houses of business, and that what has been in fact erected thereon is not in excess of what he must be taken to have expected and assented to be erected. I therefore give judgment for the defendant, and he is entitled to his costs of action."

The decision is of sufficient importance to justify calling attention to it. That there is no rule without its exception has been very forcibly made clear in this action. Few were ready to dispute the dictum laid down by Sir George Jessel under any circumstances, and the rule itself is a sound one; but there was a reservation hinted at in Lord Justice Cotton's judgment which Mr. Justice Kekewich has practically enforced. There is an apparent hardship, too, inflicted on the owners of a building which had been erected several years ago, when the light which they had enjoyed for a long time has been materially reduced by a later building at the opposite corner, and allowed to be erected by the Corporation, who had demised the premises. They had, in fact, set aside the rule in granting to their lessee, Mr. Ross, powers which interfered with the rights of light of an earlier lessee. On the other hand, the original grantee was supposed to have estimated probabilities. There was, as the Judge said, a strong probability that larger premises would one day be built on the other side, and this assumed knowledge the successor in the title is supposed to have known. A lessee, under such circumstances, cannot complain if what he might have foreseen and calculated upon has actually taken place. The principle of this argument is quite sound and reasonable; but we cannot avoid thinking that in this instance the new building is somewhat in excess of what the original lessee could have anticipated. A building 80ft. in height would materially obstruct the light of a building only 48ft. high, and divided by a narrow passage; it, therefore, would appear to be reasonable that some limitation in height should have been imposed by the Corporation in respect of the more recent building. The law cannot take cognisance of these limits, it can only apply a general principle; it follows that it is the duty of local authorities to prevent, as far as possible, these admitted grievances and invasions of the rights of old lessees.

ROYAL SOCIETY OF PAINTERS IN WATER COLOURS.

THE reputation of this old society is maintained by the present Winter Exhibition at the Gallery, 5A, Pall Mall East. The gallery opens with contributions by well-known hands. Sir Oswald W. Brierly, marine painter to the Queen, sends three or four pictures of marine subjects, which for drawing, pure colour, and breadth of effect are not surpassed. We are charmed with the simplicity and conscientious work in "Study of an Old Boat," stranded on a beach (2); the freshness and atmosphere and breadth of "Sky Study at Gorleston"; the colour and aërial effect in "A Grey Morning at Venice" (178). William Collingwood's "Chillon's Snow-White Battlement" (1), and his "Rest" (165), an old ivy-covered church with low tower, surrounded by tombs, are pleasing reminiscences enshrined in Classic verse; but there are other contributions which show this master has not lost his masterly touch and power of fascinating colour. Edward F. Brewtnall also sends a number of studies of more or less interest. "The Uttermost Parts of the Sea" (5) describe the inspiration of the artist in this sketch of a deserted coast with its crippled tree, weird in its solitariness. Mr. Brewtnall is a dexterous manipulator of the brush, as we see in this and his study of head (262). Passing a "Bowl of Roses," by Miss Maud Naftel, and S. P. Jackson's "St. Agnes, Cornwall" (7), but not without perception of their merits, we come to Norman Tayler's "A Windy Day," a sketch of a shepherd and flock crossing a common, admirable in its pure colour and freshness. Two other pastoral subjects (26 and 95) are hung. E. A. Waterlow, in his "Cottage Home" (17), has done one of the best things on this wall. There is delightful simplicity of subject and pathetic power in this little rural sketch of a cottage with an old woman driving her geese home, the sunset peeping through the trees. The colour, as usual, is blotted in with broad effect. "Summer Weeds" (57), and a small study on a screen (348), "A Connemara Wood Nymph," are also full of true feeling. Birket Foster, so well known to all lovers of water-colours, is less strong this time, though his "Autumn Leaves" (18), and his other rural studies on walls and screens, such as a charming little piece, "A Farm" (344), and "Cottage at Sidmouth" (159), exhibit the same loyalty to the old school of finished water colour, of which Mr. Foster is a distinguished member. Widely different schools of manipulators have since appeared, making the minute rendering and leafiness, and if we may term "dottiness" of this master's style somewhat monotonous. Quite Turneresque are H. Clarence Whaite's "Loch Ranza, Arran" (24), "View of Snowdon" (98), and "Mountain Gorge" (25). The "scumbled" and "sponge" effects of sky and mist are skilfully managed, and the effect of light and colour thereby obtained. Similar "sponged" or granulated effects are seen in Colin Bent Phillips's fine picture of "A Summer Day in Skye." The sweep of mountain hollow and the distant hills are well blended in hazy light. A study of sunlight (4) and other views from the Isle of Syke, by the same hand (138, 263), exhibit this technical method. A. W. Hunt is an artist of luminous colour. His "Robin Hood's Bay" (35), seen through the mist of a showery evening, and in the afternoon (163), are delightful examples of delicate colour and mist. Truly poetic are Mr. Hunt's studies of "Whitby Harbour" (85, 127), noonday and evening effects, and his small sketch on screen, "Whitby—Moonlight." The mist is wonderfully manipulated. Cuthbert Rigby's views in Derbyshire (34) and his "Calder Abbey," with its glow of reddish light (289), to say nothing of other works, are not wanting in those graces of drawing and colour which have won this painter a reputation. So we must praise R. Thorne Waite's work; his fresh meadows at "Arundel" (38), his "Kingsley Vale in Sussex" (28), his broad, sunlit landscape, "Chichester Harbour, from the Downs" (91), and his haymaking studies (311), all of which exhibit true qualities of painting, and conscientious regard to nature. Albert Goodwin this year is almost impressionist in colour in his "Pass of the Brünig" (40), his "Lucerne, Evening," "The Gate of Zoar" (198), and his very pleasing studies of Bath, Worcester, Wells, and Bristol (330, 335, 340, 347) on the screens. The sunlight effect and delicate handling are remarkable, and the sketches of the cities we have named are charmingly decisive and sharp in drawing, and luminous in tone. Henry Moore, A.R.A., sends a few sketches from the Isle of Wight. "A Sunny Afternoon" and "Freshwater Bay" (307) are vividly drawn in strong colours. A very clever study is Thos. J. Watson's "Mangolds" (46). His "Sandbank, Surrey" (90), in a prominent part of gallery, is faithfully rendered, with admirable colour. A "Wheatfield" (206), "Abode of the White Owl" (207), are both drawings exhibiting fertility of resource and technical power. H. Stacy Marks, R.A., is a skilled delineator of character. "A French Novel" (47), an elderly priest, with cigar in his hand, reading, and "Mind and Muscle," a village smith and cleric talking at a workshop door, are inimitable studies of expression. The character expressed in the features of the brawny and sinewy smith, and the intellectual cast of countenance of the old man, with large book under his arm, are unmistakable. The "Secretary" (183), and the clever studies of physiognomy, "Tasting" (190) and "Seeing" (199), are as true in the delineation of character as they are technically good. Mr. William Callow still sketches the streets of foreign cities with marvellous freedom and poetic grace of colour. His "Street in Bologna" (48), "Market Place, Ratisbon" (92), "Stonegate, York" (156), "Venice" (236), and the fine view of the apse and chapels of St. Pierre, Caen, Normandy (240), are something a great deal more than mere drawings; the light and shadow and grouping are perfect. George Fripp sends several studies of interest, and Alfred D. Fripp two delicately-handled subjects full of sunlight (105) and soft colour (170). No less than eight works are sent by Miss Clara Montalba, whose pencil is still as subtle and fascinating as ever. "On the Amstel, Amsterdam" (52), a row of brick houses beside the river, has depth and tone; "Towed Out of Ramsgate Harbour" (134) is full of sweet harmony; delightful in their mellow pearly tints are another sketch from Amsterdam (237), and some other Dutch and Venetian studies. "Fowey" (531) and "Entrance to Harbour," by Herbert Marshall, are equally good. Wilmot Pilsbury has a dozen studies of more or less merit. The "Margin of the Stream" (17), delicate in handling and colour, is one of the best examples. A sunny coast scene by Francis Powell may be mentioned; and Edward Radford, in "Two Flats" (63), has a clever

study of figures and costume of the period of the "Directoire," in which two high-waisted young ladies are listening in a listless mood to a professor at the pianoforte. At the corner of gallery Robert M. Allan has a forcibly-painted picture of "The Queen's Jubilee"—the procession passing Whitehall. Works by Matthew Hale (81) display the technical merits of the artist. We may also notice the series of Scenes from the Highlands (82) by T. M. Richardson, and another from Switzerland (103), all of interest; the sea expanse and soft light in S. P. Jackson's study (89) of Tennysonian verse. Other of his sketches on the Cornish Coast (189) and the Thames (200) show a diligent student of the sea and river. What appears to be an allegory or symbolical study of colour is Henry Wallis's "Flute Player" (94), whose other picture, "Herodotus at the Scribes'" (13), is a street scene in some Eastern city with the old historian engaged in looking at a manuscript, in both of which the colouring is strong. But figure-subjects are few. Arthur H. Marsh has a clever study of a group of fisher-people on a beach, in which there is freshness and colour; not very strong in motive is C. Robertson's "Lawn Tennis," the chief merit of which is the flower border and the execution. Several other studies by this artist are sent. Studies by H. Gillard Glindoni (16); a frame of six small sketches by G. Walter Field (121), Samuel J. Hodson's view in Verona (137), E. B. Johnson's "Pensez-a-Moi," Charles Davidson's "Derwentwater" (153), are other works. Sir John Gilbert, R.A., contributes two works, "Rocks at Tunbridge Wells" (162), and a "Back Lane," equally bold and freely-handled woodland subjects, displaying all Sir John's wonted vigour and depth of colour. H. P. Riviere, Paul Naftel, Carl Haag, Jessop Hardwick, George Fripp, Edward J. Poynter, R.A., send sketches. Our notice would be hardly perfect without reference to the fine series of drawings and sketches by the late Collingwood Smith, which occupy a large space on the walls. Some of these are remarkable for clearness and depth of tone, and represent Italian scenery and other Continental and English landscape subjects.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third ordinary meeting for the present session was held on Monday evening, the president, Mr. Edward I'Anson, in the chair. In referring to the death of Mr. Edmund Woodthorpe, the PRESIDENT remarked that a more cheery, true, and honourable man never existed in the profession than their late friend. Professor Kerr, in endorsing this tribute of respect to Mr. Woodthorpe's memory, suggested that the Institute might perhaps send a memorial to the Metropolitan Board of Works supporting the claims of his son to the favourable consideration of the Board in disposing of the appropriations held by their late colleague, a large portion of whose income probably depended on this source.

It was announced that at the recent examination in architecture 25 candidates presented themselves, of whom 19 passed; 25 candidates also satisfied the examiners in March last, making a total of 44 who had passed during the year. From among these 44 gentlemen the Ashpitel prize had been awarded to Mr. Thomas Dawson, aged 23, late of Scarborough, and now of Kennington, S.E., he being the candidate who had in the opinion of the examiners most highly distinguished himself in the examination of the current year.

Mr. RALPH NEVILL, F.S.A., read a paper on

THE AUDITORIUM OF A THEATRE.

The author, having dealt with the typical plan of a theatre and the arrangement of seats, remarked that in England, within the last few years, various efforts had been made to meet modern requirements. The drawings which he was able to exhibit by the kindness of Mr. Phipps, Mr. Verity, and Mr. Darbishire, would confirm that statement. Mr. Irving's suggested plan was bad, for the people at the back could only see the lower half of the stage; but it was the only alternative to the usual gallery arrangement. The system of seating recently adopted, by which the dress circle and stalls have been brought in close proximity, at the Haymarket was the best artistically, and the proportions allotted to the various parts of the audience were commercially most satisfactory; the system was also economical in first cost, and in proportion of cubical space to accommodation. The pit, which should be as large as possible, would, with good accommodation, always prove a financial success. The stalls should be only slightly curved, having no central passage, and the seats should be regularly alternated, so as to afford a clear view between the heads of those in front. The visible openings of boxes should not be more than 5ft. or 6ft. high. The gallery should be at the back, and not in the circle. It was important, artistically, as well as for acoustic reasons, that the ceiling of the auditorium should be as low as possible. Referring next to the question of acoustics, Mr. Nevill argued that the circular form of building afforded no advantage, the best being a triangle with the stage at the apex, as in the theatre at Baireuth, although seats arranged on a curved plan allowed a greater number to receive unimpeded waves of sound. In a plan by the author, three-quarters of the diameter was taken for the height from the stage level to the springing of the ceiling; this was lower than most modern theatres, the height of which, apparently, measured as much as the diameter. The lesser height was, however, an artistic and economical, as well as acoustic, gain. Flat ceilings rendered the hearing in the upper part defective; if curved, the sound was collected and delivered in a body on to the upper circle. Ventilation and fire risk were also connected with the ceiling: the introduction of the sun-light rendered it more easy to ventilate through the centre of the roof, and some suggested a cupola, as in Terry's Theatre, and Mr. Irving's proposal; but this he considered impracticable and undesirable. The more still the atmosphere the better for sound, and hence the advantage of the electric light, particularly for foot-lights, was enormous. Proposals had been made for reversing the draught by ventilating through the stage, but most architects would agree with Prof. Roger Smith that all draught should be from the actor to the audience. Prof. Smith quoted, in his treatise on acoustics, some experiments to the effect that though sound travelled better with the wind than against, yet it travelled better still across the wind. If this were true, and the author believed it was, one great objection to the central ventilating flue disappeared. Saunders, Prof. Smith, Mr. Salomons, and nearly all English theatrical architects upheld wood, while Lachez, followed by some of the French architects, demanded solid construction. A house for music required an amount of resonance, while in one for acting sound should be delivered pure and distinct. Wood was, therefore, as bad for the latter as stone or hard walls for other reasons. Plaster was a very suitable substance, supplemented by drapery where necessary. Wood might be a suitable lining to solid walls if carefully selected, put together like cabinet work, in short lengths, and well oiled and varnished; but floor boards nailed to wooden joists, or match boards papered or painted, had no beauty of tone, and the consequent vibration interfered with the purity of the sound. In Terry's Theatre no wood was used in this way, but, instead, concrete floors and partitions of plaster on wire netting and iron uprights. The ceiling should be treated as a resonant surface, constructed of iron and plaster, with a second roof over inclosing a sufficient hollow. The spaces under the floor and orchestra should also be hollow. Any resonant substance used should be of homogeneous character. Lighting ought to be regarded by the manager as a potent means of inspiriting an audience. It might be accepted that the electric light would be used, but nevertheless provision must be made for gas. To be successful artistically the lights must be various, both of kind and colour. In the event of fire the electric light would be extinguished by the breaking of the glasses; the gas sun-light ought, therefore, never to be put out, but turned low during the performance, and turned up full between the acts; the electric light being turned quite out in the first case, so that the eye was entirely drawn to the stage. The front of the circles was the natural place for electric lights. Putting them high up in the cupola and using ground-glass globes for electric light was to be strongly condemned; the latter, though much used, destroyed the brilliancy of the light. The lights to the passage and on the stairs should be on a separate system altogether from that of the auditorium or the stage; and should be controlled from the front of the house. To protect against rushes of carbonic gas extinguishing the light, at certain points, such as the entrance to stairs and opposite doors, small flues and openings with thick glass fronts should be provided in the walls for lamps or gas-lights. As to ventilation, the electric light rendered no great provision of fresh air necessary during a performance. It would, however, be always requisite to provide an exit for impure air; and as long as gas was used behind the scenes, there must be sufficient ventilation to take away the enormous and dangerous heat at the top, without creating a draught to the stage. The sun-burner ought to be in a little cone or drum of its own, and have an outer ring to the shaft, which should be opened by the same action that turned up the light, in order that ventilation might be accelerated between the acts. Necessarily the site largely governed both exits and entrances, and the important point was to get plenty of doors leading out of the auditorium. Any part accommodating more than 200 persons should have more than the usual two doors. The pit, holding 350, in a plan of his own, possessed four doors and an extra one in the middle. All doors should have the upper panels glazed, should open outwards, and be self-closing, so that when the audience were out the doors would be closed to fire. No better mode for puzzling an audience could be suggested than the one recently advocated of furnishing everyone present with a plan of the exits. No more dangerous arrangement could be concocted than a long straight staircase. The straight exit from Terry's Theatre had been made a great deal of in the public Press; but, having passed down it, he would rather take his chance anywhere in the passages of a burning theatre than be one of a crowd going down it. No flight of stairs should be long without at least a small landing that might afford opportunity to resist pressure from behind. The best form of landing-stair was undoubtedly such as that to the gallery at the Prince of Wales's Theatre, in which four flights of four steps each went round a centre. The rounding off of the corners was a great improvement. The great *desideratum* in a staircase was that a crowd could pass from top to bottom without any great pressure at any point and in a continuous stream. A circular staircase would best attain this, the difficulty of the difference in the width of tread being overcome by using an ellipse for the plan in which the steps were set to a very large radius, and the small ends used as landings. There was another form of the ellipse still more easy, and often applicable to a theatre—that was by forming the ellipse round a triangle. The Metropolitan Board of Works required that every staircase should be solidly closed in on both sides. The author ventured to say that regulation was a dangerous mistake. A staircase in a public building should be open at the sides from top to bottom; there should be no part from which the passengers were unable to see what took place all the way down, and, especially, to see the way out. Mr. Nevill considered it would be of the greatest advantage if all the staircases could be concentrated in one building, and be under one general control and supervision. A design of such a staircase, on the triangular plan, was exhibited: each flight rose 8ft. 6in., the height of the floors. A separate staircase started from each corner—one to the pit circle, one to the upper circle, and one to the gallery. The central space was left open, and the whole building carried up a good height to allow smoke or gas to escape upward. Iron foot-rests should be built into the stair on the inside, up which firemen could climb if required. At the present moment fire-risk was the point of most interest in connection with theatres, and after deprecating more than a certain degree of

legislation and State interference, the author expressed his belief that in London, in a well-regulated theatre, fire-risks were of the slightest. The only particular danger in a theatre, above other places, was the reckless use of gas behind the scenes and the extreme combustibility of the woodwork over the stage. Electric light and fireproof paints, together with the careful use of iron and concrete in the structure generally, would minimise the danger. Some form of fireproof curtain must be obtained, and sufficient of the top of the stage should open to form a chimney. It was an advantage to substitute iron in the seats where feasible, to avoid a blaze as much as possible. The seats should be cut off by a fire-resisting partition or wall from the corridors. The opening in the top of the stage should not be too large, and the same action which opened it should open a valve at the bottom for inlet of air. Referring to the fireproof curtain, Mr. Nevill mentioned several, such as hydraulic curtains of two thicknesses of iron, solid oak or teak, asbestos, Mr. Max Clarke's silicated cotton curtain and the water curtains of Capt. Heath and M. Marius, the latter being regarded as the better arrangement. A very useful addition to a theatre would be a separate door and small iron stair in a fireproof shaft for firemen to enter from the outside.

Mr. Walter Emden said his own training had been practical rather than theoretical. There was so much pure assertion, utterly opposed to the practice of theatre architects, in Mr. Nevill's long paper that it seemed almost impossible to discuss it. With regard to the position of the pit, no manager at the present day could afford to give the best place to this portion of the house; but there was no doubt that to place the pit a long way back, as in Mr. Irving's suggestion, was unadvisable, for the pittites would be able neither to see nor hear, and would be liable to be suffocated. The English plan of theatre arrangement was, he believed, the best, or at least the one most suited to our habits and requirements. So far as acoustics were concerned, iron and concrete were equally as good as wood, and were far preferable constructionally. There was no doubt that plaster on wire would be excellent walling from an acoustic point of view; but Mr. Nevill was mistaken in supposing this was adopted at Terry's Theatre; there the partitions were constructed in hollow firebrick, which was capable of sustaining great weights with a minimum of thickness, and afforded greater protection in case of fire. As to elliptical staircases, people would continually stumble on them, because they expected the treads to follow in a circle and not an ellipse. He formerly had an office approached by an elliptical staircase, and had frequent complaints of this character from clients. It was a question whether a straight or square staircase was the best form; but the elliptical plan was a source of danger. The lecturer had made a mistake, also, in his treatment of the question of lighting. According to the regulations of the Lord Chamberlain and of some county magistrates, the gas for lighting the auditorium must pass through a separate meter controlled from the front of the house. Although it had long been quite practicable to render a theatre constructionally fireproof, up to the present time, until Terry's Theatre was built, no building of the kind was erected on fireproof principles, much of the internal construction and the tiers of the galleries were nearly always constructed of wood. The difficulty and danger of fire were always, however, from the stage, and not from the auditorium. The iron curtain that had been proposed by Mr. Nevill would buckle in case of fire, and from its immense weight would tend to pull down the proscenium itself. What was wanted was a means of saving, not the building, but the audience, by giving time to escape. An ordinary asbestos curtain, woven in double thickness, would withstand fire for at least ten minutes or a quarter of an hour, and if provided along the top with a line of sprinklers, worked by valves, could be kept perfectly cool and intact till the proscenium itself was consumed. These sprinklers should never be automatic, but controlled by an attendant by valves; they supplied comparatively little water, but that was sufficient to check a fire at an incipient stage. For this purpose sprinklers were most useful; but their value ought not to be exaggerated.

Mr. Alfred Darbyshire, of Manchester, having spoken, Professor Kerr proposed the adjournment of the discussion. This motion was seconded by Mr. Robert Walker, who remarked that much of what they had heard was very startling. As district surveyor during the past twelve years for a portion of the Metropolis containing about 50 per cent. of its theatres, he had had considerable practical experience in the matter, and he must protest in the most emphatic manner against the lecturer's assumption that the question of safety was a commercial matter between the public and the managers. It was one for legislation of the most stringent character. As professional men it was their business, and indeed their solemn duty, to see that the public were exposed to a minimum of danger. Indeed, if they did not do this, he warned them that others would be employed who would take all precautions.

On the motion of Messrs. E. J. Tarver and O. Hansard, a vote of thanks was accorded Mr. Nevill, and the President announced that the discussion would be adjourned until Monday, Feb. 6th. At the next meeting, to be held that day fortnight, a paper would be read by Mr. F. R. Farrow, entitled "The Recent Development of Vienna."

ARCHITECTURAL ASSOCIATION.

THE third ordinary meeting for the 41st session of the Association was held on Friday evening, the President, Mr. John Slater, B.A., in the chair. It was announced that Mr. T. G. Jackson, M.A., F.S.A., had selected as the subject of his paper to be read at their next meeting: "The proposal to make architecture a close profession by imposing the test of examination and registration." On that evening, Friday, the 16th inst., the President would announce the date fixed for the convening of a special meeting to consider and define Rule 22, relating to the composition of the committee.

PERSPECTIVE DRAWING AND APPARENT FORM.

Mr. Frank T. Baggallay read a paper on "Linear Perspective and the Apparent Form of Objects," illustrating his remarks by numerous black-board diagrams. The author said that his interest in the subject was awakened by a paper read before that Association on November 24th, 1876, by Mr. Augustus Frere, on "Binocular Perspective and Natural Vision," in which it was shown that an ordinary perspective drawing represented things as if seen with one eye only. Although Mr. Frere went on to lay down rules for providing pictures of what is seen with two eyes, Mr. Baggallay believed that it is not only practically but theoretically impossible to represent on a flat surface or to a small scale even the crudest outline of a solid object as seen with two eyes—a fact recognised and commented on by Leonardo da Vinci in his well-known book. For the sake of convenience and simplicity, it may be said that the eye sees each point of an object by means of a ray of light proceeding in a straight line from that point to the retina of the eye. One eye, therefore, is enough to tell us the direction in which a point lies, but it is not able to tell us how far off that point is. If it were nearer, or more distant, the image brought by the straight ray of light would still be upon the same spot of the retina, and except for a slight difference of distinctness would be exactly the same image, so far as the brain was cognisant. It follows from this inability of our eyes, taken singly, to measure the distance of points from themselves that one eye cannot tell us the form of an object. If, for instance, we look with one eye at the angle of a cube, we cannot see that the three receding sides are square, although experience tells us that squares are more common than lozenge forms; but the second eye sees the angle from another view-point, and corrects and completes the first impression. The science of linear perspective is based on this inability of one eye to detect distance. It assumes that a man is using but one eye, and that, as he cannot tell where the points that make up the outline of the object looked at are situated on the several rays that bring the images to his brain, we may deceive him, and place those points anywhere on the rays that we choose. We generally prefer to draw, not on a spherical surface with the eye as a centre, which would theoretically be the best possible arrangement, but on a plane surface, and, therefore, we imagine the points so situated that they would all be on a plane surface. All our rules are merely directed to find where each ray from each point would cut that plane surface. Drawings made in this way, with accuracy, are scientifically correct representations of what we should see with one eye from a certain spot—that where all the rays intersect. The difficulty of providing for the different aspect given by both eyes could only be overcome by making two perspectives from very slightly differing view-points, and then uniting them in an instrument on the principle of a stereoscope. Passing on to consider the vanishing of vertical lines, Mr. Baggallay remarked that without doubt as we look at them we see all lines vanishing, vertical ones disappearing both upwards and downwards, and also the ends of all horizontal lines—*i.e.*, those which are parallel to the plane of the picture. This is because the apparent length of a line is measured by the size of the visual angle. A perspective drawing may be equally well made on any surface, mechanical facilities for execution being neglected. Thus circular panoramas are drawn on cylindrical surfaces in order to allow of bringing a more extended view into the picture without apparent distortions. In setting out a plan for a perspective on a cylindrical surface, the picture plane must be the same as that of the surface drawn on, and in setting the heights they must always be set up vertically, finishing, of course, on the picture plane. The lines of such a drawing are a conical projection of the lines of the object on the surface, and they will not be straight lines when projected on curved surfaces. Leaving theory, and turning to practical matters, the question presents itself: Can we make any alterations in the science of perspective, as it is now understood and practised, that will be improvements in the sense of enabling us to represent by any scientific process more exactly what we see? No advance had been made since Dr. Brooke Taylor enumerated the rules of plane perspective in 1715, and Mr. Baggallay firmly believes that no improvement is possible. The limitations of our science of perspective seem sufficiently serious when stated in words. It only enables us to draw what we see with one eye stationed at one particular point, and, still worse, the picture, to be seen correctly, must also be looked at with one eye stationed at one particular point. In practice these are not such serious matters, for our eyes are not very ready to discover small inaccuracies, and imagination and memory come to their aid to correct many of the errors that the trained eye would otherwise detect. Still, it is worth consideration whether or no these defects can be overcome. Binocular perspective must be dismissed from consideration as impracticable. It is impossible to insure that our perspectives shall be viewed as intended by one eye and from a particular standpoint. It is, however, a legitimate question whether by sacrificing absolute correctness as regards one point of view we could not get more nearly correct (or at least, less wrong) as regards all other points from which the picture may be viewed. This could be done, but Mr. Baggallay thinks at an expenditure of time and labour very much greater than the advantage gained. All that is necessary is to treat our drawing on flat paper as a development of the drawing we should get on a spherical surface. We must use, in that case, a circular picture plane in the plan, and circular height lines of various diameters, according to the points at which they cut the sphere; very nearly all the lines that are straight in the real object will, of course, become developments of circular arcs—*i.e.*, elliptical; the labour, therefore, of making such a drawing would be colossal, and in the end we shall only have gained a slightly greater approach to correctness when the picture is looked from wrong points of view, and that by giving up actual correctness when looked at from the right point. The rules of perspective are, in fact, so perfect that, if only means could be found to make people look at a drawing from the right point of view, no distortion would be apparent, however much the picture were extended. The usual rule is



that a picture must be confined within a visual angle of sixty degrees, the reason being that this is all the eye can conveniently grasp at once, and we should also draw as much at least as will be contained in a visual angle of 45°, to induce people to look at it from far enough off. An important condition of success in making a perspective is to so arrange it that people will naturally look at it from about the right point of view. The picture plane should always be arranged somewhere about from 18in. to 2ft. distant from the station point in plan, because that is the most convenient distance for looking at a drawing that is neither very delicate nor very large or coarse. The point of sight should always be absolutely opposite the centre of the picture in plan. The lecturer added : I always commence setting out a perspective in this way : Taking the plan, I choose a station point at the spot from which I judge the building will look best or be most seen. I then make up my mind how much of the object I want to get into my picture, and draw lines from the extremities to the station point ; then I find the visual centre by bisecting the angle. I then measure the angle, and if it is less than 45°, or more than 60°, I shift the point a little nearer to, or further from, the object—always along the central ray. When all this is settled, it is time enough to think about the picture plane. As far as the view of the object is concerned, this may be anywhere and at any angle, it will not affect the view at all ; but, in order to get people to look at the picture from about the right point, I draw the plane at from 18in. to 24in. from the station point, as nearly as the required size of the future picture will allow, and always absolutely at right angles to the central visual ray. Adverting to the vanishing of lines, Mr. Baggallay said that, as Mr. Burchett had pointed out, it is unnecessary to draw lines parallel to the picture plane as vanishing because the appearances of representations of things are subject to the same optical laws as the appearances of the objects themselves—*i.e.*, if two lines in an object which are really straight and parallel appear to vanish, then the representations of those lines on a sheet of paper will only appear to vanish in the same way if they also are really straight and parallel.

A short discussion followed, in which Messrs W. H. Atkin Berry, F. R. Farrow, H. O. Creswell, W. H. Pratt, and A. O. Collard took part, and a vote of thanks was accorded to Mr. Baggallay for his paper.

HOUSE IN SUNDRIDGE PARK, BROMLEY, KENT.

THIS house, which is in course of erection from the designs of Mr. Evelyn Hellicar, of Bromley, is situated on high ground, there being extensive views on the north, east, and west sides. The external walls are faced with red bricks from Dorking, Surrey, the roof being covered with Yorkshire tiles of a red colour. Mr. G. H. Lay, of Bromley, is the builder, the estimated cost being about £2,200.

ARCHITECTURAL DRAWING.*

MR. PHENE SPIERS'S reputation as a water-colour artist, coupled with his experience as master of the Architectural School of the Royal Academy, are a sufficiently adequate guarantee that any book from his pen on this most interesting subject would comprise much practical and useful information. His volume is nicely illustrated by typical examples of draughtmanship, including familiar specimens from the offices of Messrs. J. L. Pearson, R.A., R. Norman Shaw, R.A., Alfred Waterhouse, R.A., and the late F. P. Cockerell, who was a most accomplished artist. Mr. Ernest George is represented, as also are the late Thomas Allom, Mr. Spiers himself, and the late Geo. Edmund Street, R.A. It will thus be seen that a great variety of style and method is marshalled before the beginner, for Mr. Spiers, forsaking apparently in despair the ideal of his earlier days, when, fresh from the schools of Paris, he sought to enforce the French system of soft graduated tintings and geometric shadow projection upon his Conduit-street friends, sinks all individuality in his eminently eclectic handbook, and so leaves the student unaided in the task of making a choice as to which master he may with most profit follow, or which style of delineation he may with the best personal advantage adopt. Like the proverbial cat in the legend, the pupil's difficulty at starting is the necessity of beginning somewhere. The multiplicity of facts thus placed before him tend to confuse his judgment, and consequently, that which should have been most helpful to him is likely to prove quite otherwise. This is to be regretted, because Mr. Spiers clearly knows what he is talking about, and is familiar enough with his subject from its many and diverse points of view. Unfortunately, it is this very knowledge which seems to rob his book of any definite teaching power for the use of those who really want the information and guidance which this book was intended to supply. Its failure seems to be akin to that of which so many students from the Royal Academy schools complain, owing to the conspicuous want there of some distinct system and leading generalship. At present the pupil is confused by the varied suggestions and, what often seem to him, somewhat contradictory ideas of the distinguished visitors who in turn attend the classes, neither of whom can know what his predecessor has said nor what his criticism upon the student's previous work has been. Both in the conduct of the classes of Burlington House and in Mr. Spiers's book on architectural drawing, there manifestly is no lack of knowledge ; indeed, each is as clever as need be ; but there is nothing in either which can be accurately described as masterly or systematically complete. Gifted students, by an intuitive power of their own, may, no doubt, easily discriminate and make full use of the advantages so placed before them, while, owing to their own skill, such aspirants to fame readily enough develop into favourite pupils, and thus secure special attention ; but with the rank and file it is far otherwise, mainly because of the absolute want which we have here briefly indicated. The classification adopted, by which Mr. Spiers divides his subject into three broad divisions, is : 1, student's work ; 2, office work ; 3, out-door work. This may be a convenient arrangement, because it avoids difficult questions and leaves undecided leading points connected with architectural education ; but surely such a teacher as the author should settle, at least in a general way, for the benefit of his youthful reader, some line of action, instead of telling him that "such questions as we now leave undecided will eventually, it is to be hoped, by common consent and custom, be settled one way or the other to the advantage of the principal and pupil, the profession and the public." The pupil

* Architectural Drawing. By R. PHENE SPIERS, F.S.A. London : Cassell and Company.

naturally may exclaim, "What am I to do in the mean time to learn my business and my art to the best advantage"? This is what the learner wants to know—not that doctors do not agree, nor how they differ; but why so distinguished a master as Mr. So-and-so does this, that, and the other, the last being clearly the outcome of the first. Odd specimens of good men's work compiled side by side without any such reference clearly do not meet his needs, and the more brilliant the examples are the less likely are they to do so. Mr. Spiers furnishes some good instructions about drawing paper, instruments, and materials. Then follows an introductory chapter on elementary projection and copying, with brief references to outline freehand and drawing from the round in such schools as the Royal Architectural Museum, Westminster, the Museum at South Kensington, and the Schools of Art throughout England, the author remarking that more than often the best freehand draughtsmen are found among students from the country. Backlining is rightly condemned, though it must be admitted that what Burges called the "Flick and Dot" style, still fashionable in some leading architects' work, is equally misleading, especially when for the effect of "high light" half the lines in parts are left out entirely, or only partially put in. As to the "contouring process" or "mass lining," advocated on page 18, it is eminently childish and deceptive. An architectural drawing is a technical diagram in which every line has a precise fact to record and information to give; any trickery, "contouring" or otherwise, is a mistake, and students especially ought to be unhesitatingly warned against it. We do not like the specimen of French colouring for the same reason, which serves as a frontispiece. The general appearance no doubt is effective; but it is unquestionably unreal, and as to the projected shadows giving you the depth of the various faces, the idea is out of the question as regards the main features. For example, the shadow on the S.W. tower, thrown from the western portals, does not terminate till it passes the vertical angle of the tower, and so, as a record for measurement, is lost entirely. As for the apsidal projections at the sides of building, they might be anywhere longitudinally for aught the drawing tells us. The chapter on perspective includes some questionable remarks about spherical and cylindrical delineation; but furnishes very sparse information as to setting out drawings, rectangular or otherwise. The centrolinead is, however, both illustrated and described; so likewise is the "Perspectograph," a complicated invention by Mr. Ritter, of Frankfort-on-Maine, supposed to be capable of mechanically drawing perspectives. Some time since we offered to try this instrument, and went to an exhibition where it was on view to do so. The agent met us; but neither he nor we could make it work. This, it was said, was due to the instrument having been tampered with. Another machine was therefore sent to our office, with the same result. The agent came to explain; but he, too, was unable to make the Perspectograph do its work, and said that parts of the instrument had been sent wrongly. He took it away, promising to send another; but no more was heard of the matter. Mr. Spiers does not say whether he has used one or not; but he prints the manufacturer's description and his illustration advertisement. Either the machine is a good one, or it is not, and the student should be properly advised one way or the other with regard to it.

Some practical working drawings of buildings, which have before been illustrated, are here given in colour to show the methods adopted in some offices for showing the several materials employed; but as the lithographers were unable to follow exactly the precise tints, the colours are not quite as correct as might be wished. Mr. Rowland Plumbe's warehouse drawing is a capital one, and the plan of Mr. Alfred Waterhouse's own house ("B.N.," Jan. 7, 1881) is a good specimen; the details, however, to a larger scale on this sheet would have been more useful had they illustrated part of the building shown by the general elevation. The words "Half-inch scale detail" inscribed on the top of these plates, when the drawings scale less than a quarter, is an oversight which needs correction. The most interesting parts of the volume before us are the plates reproduced after the example of the many autograph drawings which we have published in our own pages and elsewhere of well-known architects' work, while some of them have already appeared in the BUILDING NEWS, as, for instance, Mr. Norman Shaw's house at Harrow Weald, for Mr. Goodall, R.A., called "Græme's Dyke" ("B.N.," Sept. 6, 1872), one of his most successful Artists' Homes. Neale's St. Alban's Abbey is laid under contribution; Crowland Abbey, by F. P. Cockerell; Lincoln Cathedral ("B.N.," Nov. 26, 1887), by W. H. Bidlake; and some good French sketches by Gerald Horsley. Thomas Allom's design for the Liverpool Exchange is one of the best plates in the book, and the chromo-lithographs from Mr. Cockerell's thorough studies are admirably rendered. The publishers have indeed spared neither pains nor expense in the production of the volume; but we cannot say it is likely to take rank as a permanent textbook.

REQUIREMENTS OF THEATRES.

THE observations made by Mr. Adler at the recent Convention of Architects at Chicago about the requirements of large theatres were in general sound, and his requirements are such as are now generally admitted to be desirable. With regard to site, theatre promoters have very little choice in the matter. A site is vacant, or may be obtained on reasonable terms at the corner of two streets, or in some rearward position, and a theatre is erected, of course complying as nearly as possible with the regulations of the Metropolitan Board of Works. Mr. Adler says in "no case should a site be chosen which does not permit the disengagement of the building on at least three sides." This condition is practically impossible in large towns, and would very materially restrict the erection of theatres in London; perhaps, on the whole, for the public benefit. So much is a question of financial concern, that even the determining the space to be assigned to the stage is a vital point. There must be "a reasonable proportion between the cost of producing a good opera or theatrical performance, and the size of the audience which can be drawn to see the same." In America it is found difficult to maintain a *corps de ballet* or a company large enough to fill a stage approximating that of a European house of the first rank.

Alluding to illumination of stage and auditorium during performances, the author considers the incandescent electric light the only desirable means; shadows, of course, should be avoided in distributing the lights of the stage, and reflectors are useful to throw the light where it is required. On the important question of ingress and egress, Mr. Adler says no allowance less than three feet for every two hundred persons in determining the width of passages, doors, and stairways should be allowed. The corridors and lobbies should be large enough collectively to hold more than half the audience. Other suggestions are that the passages and corridors should lead direct to the doors, and be narrow and numerous rather than few and wide. We do not see any suggestion as to the form of stairs, which formed a subject of discussion at the Royal Institute of British Architects on Monday night—whether the rectangular or dog-legged staircase or one of elliptical shape is the safest. We should be inclined to think the former is the best form, if all the angles are rounded. Mr. Adler says the air must be warmed in winter and cooled in summer, a sufficient quantity being forced into the house and removed by mechanical means. For acoustic reasons the air currents should tend from the stage outwards; for this end he thinks one-third of the air ducts should open on the stage, but be under control of the prompter when smoke is produced on the stage.

Amongst the provisions against fire the author suggests a very large and high smoke-duct above the stage—with a valve that can be controlled by the prompter—for the escape of smoke; automatic sprinklers, hand-pumps, grenades, &c. To promote good acoustic properties, the adoption of Scott Russell's isacoustic curve to the seats is desirable. A low proscenium, and not an excessively wide opening, is recommended for the same reason. Wide side galleries are objectionable. Many of these suggestions are excellent, and have been before advocated; but the difficulty is to introduce improvements in structure and arrangement where commercial considerations are so strong, and theatrical views of arrangement have to be consulted. Managers and lessees of theatres are generally found averse to all changes and new arrangements. They will not tolerate the abolition of galleries, and steadfastly oppose the increase in the number of entrances and exits. Of course, every additional entrance entails the cost of door-keepers or ticket collectors—matters which concern the pockets of the lessees. In brief, the public safety and interests clash so much with those of proprietors, that it is very hard for architects to get their way entirely.

NEW FORMULA FOR THE FLOW OF WATER.

AT a meeting of the Society of Engineers, held at Westminster Town Hall, on Monday evening, Professsor Henry Robinson, president, in the chair, a paper was read on "A New Formula for the Flow of Water in Pipes and Open Channels," by Mr. Edgar C. Thrupp. The author said that, having worked out, by means of graphic diagrams, a formula for the flow of water in pipes, based on a large number of experiments by M. Darcy and others, with some by himself, he was induced to try, this year, how far experiments on the flow of water in open channels (such as those by Darcy and Bazin, and by Major Cunningham) would be amenable to the same mode of treatment. The results were not only satisfactory, but unexpectedly threw light upon some points in the question of the flow in pipes, which had before been difficult to explain. He had thus been enabled to obtain a general formula, applicable both to pipes and open channels, and taking into account the effects on velocity of the varying relations between hydraulic depth and roughness of surface, in a manner that had not hitherto been done. After describing the experiments of Professor Osborne Reynolds, which brought out the curious fact of a "critical velocity" at which eddies come in, for a limited range of velocities, after which an even flow again takes place, the author described the apparatus he had himself used, and showed the graphic results of experiments, which he had also reduced to tabular forms. He then gave Reynolds' formula, and Hagen's, of which latter his own was a modification, the changes introduced having for their object to express the effects of various degrees and kinds of roughness in the surfaces flowed over, with varying hydraulic depths. Hagen's formula, as proposed to be modified, is :—

$$v = \frac{R \quad x + y\sqrt{z - R}}{\sqrt[n]{c}\sqrt{S}}$$

In this formula the constants are—for wrought iron pipes, $n = 1{\cdot}80$, $c = 0{\cdot}004787$, $x = {\cdot}65$, $y = {\cdot}018$, and $z = {\cdot}07$. For riveted sheet iron pipes, $n = 1{\cdot}825$, $c = 0{\cdot}005674$, and $x = 0{\cdot}677$. For an open channel of pure cement, semi-circular (4·1ft. diam.), $n = 1{\cdot}74$, $c = 0{\cdot}004$, and $x = 0{\cdot}67$. For an open channel of pure cement of rectangular form (5·94ft. wide), $n = 195$, $c = 0{\cdot}006429$, and $x = 0{\cdot}61$; and for open channels of "earth, no vegetation," &c., $n = 2{\cdot}00$, $c = 0{\cdot}015356$, and $x = 0{\cdot}72$. Mr. Thrupp concluded by justifying the effort to make a more accurate formula, by comparing the results of experiments with the results obtained by calculation.

MASONRY AND STONE-CUTTING.*

By LAWRENCE HARVEY.

THIRD LESSON.—PROBLEM.

To construct a semicircular Archway in Stone, penetrating into a semicircular concrete Vault; the outside Face of the Wall being on the Batter, and not Parallel on Plan to the inside Face.

WE have selected this peculiar arrangement in order to handle the problems of stone-cutting in their general bearings with every difficulty which may occur; the usual dispositions of walling being but special, although simpler, constructions. At all events,

* All rights reserved.

such a structure as the one proposed might occur in forming an opening through a river-wall into a tunnel placed under the roadway.

The reader will observe that we have in this structure only to cut voussoirs with a plane face at one end and a cylindrical one at the other, and that we have *not* to connect these voussoirs with others, as would have been the case if the vault had been constructed of stone instead of concrete.

The perspective view, or, rather, axonometric projection (Fig. 14), may help the reader in getting a clearer idea of our structure. The semicircular vault of section G X D″ is carried on one side by a wall, the interior face D″ *d*″ of which is vertical, whereas the exterior face D′ *d*′ is on the batter; and, as stated, the outside ground-line *d*′ *c*′ of this wall is not parallel to the inside line *d*″ *c*″. The axis of the archway is perpendicular to the interior face of the wall; its section is semicircular, as shown in A Z B, and its springing line, A B, is on the same level as the springing line of the vault.

It is evident that the outline of the archway on the outside face of the wall will be an ellipsis, for it is the intersection of a cylinder by a plane not perpendicular to its axis. On the other hand, the intersection of the archway with the vault will be a line of double curvature, as shown by dotted line A″ Z″ B″ (Fig. 14).

(Fig. 15.) In making the working drawings for cutting the stone voussoirs, we leave out the walls that support the vault, and take our plan at the level of the springing line common to both vault and penetrating archway. We select for our elevation a plane perpendicular to the axis of the archway, and thereon draw the semicircular archway and its voussoirs as if we had to deal with any ordinary archway. On plan the arrises of the bed-joints will be parallel to the axis of the archway, and we have only to find out the points where they are terminated either by the exterior face of the wall or by the surface of the vault.

We shall describe only the process of drawing one voussoir—say, the one projected vertically on the pentagon M N P Q R, as the operations carried out for this voussoir have but to be repeated for the other voussoirs to get all the stones which form the archway. The voussoir being a prism contained entirely between the face of the wall and the surface of the vault, to delineate it completely we have only to find the intersection of its sides with the face of the wall and the intrados of the vault.

To get the intersection with the wall face, we produce through a point C two sections of the wall, the one by a vertical plane on trace C′ E′, the other by another vertical plane on trace C′ F′ (see plan); the one is perpendicular to the wall face, the other is parallel to the axis of the archway. The first section on C′ E′ is given by the batter of the wall, and we can at once draw it in C E on the left side of the elevation. The second section on C′ F′ can be deduced from the first, for we know that E′ F′ parallel to the wall face is the plan of a horizontal line E F. If Z on the elevation shows the height of the horizontal line E F, we will be able to mark the points E and F, through which each section of the wall face will pass.

Thanks to this preliminary operation, we shall be able to draw the intersection of the voussoir by the wall face. Take, for instance, the arris of the voussoir projected vertically in M and horizontally on the line G *a*′ M′. To get the point M′ we cut the wall by a vertical plane, of which G *a*′ M′ is the trace. This section will be a straight line, forming, with a vertical line produced in *a*′, an angle equal to the angle Z C F, and, therefore, we can conclude that the distance I K produced on the elevation at the level of M will be equal to *a*′ M′ on plan. Such is the simple operation by which we readily find not only the angles of the voussoir on the wall face, but any number of intermediary points by which we can delineate the curved portions thereof.

If we repeat this operation for all the voussoirs, we shall have drawn on plan the horizontal projection of the head of the archway with the curves of intersection of the intrados and extrados. These curves are portions of ellipses of which we have conjugate diameters, the one the trace A′ B′ of the wall, the other the axis of the archway itself; this allows us to draw also these curves direct without reference to the elevation. (For the delineation of ellipses, of which two conjugate diameters are given, see "Burchett's Practical Geometry," Problem 117.)

To determine the horizontal projection of the other end of the voussoir, the one which forms part of the surface of the vaults we draw on the right-hand side of the elevation the section D U X of the vault; the distance T U taken at the level of the arriss M will give us the distance *a*″ M″ on the plan. We can by this method get the intersections of the arrises of all the voussoirs, and by joining these points of intersection we get on plan the curves of penetration in the vault by the intrados and the extrados of the archway. It is useful to know, although it can only be proved by algebraical calculation, that these curves on plan are hyperbola, the axes of which are the axes of the intersecting cylindrical vaults.

It is evident that the planes of the bedjoints of the archways cut the vault according to elliptical curves. These may be drawn with the help of intermediary lines taken on the surface of the bedjoints between the arrises; but considerable help is obtained in drawing these curves by the knowledge that their prolongations must all pass through the point O″ on plan. As shown in our drawing, the axes of these ellipses are easy to find, which allows of delineating the curves mechanically with the help of a trammel.

(Fig. 15.) *Tangents.*—Curves of large dimensions are more easily drawn with the help of a few points and tangents to the curve, than by getting a great number of points without the assistance of tangents; for this reason we show how tangents to the various curves which occur in masonry are to be found.

For the curve of the archway on the exterior face of the wall, tangents to any point, such as N′, are readily obtained. The vertical projection N *t* of such a tangent is tangent to the elevation of the archway, and it cuts the trace A′ B′ in the same point *t*′ as the plan of the tangent, which is therefore N′ *t*′.

A similar method can be used for finding tangents to the elliptical curves formed by the intersection of the vault and the bed-joints. If we consider the section of the vault as an auxiliary elevation, the tangents to the vault in the points U and X are elevations of the tangents to the curve of intersection of the bed-joint M R in the points M″ and R″. The tangents being contained in the plane of the bed-joint will, of course, meet the axis of the arch, and if we make O″ *s*′ = D*s* and O″ *v*′ = D*v*, we shall get the points *s*′ and *v*′ through which the tangents pass.

The tangents in points of the curve of intersection of the arch and vault can be found in the ordinary way as the intersections of the planes tangent to both cylinders, the arch and the vault. If the tangent in the point N″ were required, we might produce the tangent to the point Y on the section of the vault, and the point where it would cut the ground-line A D would give us the distance from D where the trace of the plane tangent to the vault would pass. The same operation, carried out for the point N itself on the archway, would give us the trace of the plane tangent to the intrados of the arch. The intersection of these two traces would, of course, be a point of the tangent required, and the point N″ would be another. But this operation is inapplicable to the starting points A″ and B″ of the curve, for in these the two tangent planes are vertical, and their intersection on plan is all projected in one point. Besides this deficiency, the former operation is longer than the following, which is applicable to all points alike.

The rapid method of finding tangents is based on the fact *that the plan of a tangent to a curve of intersection is perpendicular to the trace of the plane which contains the normals in the same point to both the intersecting surfaces.* The normal to the surface of the archway in the point N″ is projected on plan in N″ ε, of which ε is the foot on the ground plan taken at the level of the springing line. Likewise the normal to the vault is on plan N″λ, of which λ is the foot; therefore, the line ε λ is the trace of the plane of the normals. We can now produce the plan of the tangent, N″θ perpendicular to ε λ, which is all we require to guide us in drawing the curve.

(Fig. 16.) *Moulds.*—Having drawn all the voussoirs of the archway in projection on plan and elevation, we have now to get the exact outline of the faces of each voussoir, so as to be able to cut out in cardboard the moulds we require for working the stones.

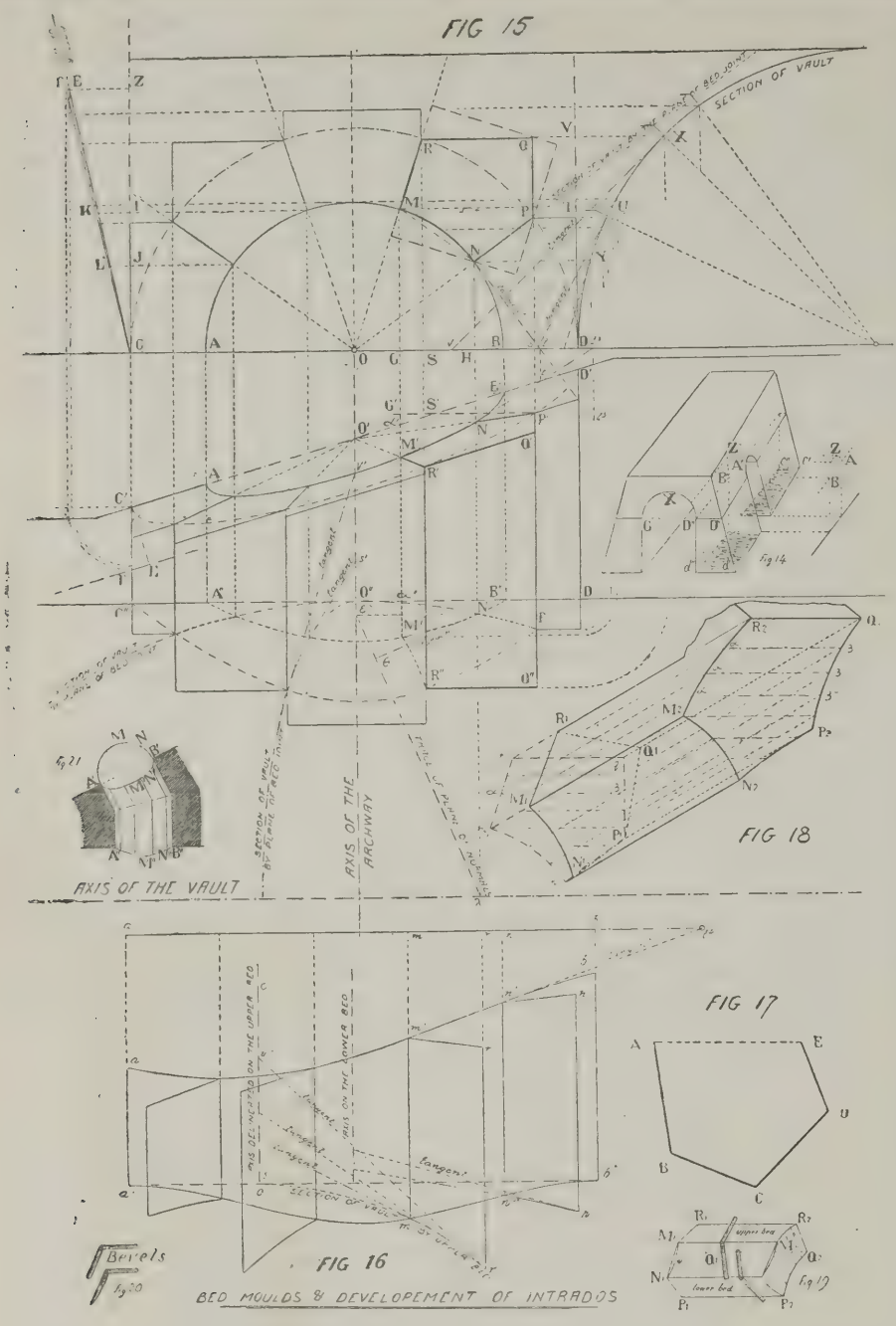
The soffits of the voussoirs can be easily developed, for they form part of a cylinder, the intrados of the arch. In Fig. 16 we have made the straight line *a b* equal to the circumference of the arch, and we have shown by the points *m* and *n* the portion thereof which belongs to the voussoir we intend to cut out. We draw on the development the direction of the arrises M and N and as many other generators of the cylinder as we may require; then carrying the distances *m m*′ = G M′, *n n*′ = H N′, &c., we got the development *a*′*m*′*n*′*b*′ of the head curve of the arch. By a similar operation we get also the development *a*″*m*″*n*″*b*″ of the curve of penetration into the vault. The development of the soffit of the voussoir considered is, therefore, comprised within the quadrilateral figure *m*′*m*″*n*″*n*′.

To get tangents required for drawing these curves of the developed cylinder, use the usual methods of descriptive geometry, remembering that the positions of elevation and plan are here reversed—t^3 is the trace on the plane of our elevation of tangent N*t*, and Nt^3 is the length which we have to carry from *n* to t^4 so as to get $n't^4$, the tangent required. The same operation applies to finding the tangents of the other curve. Simplifications are also obtained by taking the ground line at different levels to get the traces not too distant from the drawing.

To get the moulds of the bed-joints, we turn down the planes of the joints round the arrises of the voussoirs such as M. The upper arris will then occupy the position *r r*″, in which the distance *r r*′ is equal to the distance S R′ of Fig. 15. The arris *m*′ *r*′ is a straight line; but the arris *m*″ *r*″ is a part of an ellipsis, and to draw it, a few intermediary points are required, found by the same method by which the points *m*″ *r*″ were found. A simplification is obtained if we delineate on the turned-down plane of the bed-joint the axis O O″ of the arch; then we know that the curve *m*″ *r*″ prolonged will pass through O O″, and that the tangents to the curve will cut the turned down axis in the same points *s*″ and *v*″ as on the plan.

Operations for Cutting the Voussoirs.—The voussoirs can be cut by two different methods: in the one *squares* only are used, in the other *bevels*. In the first method we begin by forming a parallelopiped, of which the pentagon (Fig. 15) M N P Q R is the base, after which we cut off the portions of the parallelopiped which lie outside the finished voussoir. This is by far the safest method of stone-cutting; on the other hand, it is the more costly, as it involves working surfaces of operation which have to be destroyed afterwards, and, in some cases, it involves a great loss of material. In the second method, the surfaces of the stone are worked successively by means of bevels equal to the angles formed by the arrises of the stone. In this method of operating, every mistake made entails further mistakes, and we should say that absolute accuracy is rendered thereby impossible. It is, in fact, a method similar to that which a draughtsman would employ if he endeavoured to copy the polygon (Fig. 17) by drawing successively the sides A B, B C, C D, and D E, measuring the angles with the aid of protractors. It is evident that, starting from A, he would have little chance of reaching E accurately! whereas by taking A E as a basis, and drawing a series of triangles, he would get the points D, C, B without difficulty, and absolutely correct. Nevertheless, on account of its cheapness, the method of bevels is invariably preferred by stonemasons.

In Fig. 18 we show the operations of stone-cutting according to the *first method*. We select a stone in the shape of a prism, the base of which is at least equal to the dotted rectangle, which surrounds the elevation of the voussoir M N P Q R (Fig. 15), and the length of which is equal to the greatest dimension of the voussoir measured on plan. Once the basis of that prism has been worked plane, a mould $m_1\ n_1\ P_1\ q_1\ r_1$ = M N P Q R (see Figs. 18 and 15) is delineated on that surface, taking care that one of the sides, such as $m_1\ r_1$, corresponding to a bed-joint, shall follow the quarry-bed of the stone. This operation accomplished,



the mason can form a prism by working the other faces of the stone with the help of a square. He will then apply the mould (Fig. 16) m' r'' r'' m'' on the surface which starts from m_1 r_1 (Fig. 18) placing the point m' in M_1 (Fig. 18) at a distance $m_1 M_1 = G' M'$ (Figs. 18 and 15) and $r_1 R_1 = R' S'$ (Figs. 18 and 15); thus he will draw on the stone the real outline $R_1 M_1 M_2 R_2$ of the bed-joint. The workman will delineate likewise the other bed-joint on the surface which starts from the arris $P_1 n_1$.

As to the soffit of the voussoir, it is a portion of a cylinder which can be worked with the help of a square, or with the help of templets, such as those shown in Fig. 12. On that cylindrical surface the workman will apply a flexible mould, cut according to $m'n'n''m''$ (Fig. 16), and thereby he will be able to delineate on the stone the curves M_1N_1, M_2N_2 (Fig. 18).

The upper horizontal joint, and the vertical joint of the voussoir, are simple planes. The mould for the horizontal one is found on plan (Fig. 15) as $R'R''Q''Q'$, which we place in $R_1R_2Q_2Q_1$ (Fig. 18). On the face of the vertical joint we have only to join Q_1 and P_1 to get the arris at one end; whereas, at the other end, which is the one where the voussoir forms part of the surface of the vault, a templet cut according to the curve of the vault will enable us to delineate the curve $Q_2\beta\beta'\beta''P_2$ (Fig. 18).

The surface of the vault will be cut by following horizontal generators thereof from $\beta\beta'\beta''$, &c. To get these generators we simply draw parallels to them on the basis of the prism, such as $\beta_1\alpha_1$, and then parallels to the upper arrises, as a_1a^1 (Fig. 18), which gives us the points a a' a'', &c., required to guide the workman's ruler and chisel when cutting the stone from β to a.

This operation completed, the portion of stone at the base of the prism which does not belong to the voussoir is cut off, and the voussoir is then completely dressed.

In Fig. 19 we show the method of stone-cutting with the help of bevels, such as those delineated in Fig. 20. Bevels are articulated pieces of metal or wood capable of being set at any given angle, and then used as common squares.

We begin the operation by dressing the surface of the natural bed of the stone and delineate thereon by means of a mould the outline $M_1R_1R_2M_2$ (Fig. 19) of the upper bed-joint. Through the arris M_1M_2 the workman can, by means of a bevel, dress a plane, forming with the plane of the bed-joint an angle equal to R M N (Fig. 15). This will be the operation plane from which the soffit of the voussoir will have to be cut out. Starting from this operation plane, and with the help of the bevel already used, we get the plane of the lower bed-joint. After marking on these surfaces the contour of the moulds, the surface of the head of the voussoir on the outside wall face can be cut, for it is given by the arrises M_1R_1 and N_1P_1 (Fig. 19). On that surface the workman will delineate the other two arrises R_1Q_1 and P_1Q_1 of the head face, which can be done with the help of a pair of compasses by taking the real lengths of R Q and P Q in Fig. 15, and marking off thereby the point Q_1 on the stone. This done we can easily cut the surface of the upper horizontal joint by the help of the arrises R_1R_2 and R_1Q_1 already obtained; and likewise, by the help of the arrises P_1P_2 and P_1Q_1, the surface of the upright joint can also be obtained. The cylindrical surfaces can then be worked out as in the former method; the soffit of the voussoir, by the help of a templet $M_1\psi_1N_1$, giving the curve of the archway; the end of the voussoir forming part of the vault by means of generators parallel to the arris R_2Q_2.

Sharp acute arrises are to be avoided, and, therefore, we must leave a ledge of 3in. above the upper arris of the voussoir where it intersects the vault. On the exterior of the wall the vertical arris is also sharp, and it will be advisable to leave there also some thickness of stone to form a joint of about 3in., perpendicular to the face of the wall; but in this case it is less important, as this joint will not be subjected to any pressure. The left-hand side of the archway and jamb in A will also present an acute angle, which one might cut off after the work was up. But this will hardly be necessary, as our construction would only be adopted in practice when the wall is only slightly oblique; if the obliquity were great, the archway would have to be composed of two vaulted surfaces meeting in a groin, as in Fig. 21. This structure we shall learn to deal with when studying the groin at the meeting of two cloisters.

THE OFFICE OF CITY ARCHITECT.

THE City Court of Common Council discussed, at their meeting on the 1st inst., the proposed appointment of a new City Architect and Surveyor. Mr. Sly, the chairman of the Officers' and Clerks' Committee, first moved the conversion into a standing order of a resolution of the Court of 1879, prohibiting any person in the employment of the Corporation receiving any commission or gratuity on pain of instant dismissal. This was carried unanimously. A report was next brought up on the duties of the office of architect, stating that while the committee contemplated the employment of the City Architect in the preparation of whatever architectural designs might from time to time be required for the purposes of the Corporation, they thought it should be distinctly understood that nothing therein contained should be taken as precluding the Corporation from obtaining, as and when they might think proper, either by competition or otherwise, designs from other persons for the erection of any building or other structure which they might require to be executed. The report was adopted. Another report, recommending that the age of candidates for the office should not exceed 50 on the day of election, was, after a long discussion, rejected by 112 votes to 33. Mr. Alliston next moved the suspension of the standing order which prevented members of the Court from becoming candidates; but this was summarily rejected by 115 votes to 16. It was arranged that the election should be held at the meeting on Thursday, in next week, the 15th inst.

Lord Salisbury's sale of his Strand property proved, says a London correspondent, a very good thing for the purchasers. The marquis received £200,000 down, and the land was almost immediately afterwards resold, and fetched £240,000. Most of the leases on this portion of the Cecil estate are coming to an end, and it is expected that the changes necessitated by rebuilding will cause almost as great a revolution in the aspect of a very familiar district as Lord Cadogan has wrought in Chelsea by the extensive rebuilding which he has undertaken there.

The removal of the French Protestant Church, the Great Northern Railway parcels office, Bull and Mouth-street, and the Queen's Hotel, for the extension of the General Post Office, have revealed another section of the old Roman Wall of London. It is of concrete, interspersed with courses of thin tiles, and is 4ft. in thickness.

WAYSIDE NOTES.

IS "the architect of the future" to be a lady? Perhaps the Registrationists had better contemplate the contingency seriously. I see the Countess of Mar, in the Christmas Number of the *Queen*, pleads for the employment of lady architects on the ground that men live but a little of their time in the houses they design, and know nothing about domestic requirements. A good many villa plans I get week after week, Lady Mar, justify your fault-finding; but I fear your sweet sex is hardly likely to mend matters much. We have already not a few people in the profession whose gender is a matter of some doubt, if one may judge by the importance they attach to the mere trimmings, and the rivalry of *bonâ fide* women-architects in the arrangement of cupboards and the decoration of doors does not alarm me; but if a separate covered entrance to each house in a London street, or a window that will shut and open without the help of an athlete, is all you want, I think you can get it as matters are—always provided the ground landlord is willing in the one case, and you will pay the ironmonger in the other.

They say a Yankee of Halifax has at last solved that problem of sucking mechanics and wood-workers how to bore a square hole, and that a company is forming to bring his device on the market. It is simply an oscillating head with chisel edges and projecting lips, which cut out the corners in advance of the chisel. The balance of the machine is an almost exact counterpart of the old-style boring machine. It is asserted that it will cut a two-by-four mortise in from four to five minutes, and do it with perfect accuracy, that a carpenter cannot complete in less than half an hour. I suppose, as usual, our own wood-working machine-makers will be in the field with something like it—half a dozen years after the Yankees.

The *Stonemason* for this month (p. 108), referring to the avocation of stone-carving in England, says:—"Many of the best stone-carvers at work here are Italians, and the most expert among the English ones have studied in Italy. It would not be difficult to explain why Italians were brought over to sculpture the tombs of Henry III. and Henry VII., but at present the phenomenon of the employment of foreign stone-carvers to execute works comparatively simple may, perhaps, point to some deficiencies in our art and technical schools." Surely there is no truth in this? One of the best known English sculptors who has been intimately associated with architectural stone-carvers all his life, assures us he never knew a really good workman who was an Italian in his life. Is anyone else's experience different?

The Alexander Thomson Travelling Studentship drawings must be delivered to the Secretary of the Memorial at Glasgow before the 15th inst. It is to be hoped that there will be a good number of competitors. There is, perhaps, no style that rewards study more than that of ancient Greece, be the present fashion in design what it may; for the study of Greek detail in reality includes that of the Roman as the incomparably greater includes the less, Roman architecture being in a sense debased Grecian. Whether, therefore, the coming taste in Classic design be for Greek or Roman is a question that should not affect the direction of the student's study. Besides, Grecian architecture is the "thirteenth century" of all Classic styles, and familiarity with its refinements cannot but elevate the taste and enlarge the understanding. So it would seem best to point out in passing that all young architects who contemplate entering for the Institute examination should not hesitate as to which Pagan style to particularly get up, even if his own penchant be for the bolder forms of Roman architecture.

The smouldering fires of the "Neo-Greek" style have received fresh fuel by the action of the British School of Archæology at Athens in offering a prize of £50 to a travelling student to be chosen shortly; and Mr. I'Anson's generous contribution towards the sum to be paid to the student will also greatly help the cause. But the seeds sown in the student days of the recipient will not bring forth fruit unless he become a successful practitioner. It is not so much measuring and sketching that will advance the style, as it is *thought* and *trial*, such as led to the triumphs of Alexander Thomson himself. We may cull forms and features from plates; may obtain microscopic delineations of the gable mouldings from such works as that of Pennythorne; and Penrose's "Athens" will give us all the peculiar refinements of the old temples. But the problems before the Neo-Grecian architect are rather in the direction of general composition—of outline and massing, and the fitting of old details in positions justified by reason and sound common sense. The age is ripe for a great composition in the Neo-Grecian style; but the world will not thank the composer for a mere reproduction of temple fronts, with their orthodox columns, pediments, and enrichments.

The apostle of Neo or Anglo Greek has a weary time in this city of fog and smoke. I must modestly affirm that I have been, am, and shall most probably ever be, an admirer of those architects who endeavour to found a modern style on old Grecian principles of design. But I must also admit that I have at times many disheartening misgivings as to the prospects of such a style in our northern clime. In London, at any rate, we cannot with reason erect an edifice with that delicate work which we have been taught must accompany any attempt at the style. Here, a building completed in late autumn receives during the winter months such a layer of grimy soot that wholly destroys the effect of a set of mouldings of the delicate Grecian section. My own idea is that a very beautiful style of Trabeated architecture might be evolved without super-refined mouldings. We must cut our garment according to our cloth: we cannot expect to have our designs executed in *marble* nowadays, so our mouldings should be adapted to the materials at hand.

Alexander Thomson must certainly be considered the greatest master of the Grecian style we have seen. He, in fact, made almost a style of his own. "Thomson-Greek," shall we call it? I have had by me for some months a cutting from a Scotch paper that contains a short and rather unworkmanlike report of a lecture by Mr. Gildard to the Glasgow Architectural Association on "The Genius of Alexander Thomson." It may not be uninteresting to the reader. The report concludes as follows:—"His (Mr. Thomson's) all-embracing knowledge of Greek art is seen in the harmony of its architecture and accessories, metal-work, and decoration, &c., while of his ability as a writer some idea was given by extracts from one of his Haldane lectures. It was matter for astonishment to the lecturer that in the century of Glasgow men this distinguished architect's name found no place; one who would have been a new man among the Greeks. His reward, the consciousness of carrying out a style till it reached the splendid culmination shown in St. Vincent Church, was greater than has been vouchsafed to any other architect of Europe."

The inaugural address of the Chancellor of the Exchequer to the Royal Statistical Society was interesting to the architect of a very matter-of-fact stamp. Mr. Goschen touched upon the financial aspect of domestic architecture, and gave some statistics showing the increase in the number of houses of low rental. "From 1875 to 1880 houses between £20 and £30 increased 28 per cent.; and from 1880 to 1886 the increase was 19 per cent. There had been an increase also between 1880 and 1886 in houses between £30 and £40 of 19 per cent.; and in no class of house had there been a decrease except in those of £1,000 a year rental and upwards, which showed a decrease of 8 per cent." Depression in trade has led to the multiplying of "small property"—people being obliged to go from the unassuming house to the pretentious villa. There is much in Mr. Goschen's address that should be studied by all. A full report of it will be found in the *Times* of Wednesday last. The fact of the decrease in houses of the largest type is much to be regretted; but it is to be hoped that better times may alter things a bit, and Mr. Goschen's statistics require amending.

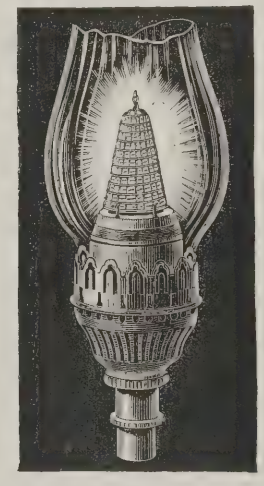
It is really painful to notice in one's country rambles the large percentage of old and new mansions that lie empty and tenantless. In the district where I reside there were till lately three of the finest houses in a desolate condition. One is a unique old Mediæval mansion, and the other two modern ones, with immense estates. Perhaps it may be taken as an encouraging sign of the times that two of them have just been let.

Touching large buildings, I hear that there is to be built an hotel at Vancouver City, in British Columbia, that is to be the largest in Canada, or the States even, is, I believe, to be the terminus hotel of the Canadian Pacific Railway.

All who are personally acquainted with Colonel Duncan will feel that the Registration Bill has fallen into good hands. Best wishes for its success in the House! I trust the funds will not be lacking: the amount required would be a very small claim upon the profession if it were spread over all who wish well to the scheme. Just at the present, as Mr. Edgar Farman intimates, help will be most effective. Already visions of brighter days come to one; and if it be not for ourselves, we may be certain the next generation of architects will bless the remembrance of those persons who have been instrumental in leaving them a better field in which to work: a profession purified of one of the greatest evils that at present afflict it—the existence of those whose watchwords are, "Humbug, Brag, and Bombast." GOTH.

THE CLAMOND INCANDESCENT GASLIGHT.

VISITORS to the gas exhibition held at the Crystal Palace a few years ago will remember the Clamond Incandescent Gaslight, which rivalled the electric arcs in brightness.



That result was accomplished by forcing a stream of heated air and gas downwards into a "basket" or "cone" formed of threads of magnesia supported by a netting of thin platinum wire. In the annexed engraving we illustrate the new form of the Clamond, which it will be seen is in the ordinary position, and dispenses with the necessity for employing machinery to compress air, and force it against the "basket" or "cone" of incandescing material. The improved burners can, however, be had in the inverted form, and on the regenerative principle if desired, thus avoiding the shadows thrown by the ordinary pedestal lamps; but as the new form can be readily adapted to existing fittings, it will no doubt be preferred. The sole agents for the United Kingdom are the Æolus Waterspray General Ventilating, Gas, and Electrical Engineering Company, 124, High Holborn, W.C. The Clamond light has been reported on most favourably by, amongst others, Prof. Foster, M.A., F.C.S; Mr. C. Heisch, F.C.S., gas examiner to the Corporation of London; Mr. Lewis T. Wright, and Mr. E. Field.

The time for sending in designs for the State Soldiers' and Sailors' Monument, to be erected in Central Park, Indianapolis, has been extended from the 12th inst. to the 12th January.

CONTENTS.

Unpractical Architects... 851
A Recent Decision as to Right of Light... 851
Royal Society of Painters in Water Colours... 852
Royal Institute of British Architects 853
Architectural Association 854
House in Sundridge Park, Bromley, Kent 855
Architectural Drawing 855
Requirements of Theatres 856
New Formula for the Flow of Water 856
Masonry and Stone-Cutting 856
The Office of City Architect 858
Wayside Notes 859
The Clamond Incandescent Gaslight 859
Our Lithographic Illustrations 860
Sketches at the Sale Rooms 860
Woodroyd Board School, Bradford, Yorkshire 860
Competitions 860
Books Received 881
Building Intelligence 881
Engineering Notes... 882
Architectural and Archæological Societies 882
Schools of Art... 883
Correspondence 883
Intercommunication 885
Legal Intelligence... 886
Statues, Memorials, &c. 886
Water Supply and Sanitary Matters 886
Our Office Table 886
Meetings for the Ensuing Week 887
Tenders 888

ILLUSTRATIONS.

CONGREGATIONAL CHAPEL AND SCHOOLS, MANNINGHAM, BRADFORD. — GATESHEAD CHILDREN'S HOSPITAL.—WOULDHAVE MEMORIAL, SOUTH SHIELDS.—ALL SAINTS' CHURCH, CANNINGTON, ALLAHABAD. EAST WINDOW, EASTWOOD CHURCH, ESSEX. — SKETCHES IN THE SALE ROOMS.—WOODROYD BOARD SCHOOL, BRADFORD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW CONGREGATIONAL CHAPEL AND SCHOOLS, MANNINGHAM, BRADFORD.

These buildings have been erected to take the place of Salem Chapel, Manor-row, which has been acquired by the School Board for new offices. The site of the new chapel and schools is an excellent one, situated at the corner of St. Mary's-road and Oak-lane, in a suburb which is gradually becoming fully populated. The building will be erected of local stone in a substantial manner, and the foundation-stone was laid by the Rev. J. G. Miall, who was the first pastor of Salem Chapel, on the 15th of October, 1887. The contracts are let to local contractors, and the architect is Mr. James Ledingham, A.R.I.B.A., of Bradford.

JUBILEE CHILDREN'S HOSPITAL, GATESHEAD.

On Friday last the foundation-stone and four memorial or corner stones were laid respectively by the Hon. W. H. James, M.P., the Hon. Mrs. Parsons, the Mayoress (Mrs. Geo. Davidson), Mrs. James Joicey, and Mrs. W. Clarke. We have given a bird's-eye view of the buildings as they will appear when completed. At present it is only intended to erect the administrative block and one pavilion or ward wing. The administrative block—85ft. by 46ft.—is two stories in height, with ample attic accommodation. The ground floor includes committee-room, waiting-room, separate rooms for nurses and matron, doctors' consulting room, dispensary, and operating room. The kitchen and laundry departments have been well considered, the matron having direct and immediate control of the staff. The bedrooms for the staff are on the first floor and attic story; advantage has been taken of the sloping site for ample cellar accommodation. This block has been so planned by the architect that it can be used for a hospital complete in itself, and for the present will be so occupied. The wing wards are each about 50ft. by 21ft., with day-room ward, kitchen, bath-room, and conveniences, and accommodation for 15 beds to each floor. The arrangement is such that should an epidemic break out the wards can be entirely shut off or isolated from the main building. The sanitary arrangements will include all the most modern and perfect appliances, and the plans for heating and ventilating have received the most careful attention. The material used in the building will be red bricks with stone dressings, the gables being formed with wall timbering, plaster, rough cast, and barge boards. The design is of a simple yet pleasing character, being a departure from the ordinary stern appearance of hospitals. The site of the new structure commands a beautiful view of the river Tyne and Ravensworth Woods, and Lady Northbourne's generosity in presenting the land as a free gift to the committee merits the warmest thanks of the people of Gateshead. Mr. W. H. Dunn (Thompson and Dunn), Newcastle, is the architect, and the contract is let to Haswell and Waugh, Gateshead. The amount for central block is £2,000, and each wing ward £1,000.

THE WOULDHAVE MEMORIAL, SOUTH SHIELDS.

The memorial illustrated to-day is proposed to be erected in a prominent position near the Marine Parks, to serve both as a memorial of Her Majesty's Jubilee year, and of the invention of the lifeboat by Willie Wouldhave, a native of South Shields. The sculptured panels on the four sides will show a bust of Wouldhave, the building of the lifeboat by Greathead, the launch, and the saving of the crew. Twenty-eight designs were submitted in competition, and that by Mr. J. H. Morton, F.R.I.B.A., South Shields, was selected, Mr. R. J. Johnson, F.R.I.B.A., advising the committee in their selection.

ALL SAINTS' CHURCH, CANNINGTON, ALLAHABAD.

The week before last we published some general drawings and a plan, with letterpress description, in illustration of the Cathedral Church of Cannington, in India, which is now being completed from the designs of Mr. William Emerson, F.R.I.B.A., its original architect. To-day we have herewith printed a detail drawing of the west front, showing half the interior and half the outside elevation. The detail is cleverly adapted to Indian requirements and climate, preserving at the same time the character of pure Gothic work as perfected in Normandy and England during the 13th century.

EAST WINDOW, EASTWOOD CHURCH, ESSEX.

This window has just been designed and executed by Messrs. Cox, Sons, Buckley, and Co. It is erected in the church of Eastwood, near Rochford, Essex, as a memorial of the Jubilee of 1887, by Mr. G. Miller. The subject is the "Crucifixion." The style is that of the best period of English glass—namely, that of the 15th century; the three figures are well drawn, and shown as "foreground" figures only, the backgrounds of curtains and trees being used merely as accessories; the extensive use of white glass, with golden "stain" on it, either as "quarries" in the skies, or in the borders, robes, &c., imparts, as in the old glass at Lichfield and Cirencester, great value to the other colours. The robes are covered with rich damasked patterns, and the folds are boldly drawn and expressed by the lead lines. Whilst keeping to the flat treatment essential to painting on glass, still sufficient shading is introduced to give due relief and expression to the countenances and "pose" of the three principal figures. The tones of ruby, blue, and olive green, used in portions of the window, are very harmonious, beautiful effects being produced by the use of "flashed" glass, as in old Venetian examples.

Arrangements have been made by the North-Eastern Railway Company for carrying out railway improvements in Newcastle-on-Tyne of an extensive character. With the exception of the eastern wing of the Central Railway Station Hotel, the remainder of the present hotel premises will be utilised for offices and traffic purposes generally, while the hotel will be extended. There will be additional platform accommodation and a new booking office and waiting room. These alterations will entail the formation of a new street, being a continuation of Westgate-road, which will be a broad 50ft. street from Collingwood-street to the end of St. Nicholas's Buildings.

At a meeting held at Canterbury on the 1st inst. it was decided to take steps for restoring the parish church of St. Alphege, the most ancient one in the city, and now in a state of dilapidation and decay. Plans by Mr. Joseph Clarke, F.S.A., the diocesan architect, were adopted, it being estimated that for absolutely necessary works £760 is required, and for restoration, reseating, and the rebuilding of the tower £2,000. Towards this £600 was promised in the room.

SKETCHES AT THE SALE ROOMS.

We illustrate to-day a few sketches of Decorative Furniture which was sold at Messrs. Phillip, Son, and Neale's rooms a short time since. The Marquetry Commode was of satinwood, inlaid with tulipwood, ebony, &c., and mounted with massive ormolu. The Chippendale Chair was of an unusual character about the back, which was shaped out of the solid. The little Italian Cabinet was a curious piece of work, and was enriched all over with gilded Japanese figures and flowers, conventionally treated, though how these came on an Italian cabinet would be hard to say. The piece of Jacobean work next was curious on account of the network of chased steel that covers it, and this was a characteristic of the best Scotch work of that period, though examples of it are rare, and we never recollect having seen one in a Sale Room before.

WOODROYD BOARD SCHOOL, BRADFORD, YORKSHIRE.

This school is arranged in three departments, forming three sides of a square. There are five classrooms to each department. The total accommodation is for 1,042 children. The cost of school buildings, furniture, playground, forming boundary walls, and outbuildings is £10,411, or £9 19s. 9¾d. per scholar. The architect is Mr. E. P. Peterson F.S.A., of Bradford.

COMPETITIONS.

Manchester.—Designs were last Friday sent in for the School Board Offices about to be erected in Manchester. The competition is restricted to four or five firms of architects in practice in the city. The site is a fine one, standing between three streets with a frontage to each of them.

Walton-le-Dale, near Preston, Lancashire, Competitive Sewerage Scheme.—Some little time back the local board of Walton-le-Dale advertised for schemes for the sewering and disposal of the sewage of their district. In response to this, many schemes have been sent in from some of the most eminent engineers in the country. The ultimate decision as to the merits of the various schemes was submitted to Mr. Thomas Fenwick, C.E., of Leeds, and he has just awarded the first premium to Mr. William Wrennall, C.E., of Liverpool; and the second premium to Messrs. H. T. Johnson and Co., civil engineers.

CHIPS.

The Bishop of Rochester on Thursday, the 1st inst., dedicated the first instalment of the restoration of the parish church of Chatham. The chancel and two transepts have been rebuilt by Messrs. Goddard, from the plans of Mr. A. W. Blomfield, F.S.A., at a cost of £3,000.

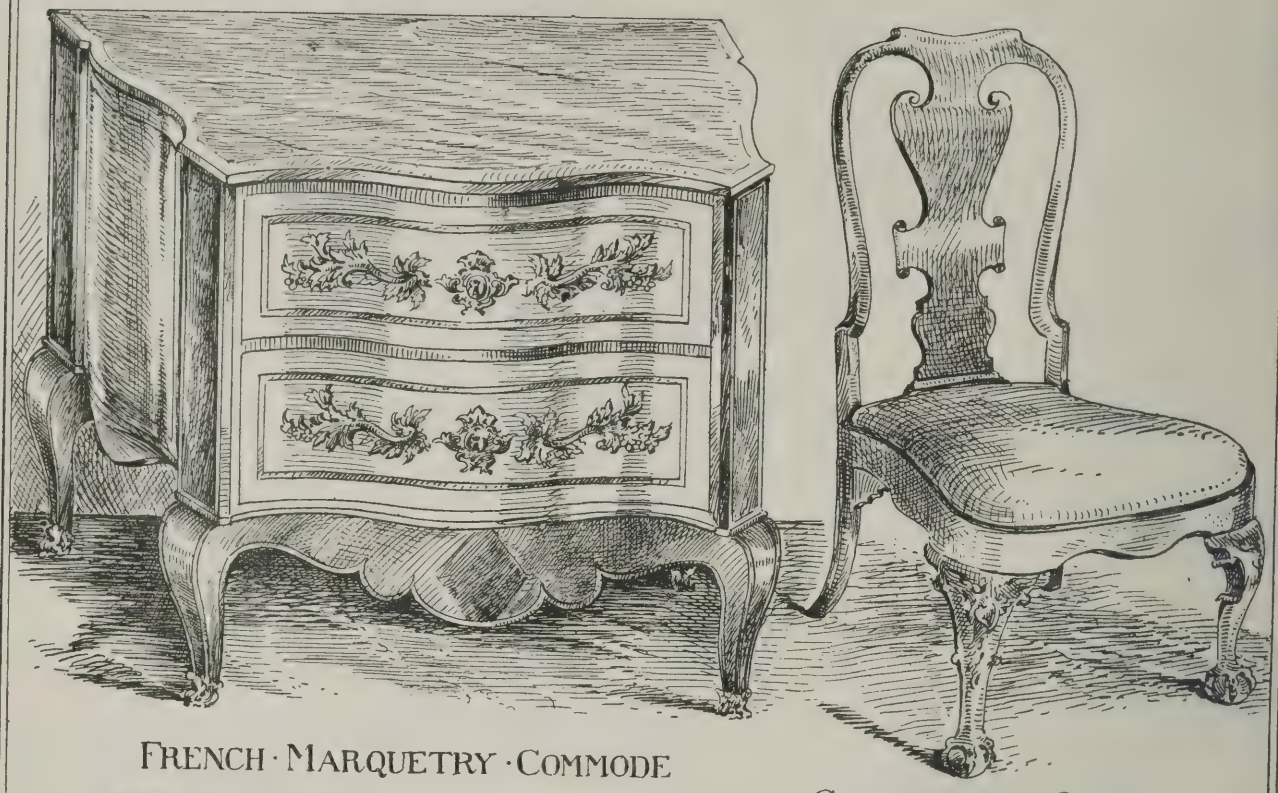
New premises in Southampton-buildings are about to be erected for the Birkbeck Bank and Building Society, from designs by Mr. T. C. Knightley, of Cannon-street, E.C.

Extensive repairs are being carried on at the east end of Lichfield Cathedral. Two or three of the buttresses were in danger of falling, and have been renewed. The mullions, inserted in the windows about A.D. 1802, were mere rubbish, and some of them have been, and the rest of them will be, replaced by new stone. The priceless 16th-century glass was very imperfectly secured when it was fixed in the Cathedral, and needs releading throughout. The third of the seven windows and glass, thus renewed, will be finished before Christmas.

The Great North of Scotland Railway Company propose doubling their main line between Inveramsay and Insch stations, in accordance with plans prepared by Mr. P. M. Barnett, their engineer.

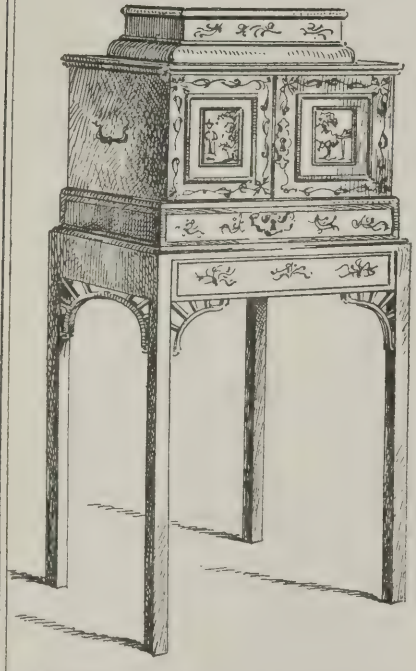
Probate has been granted of the will of Mr. Charles Waring, railway contractor, of the firm of Waring Brothers, and formerly M.P. for Poole. The value of the personal estate was declared at £552,270.

The death is announced, at his residence, Framingham, near Norwich, at the age of 76, of Mr. Christie, formerly head of the eminent firm of art auctioneers.

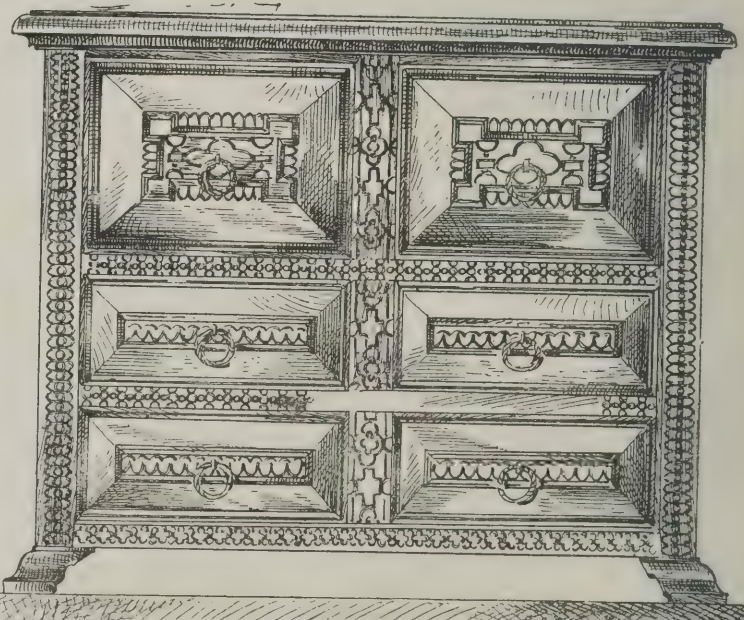


FRENCH · MARQUETRY · COMMODE

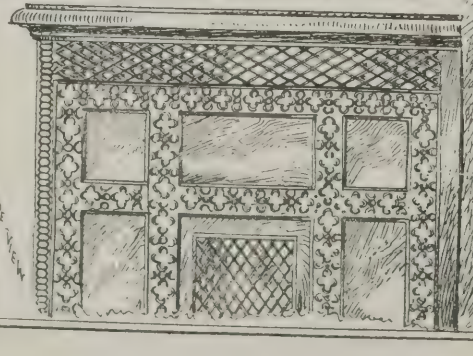
CHIPPENDALE · CHAIR



ANTIQUE · ITALIAN · CABINET

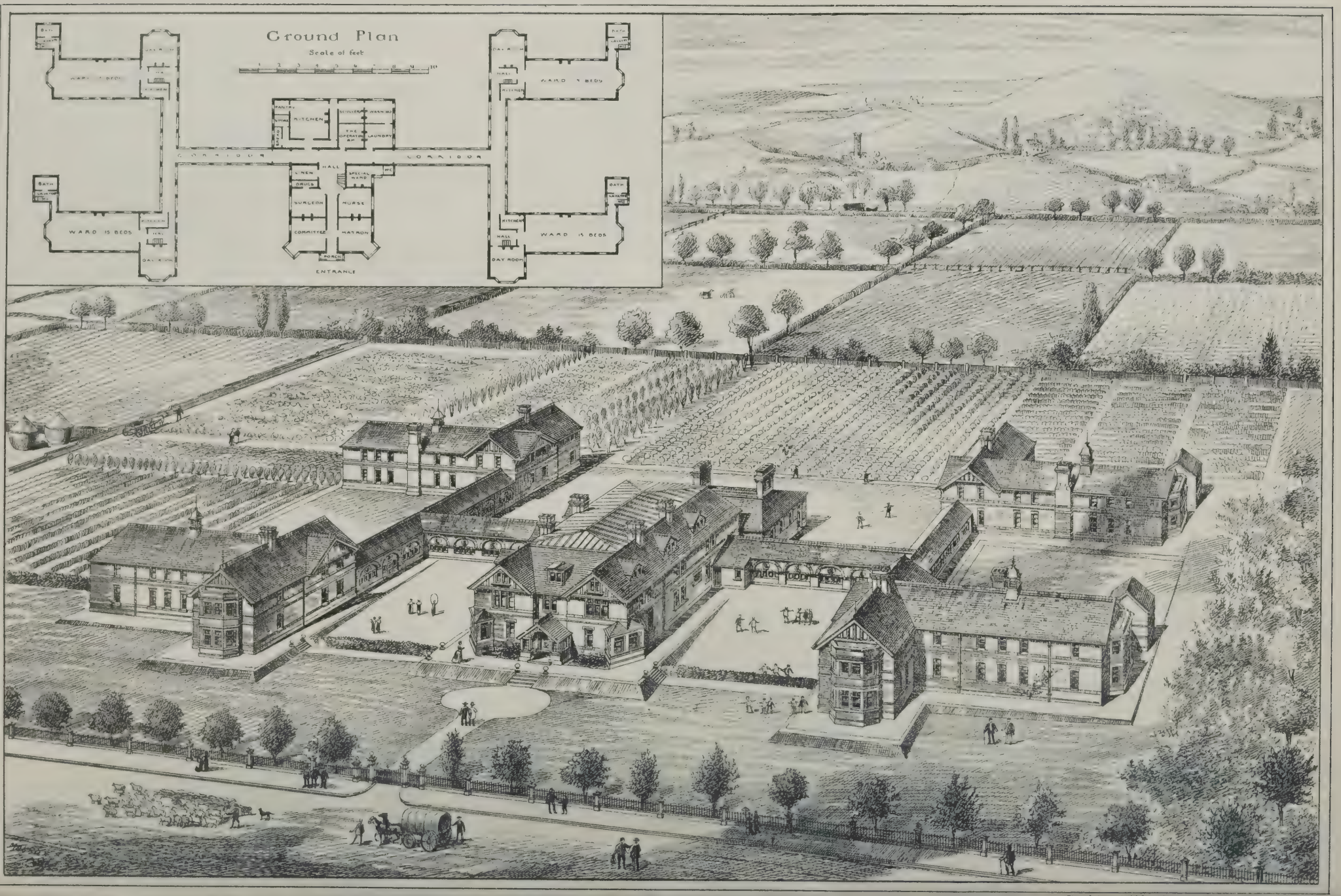


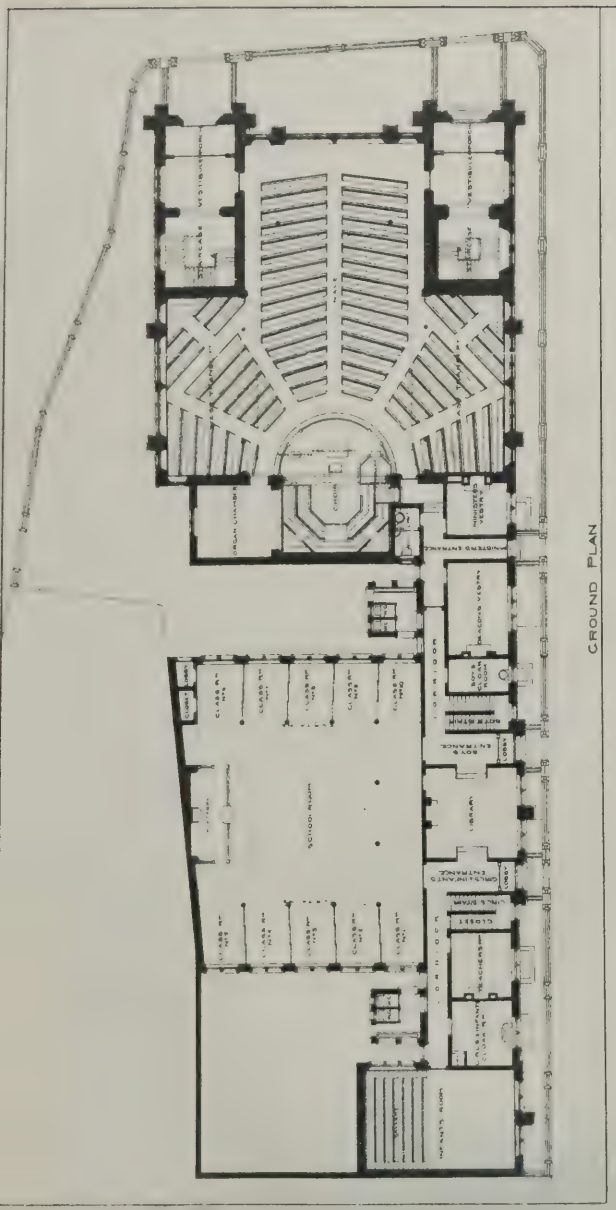
JACOBEAN · CABINET
WITH · STEEL · ORNAMENTATION



AT · THE · SALE · ROOMS

SKETCHES · AT · A · RECENT · SALE
AT
MESSRS PHILLIP · SON & NEALE'S


Ground Plan
Scale of feet
WARD 16 BEDS
KITCHEN
PANTRY
STORE
SCULLERY
WASH HS
THE OPERATING BY
LAUNDRY
CORRIDOR
CORRIDOR
HALL
LINEN
DRUGS
SPECIAL WARD
WC
SURGEON
NURSE
COMMITTEE
MATRON
PORCH
ENTRANCE
BATH
WARD 16 BEDS
KITCHEN
DAY ROOM
WARD 16 BEDS
KITCHEN
BATH
WARD 16 BEDS



GROUND PLAN

CONGREGATIONAL · CHAPEL · AND · SCHOOLS

ST MARY'S · ROAD · MANNINGHAM

JNO · LEDINGHAM · A·R·I·B·A · ARCHT

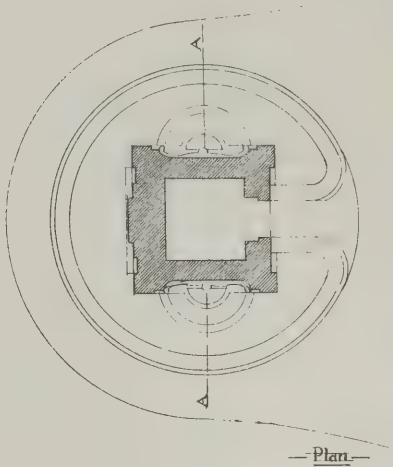


J. Langham del.

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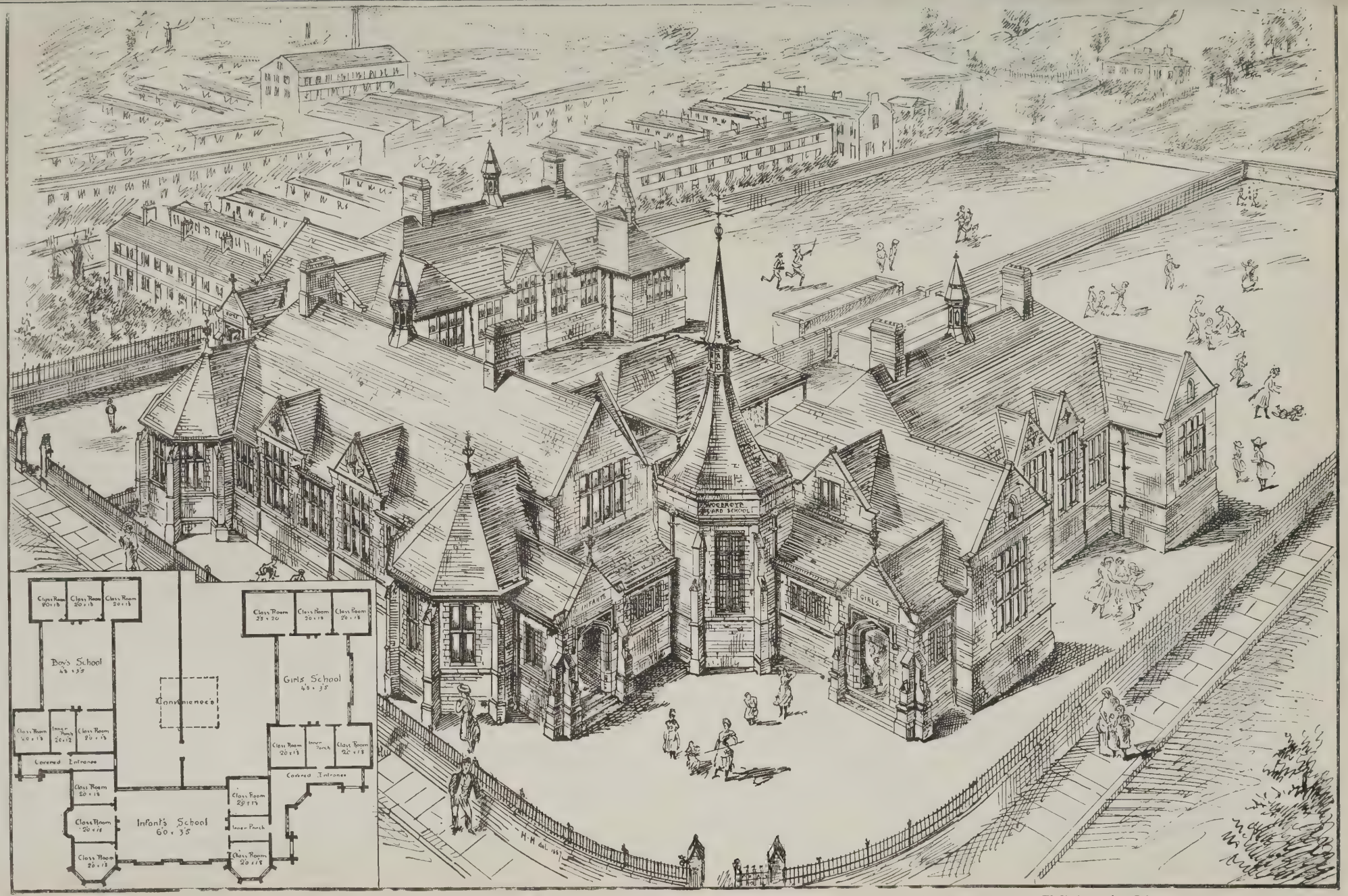
Section A-A



Plan

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THE · WOULDHAVE · MEMORIAL · SOUTH · SHIELDS · SELECTED · DESIGN · J·H·MORTON · F·R·I·B·A · ARCH.T



WOODROYD BOARD SCHOOL, BRADFORD, YORKSHIRE.—Mr. E. P. PETERSON, F.S.A., *Architect*.

BOOKS RECEIVED.

The Transactions of the Civil and Mechanical Engineers Society (published by the Society at 6, Queen Anne's-gate, Westminster) contains papers, mostly illustrated by drawings, by Mr. C. H. Cooper, on "Sewage Treatment at Wimbledon"; Mr. Francis Campin, on "The Design of English and Foreign Iron Bridges"; Mr. W. Lee Beardmore, on "House Drainage"; Mr. H. D. Appleton, on "Rural Sanitary Authorities"; Mr. R. E. Middleton, on "The Forth Bridge," and others. Most of these papers have appeared in full, or as abstracts, in our columns at the time of delivery before the Society.——*International Discharge and Continuous Overflow System of Sewering*, by H. R. Newton, F.S.A., architect, is the title of two pamphlets on the sewage problem—one, a scheme for dealing with the Houses of Parliament, being in the form of a letter addressed to Mr. Gladstone, while the second, treating of the subject in a more general manner, is addressed to Mr. C. T. Ritchie. Mr. Newton's theory is that drains and sewers should be permanently filled, the discharge being by overflow, his idea being by this means to prevent the production of sewer gas and the fouling of the air caused by passing through a contaminated channel.——*Lockwood's Dictionary of Mechanical Engineering Terms*, edited by a Foreman Pattern-Maker (London: Crosby Lockwood and Son), appears from a glance through its pages to be just the sort of handy dictionary required by the various trades engaged in mechanical engineering. The terms selected comprise those used in the drawing office, pattern shop, foundry, fitting, smith's, and boiler shops, many of which are unknown outside the workshop. The practical engineering pupil will find the book of great value in his studies, and every foreman engineer and mechanic should have a copy.

CHIPS.

During the work of scraping the whitewash from the walls of the east end of Peterborough cathedral numerous remnants of frescoes have been found. Some rosettes and escutcheons have also been discovered, but in none are the pigments very brilliant.

A new school chapel was opened at Winshill, near Burton-on-Trent, on Wednesday week, in connection with the United Methodist Free Church. The building will accommodate about 250 persons, and has been erected at a cost of about £500 by Messrs. Lowe and Sons, of Burton.

The Post Office authorities have at length resolved to proceed with the erection of the new post-office at Inverness, for which ground was feued in Queensgate two years ago. The contract for the works has been secured by Mr. Thomas Macdonald, builder, Hilton, Inverness. The building, it is understood, will cost over £10,000, and the works will be commenced forthwith.

The Metropolitan Board of Works have allowed Mr. H. Gundry, district surveyor of Paddington, a special fee of twenty-five guineas, in addition to the usual fees under the Dangerous Structures Clauses, for the exceptional character of his services in superintending the shoring and pulling down of Mr. Whiteley's premises after the last fire.

The parish church of Eccleshall, Staffs., has been recently enriched by the addition of a stained-glass window in commemoration of Her Majesty's Jubilee. It is one of the two-light windows in the north aisle, the subjects being "Abraham Meeting Melchisedeck, King of Salem, and Presenting to Him a Tenth of the Spoils," and "The Priests Proclaiming the Jubilee." Messrs. Burlison and Grylls, of London, carried out the work.

New Wesleyan Sunday schools were opened last week at the rear of the chapel in Unwin-place, Truro. They have been built from designs by Mr. Silvanus Trevail, M.S.A., of that city, the architect for the recent reconstruction of the adjoining chapel, the outlay on the entire scheme having been £7,000. The large hall on the first floor is 63ft. 6in. by 27ft. 6in., and is 25ft. high, and from this hall open out 12 classrooms in two tiers from the ground floor and gallery levels. The contractors were Mr. John Farley for masonry, and Mr. W. J. Tippet for carpentry. Mr. F. Whetter has acted as the clerk of works.

At Clinstone Church, Devon, special services were held last week in celebration of the erection of a new organ, built by Messrs. Voules, of Bristol, at a cost of £300, and the re-hanging of the six bells in the tower, a work carried out by Mr. Aggett, of Chagford.

Building Intelligence.

CURDRIDGE.—The memorial stone of the new church of St. Peter, Curdridge, Hants, was laid on Tuesday week. The church replaces a dilapidated and small structure built fifty years since, and will cost above £4,000. It will seat 240 persons, and will consist of a nave, chancel, west tower, and organ chamber, and vestry on the north of the chancel. The walls will be faced with flint work and dressings of Box Ground stone externally, and internally with chalk. There will be a half-timbered porch of solid oak framing on the south side. The building of the tower will be deferred; but the foundations have been put in. It is intended to be 22ft. square and 70ft. high to the top of the stair turret. The style adopted is 15th-century Gothic. The stonework and flint will be surmounted by a roof of red tiles. The chancel is to be laid with black and white marble, and the nave with stone, and wooden floors will be provided under the seats. The length of the nave will be 64ft. and the chancel 32ft., while the span of the former will be 27ft. and of the latter 21ft. Mr. G. Dobson, of Colchester, is the builder, and Mr. T. G. Jackson, M.A., F.S.A., of London and Oxford, is the architect.

HAUGHTON.—The parish church of St. Giles, Haughton, Staffs, was reopened on Nov. 29th, after the rebuilding of the chancel and restoration of nave, from plans by Mr. J. L. Pearson. The building was rebuilt early in the 18th century in the plainest fashion. In the present works the south wall of nave has been taken down and rebuilt on the old lines; but in rebuilding the chancel it has been lengthened by 9ft. The whole of the roofs are of necessity new and are of oak. The nave roof is of nine arched trusses, dividing the space into eight bays of about 5ft. each, and springing from moulded wall-plates and framed into moulded rafters and collars. There are three smaller common rafters in each bay, with upright struts from the wall-plates supporting a moulded cornice, or purlin; above this are two other purlins. The many divisions give an effect of great length and richness. The nave is lighted on the south side by three new windows of three lights each, in the Transition Decorated style, and with tracery in their square heads. The chancel roof is similar in general character to the nave roof, but more enriched. The ridge is on the same level as that of the nave, the side walls being 2ft. higher and the chancel itself nearly 4ft. narrower than the nave. An effect of much greater height is obtained. The chancel is rebuilt in the style of the early part of the 13th century. The east window is a triplet of lancets, widely separated. This is filled with painted glass representing the Crucifixion of our Lord in the centre light, with St. Mary and St. John in the two side-lights, executed by Messrs. Gibbs and Howard, of London. The reredos is of Caen stone, and the stalls are of oak, with solid, shaped ends, terminating with poppy-heads. The pulpit will be of Caen stone with red marble shafts, hexagonal in plan. The organ is in course of re-erection, with improvements, by Mr. Pickett, of Wolverhampton. Mr. G. J. Muirhead, of Newport, Salop, was the contractor. Unhappily, a fire broke out on his premises on October 10 and destroyed all the wood floor blocks and a large amount both of the old and new oak belonging to the church, but Mr. Muirhead determined to try and be ready for the date fixed for the reopening, and was successful. The total cost has been about £2,000.

MORETON-IN-MARSH.—The memorial hall which has been erected to the memory of the late Earl Redesdale at Moreton-in-Marsh, was opened on Friday last by Sir M. Hicks-Beach. The architects are Messrs. Ernest George and Peto, and the builders Messrs. Peto Bros., of Pimlico. The main floor of the hall is floored with oak, with a stone chimneypiece, and with windows on each side of the hall bearing the arms of the family of Lady Clementina Mitford, the daughter of the late and sister of the present Earl of Airlie, and of Mr. A. B. Freeman-Mitford, C.B., the donor, who was, up to the time of the death of his cousin, the late Earl of Redesdale, Secretary to the Commissioners of Public Works. The building is in the Tudor style, and built of Cotswold stone, raised on the Batsford estate. The building was illustrated in our issue of May 13th last.

PARTICK.—The railway station at Partick, near Glasgow, is undergoing enlargement and reconstruction. Greater accommodation was required, and this has necessitated an entire reconstruction of the buildings and rearrangement of the entrances and exits. New accesses are being formed on three sides. New buildings are being erected on both platforms. They are of brick, the elevation to the railway being of wood and glass, on which side is a verandah, about 14ft. broad, extending the whole length of the building. The accommodation for the public and for traffic requirements is ample. The plans were prepared by the company's architect, Mr. A. G. Gordon. Messrs. Kinnear, Moodie, and Co., Glasgow, are the contractors, and Mr. George Mellis is clerk of works. The cost of the improvements will be about £4,500.

SOUTH SHIELDS.—A parish church, to be dedicated to St. Aidan, has been erected on a corner site near the North Marine Park. The character is Early English, verging on the transition to the Decorated style. Owing to the site sloping from north to south, the floor of the church is 15ft. above the adjoining back street. The basement is utilised for a parish room beneath the chancel; and large choir and clergy vestries under the south aisle. The church has sitting accommodation for 612 persons, and the plan comprises nave with aisles, chancel, and organ chamber. The nave is of five bays, lighted by lofty clerestory windows of two lights each. The internal dimensions are:—Length, 118ft.; width, 55ft.; height, from floor to ceiling, 40ft. The walling throughout is of rubble, with sneck facing and chiselled stone dressings. The mosaic floor of the chancel is raised three steps, and the altar table is raised four steps more. The ceilings are divided by moulded ribs into panels, filled with plaster in the nave and aisles, and pitch-pine in the chancel. The whole of the internal fittings are of pitch-pine, and the windows are filled with leaded glazing of cathedral tinted glass. The east window is of three lights, the centre one being of stained glass, representing the Crucifixion. The church was designed by Mr. J. H. Morton, F.R.I.B.A., of South Shields, and the contract for building has been carried out by Mr. Robert Allison, of Whitburn. The buildings and site have cost over £4,500.

TRURO.—At the annual meeting of the Truro Diocesan Conference held on the 1st inst., the following report with regard to the Cathedral was received from Mr. J. L. Pearson, R.A.:—I have now the pleasure of congratulating the committee on the successful completion of the first portion of their undertaking. It has been a great source of satisfaction to me that the committee were enabled, not only to complete the substantial part of the structure as far as the first bay of the nave, but also to order by far the greater part of those internal fittings and adornments so essential to a Cathedral; and I also rejoice that these works—several of them ordered at the last moment—were practically completed before the day of consecration. I should like to call attention to the works (comparatively few in number) which are yet incomplete, and first amongst these I must mention the organ. I trust some arrangement will be at once made with Mr. Willis to fill in the necessary pipes to complete the front, and that at no distant date the oak case now so much needed will be added. As important as the organ, if not more so, are the completion of the stalls at their western end, and the erection of something in the nature of a screen to protect the choir. It is obvious that the present lighting of the Cathedral is temporary, and I hope that suitable coronæ (which, perhaps, may cost £7 or £8 each) will ere long replace the present fittings. A portion of the carving of the south porch will still remain unfinished when the amount devoted by Canon Phillpotts for this purpose has been expended. Until the remainder of this carving is completed, and the panels and niches are filled with sculpture, the effect of the design cannot be realised. I may also mention the levelling, laying out, and fencing of the Cathedral precincts. In conclusion, I would express the hope that we of this generation may live to see the completion

of what remains to be built—viz., the central tower, the nave, aisles, porch, and west front.

WALSALL.—The new Church of St. Andrew, erected in the populous and poor district of the Birchills, Walsall, was consecrated by the Bishop of Lichfield on Wednesday week. It is a plain edifice of Gothic character, faced externally with red bricks and a tiled roof, a bell turret covered with oak shingles. Internally the walls are faced partly with red bricks and partly with plaster, the pillars and window-sills being of stone, and the roof an open one of pitch-pine. It consists of nave, north and south aisles, a lean-to narthex, opening into the naves with three arches, chancel, morning chapel, organ-chamber, and choir and clergy vestries. The floor of the nave is of wood blocks, and that of the chancel of tiles; and the structure is heated by means of Gurney stoves. The internal dimensions are:—Length 124ft., breadth 51ft., and height 27ft. 6in. to the wall-plate, and 50ft. to the ridge; and the seating accommodation, by chairs, is for 700 persons. The architect is Mr. J. E. K. Cutts, of Southampton-street, Strand, London, and the builder Mr. A. Lynex, of Walsall. The cost of the church and fittings has been £3,500.

WALTON, LIVERPOOL.—St. Mary's Parish Church, Walton, was reopened on Friday week by Bishop Ryle after restoration. The first section of the work, the decoration and repair of the sacrarium, was carried out in 1882. The present work has cost about £2,300, exclusive of the new organ to be built, at an outlay of nearly £600. The principal improvements are the removal of the north and south galleries, the reconstruction and reseating of the western gallery, and forming a new staircase thereto; the removal of old seating and furniture, and reseating with pitchpine benches; the concreting of the floor area, and the laying of a new floor; the building of a choir vestry; the formation of a chancel with choir stalls, and new pulpit (the latter in lieu of a "three-decker," which formerly blocked up the central passage); the introduction of a new heating apparatus; the replacing of the ancient font in lieu of the modern one recently in use; the changing of the position of the memorial monuments; the reglazing of the windows with coloured glass, and the decoration of the walls of the buildings. Two of the windows are filled with stained glass subjects. The chief contractors for the work were Messrs. Kelly Bros., of Walton. The architects were Messrs. Aldridge and Deacon, of Liverpool.

CHIPS.

A Primitive Methodist chapel at Hutton Radley, North Yorkshire, was opened on the 1st inst. It seats 220 persons, has a school and classroom attached, and was built from plans by Mr. Geo. Race, of Westgate, Weardale.

About £10,000 has now been raised to meet the Bishop of Chester's proposed fund of £80,000, for the purpose of building ten new churches and fifteen mission rooms in the rural deanery of Stockport.

The first sod of the Warrington section of the Manchester Ship Canal was cut on Wednesday week, and operations have now been actively commenced under the supervision of Mr. Squires. Mr. T. A. Walker is, it will be remembered, the contractor for the canal.

The contract for the removal to, and re-erection of Temple Bar at Theobald's Park, Cheshunt, Herts, for Sir Henry Meux, Bart., is being carried out by Mr. Samuel Elliott, of the Albert Works, Newbury.

Last week the Bishop of Lichfield consecrated a new vestry which has been added to St. Mary's Church, Stafford-street, Wolverhampton. The north transept has hitherto been utilised for the purposes of a vestry, and that space will now give accommodation for 60 worshippers. The vestry, which is 36ft. by 20ft., with a height of 25ft., has been erected by Mr. H. Willcock, from the designs of Mr. T. H. Fleeming, at a cost of £600. The style is similar to that of the church.

At the Bankruptcy Court on Wednesday, Alfred Bath Baker, described as a builder, of the Lodge, Ealing-green, applied for an order of discharge. His statement of affairs showed debts amounting to £6,638, and there were no assets. Mr. Registrar Giffard, on the ground that the bankrupt's books were not such as sufficiently disclosed his business transactions and financial position, suspended the order of discharge for one year.

Engineering Notes.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The opening meeting for the present session of this society was held on Wednesday evening, at the Town Hall, Westminster, when an inaugural address was given by the president, Mr. Reginald E. Middleton, M.I.C.E., who referred with satisfaction to the fact that during the past session a committee of the council had drafted a Bill on the Sanitary Registration of Buildings, which had been favourably received and commented upon. He then dealt with the question of technical education, and emphasised its need for all engineers.

RAILWAYS IN NORTH CORNWALL.—The railway in course of construction from Bodmin to Wadebridge is making satisfactory progress, and will be opened throughout on February 1st. The section of the line from Bodmin to Boscarne Mill is being made by the Great Western Railway Company. From the latter place to Wadebridge, which is a part of the old Bodmin and Wadebridge Railway, the line is being re-laid, straightened, and improved by the South-Western Railway Company. The station at Wadebridge is commenced, and there is no doubt that the railway when completed to Wadebridge will be continued to Padstow, seven miles further. Early in the coming year, too, the second section of the railway from Launceston to the Delabole Slate Quarries will be commenced.

WICK.—The widening of the north quay of Wick Harbour to the extent of 15ft. is making favourable progress under the direction of Mr. Barron, C.E. The foundation of the extension is being formed of concrete, of which three blocks, each 22ft. in length, have been laid, and the upper portion of the quay is being built of dressed and coursed stone taken from the local quarries. The quay is also being lowered 2ft. to bring it to the same level as the south quay. When finished it will have a breadth of 39ft., as compared with 24ft. formerly. The steam dredger continues to work day and night in deepening the harbour; and as most of the large boulders which were embedded in the clay bottom have been removed, the work of deepening is now making good progress. The work when completed will give throughout the harbour a depth of 8ft. at low water.

A reredos has been presented to the church of St. Mary the Virgin, Greenhow Hill, near Leeds, designed by the Rev. J. Stanley Tute, vicar of Markington, and the carved work and illuminating have been executed and given by him. A new credence and sedilia have also been given. The reredos is of carved oak; the central portion has three square panels, filled with red and green figured silk of ecclesiastical pattern.

The town council of Warrington have disposed of the encaustic tiles found during the recent excavations on the site of the Friary in that borough, by ordering that a sufficient portion of the tiles to represent the design of the pavement be framed and hung on the wall of the Antiquities Room of the Museum; that specimens of each kind be exhibited in the cases; and that the remainder not required for the museum be given to the vicar and wardens of Holy Trinity, on condition that they lay them down in a suitable place in Trinity Church.

Operations in connection with the Thirlmere waterworks have been in progress in the Troutbeck Valley for some months, and the tunnel through Moor How, from the direction of Kendal, has now penetrated 100 yards, in addition to which offices and engine-houses have been erected, steam engines having been at work in the latter for some time. On the Hugill side of Moor How the works have been much longer in operation, and are further advanced.

The new chancel of the Abbey Church, Shrewsbury, built from designs by Mr. J. L. Pearson, R.A., was consecrated on Monday. The whole of the work has been executed by Messrs. E. Abley and Co., builders, Salisbury, under the superintendence of Mr. Thomas Athey, clerk of works, with Mr. W. Cowley, foreman; the carving of stalls and other fittings is by Messrs. Luscombe and Son, of Exeter; the glazing of the windows was done by Mr. Jackson, of London; and the old heating apparatus has been re-arranged and extended by Mr. W. B. Morris, of Shrewsbury.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

EXETER DIOCESAN ARCHITECTURAL SOCIETY.—A paper on "Romanesque Work" was read by Mr. E. Ashworth before this society at the College Hall, Exeter, on Friday last. Mr. Ashworth described the great works undertaken directly after the Norman Conquest in the principal cathedrals of England, the new bishops removing Saxon work and substituting the noblest and most majestic Romanesque. Durham might be taken as the foremost example, and Norwich, Ely, Peterborough, Oxford, and Winchester retained at the present day the stately arcades of the 12th century. Notice was taken of some few picturesque parish churches of the same date, such as Tickencote, Castle Rising, Barfreston, and also of crypts, which, even to parish churches in some cases, evinced much skill and ability in their design, and might give lessons to the architect of the present day. Descriptions were given of different abbey churches—Romsey, Tewkesbury, the Hospital of St. Cross, near Winchester, and Waltham Abbey. The paper was also illustrated with a number of drawings in water-colour, photographs, and engravings.

MANCHESTER ARCHITECTURAL ASSOCIATION.—A meeting was held on Tuesday week, the President (Mr. A. H. Davies-Colley) in the chair. Mr. John Slater, B.A., president of the London Architectural Association, read a paper on "Modern Architectural Education." He commenced by saying that Vitruvius's writings on the requirements of an architect, nearly 2,000 years ago, applied with almost equal force in the present day, and used them as the text of his paper. In addition to the recognised course of study, he said it was desirable to practise modelling, and history was necessary in the study of architecture to understand the conditions under which the various styles were developed. Messrs. Booth, Freeman, Hodgson, and others took part in a discussion which followed.

NORFOLK AND NORWICH ARCHÆOLOGICAL SOCIETY.—A meeting of this society was held in the Ethelbert Gate, Norwich, on the 28th ult., Dr. Bensby in the chair. Among the objects of interest exhibited was the book of the Carpenters' Company, Norwich, commencing 1594, lent by Mr. Walter Rye. Mr. Mark Knight read a paper setting forth a number of facts tending to show that "Strangers' Hall," in the parish of St. John in the Maddermarket, was originally the Hall of the Guild of St. George. Mr. Willins had stated that there was no clue as to who erected the building, which is of the Perpendicular period, as shown by its porch and window, but stands on crypts of the Decorated period. Upon the character of the carvings and the spandrels portrayed, Mr. Knight based the argument that the hall was built some time in the fifteenth century, for a semi-religious society, which held St. George in special veneration, and such a Guild was incorporated by Henry V., and purchased fresh premises, now covered by the City Free Library in the reign of Henry VII. Mr. Beecheno read some memorials of St. Andrew's parish, based on "The Cambridge Chest," containing wills and accounts between 1555 and 1676, and the Rev. W. Hudson a paper on "The Early Court Leet Rolls of Norwich."

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The annual general meeting of this society was held on the 1st inst., Professor Duns, D.D., in the chair. The office-bearers for the ensuing year were elected as follows:—The Marquis of Lothian, president; Norman Macpherson, LL.D., Sheriff of Dumfries and Galloway, the Earl of Stair, and Mr. Robert Herdman, R.S.A., vice-presidents; Mr. J. R. Findlay and R. W. Cochran-Patrick, LL.D., secretaries; Mr. W. Forbes and Thos. Dickson, LL.D., foreign secretaries; Joseph Anderson, LL.D., assistant secretary; Gilbert Goudie, treasurer; R. Carfrae and John J. Reid, curators; Adam B. Richardson, curator of coins; and John Taylor Brown, librarian. The members of the council, in addition to the office-bearers, are—Sir Noel Paton, Francis Abbott, Sir Arthur Mitchell, Dr. David Christison, Sir Herbert Maxwell, Professor Masson, Thos. G. Law, Sir W. Fettes Douglas, and Professor Sir W. Turner. The number of members added during the year has been 43, and deducting the losses by death and

resignations, there has been a gain of 17—the total number of Fellows being now 689. The annual report of the museum showed that it had been visited by 67,261 persons during the year, and had received 156 donations, while the donations to the library amounted to 697 volumes. During the year 2,089 objects of antiquity had been purchased for the museums and 64 volumes for the library.

SCHOOLS OF ART.

WOLVERHAMPTON.—The annual meeting for the distribution of prizes was held on Friday night. The report showed that the number of students attending the school during the year was 394, an increase on the previous year. The advanced work, while reaching a high standard, was still very far behind what they had anticipated, and what they hoped would be attained in the future. The prizes having been distributed, Mr. A. Harris, of Bradford, said that for 34 years the South Kensington Department had endeavoured to get hold of the artisan, but had failed owing to the plethora of objects in the museum, which led the students astray. A large measure of artistic ability existed amongst the artisans, but it had remained dormant owing to a want of development and practical training; and now this artistic ability was being developed by schools in the provinces which had fewer resources at their disposal. If they were to further the movement of artistic training it was necessary to consider in what points the present schools were defective, and what means should be employed to make them more efficient in the future. In any system of art instruction it was necessary that two cardinal points should be considered. They must first insure an association of trade with the schools, and they must then secure teachers versed in the requirements of trade as well as the principles of art. It was also desirable that each centre of industry should have under its control a number of good models and examples bearing upon the special trades of the district. The energies of the schools, in short, should be directed to the teaching of art as applicable to the industries of the country, and not to the teaching of art in the abstract, which should be of subordinate importance. Another desirable change was the holding of local exhibitions of the works of art students. Unless some such methods as these were generally pursued, no radical improvement would be made.

CHIPS.

The new Home of Industry, Bethnal Green-road, E., was opened on the 18th November. A building has been purchased and fitted up at a cost of over £8,000 for the purpose of training boys for emigration and other philanthropic work, carried on by Miss Macpherson. The architect was Mr. George Baines, 4, Great Winchester-street, E.C. The contractor was Mr. H. L. Holloway, of Deptford.

Mr. Harry Page Woodward, eldest son of Dr. Henry Woodward, F.R.S., of the British Museum (Natural History), who has served for more than three years as Assistant Government Geologist in South Australia, has been appointed Government Geologist for Western Australia, embracing an area of 975,824 square miles, being the largest of the Australian colonies. Only a very small portion of this enormous area has at present been examined by a geologist.

The Glasgow Art Club has elected Mr. Joseph Henderson president, Mr. A. S. Boyd vice-president of the artist section, Mr. Henry Johnston vice-president of the lay one, Mr. Thomas Morton, jun., hon. secretary, and Mr. William Adam hon. treasurer.

At Manchester the Arts Committee of the Royal Institution have decided to throw open the current autumn exhibition, and also the permanent collection, free to the public for five Sundays, between the hours of 2 and 8 p.m.

New vaults and warehouses are being erected for Messrs. McKenna, at the corner of Gould-street and Rochdale-road, Manchester. The fronts to Rochdale-road and Gould-street are being faced with Aberdeen granite and Edwards's pink-coloured bricks. The whole of the dressings, such as strings, labels, copings, and cornices are in granite. The cost of the work is £5,150, exclusive of fittings. Messrs. Wilson, Toft, and Huntly are carrying out the contract under the superintendence of Messrs. Alfred Darbyshire, F.R.I.B.A., and F. Bennett Smith, the architects.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., and XII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—H. F. S.—F. R. O.—I. L. Bd.—H. L. B.—L. H.—F. W. H.—M. W.—A. A. and Co.—W. B. S. B.—E. H. S.

L. HANSON. (We really must decline to act as architect on your behalf to the gentleman who wants the half-timber lodge, and will not sacrifice his gateposts. One thing is quite certain, the two are incompatible; but that probably won't matter.)—JUNIUS. (No such Act has been passed. The judges in two important cases have decided that the client can claim the drawings, and we have repeatedly referred readers to them. Our own opinion is that if the profession were thoroughly united and represented by an efficient corporate body, a more satisfactory interpretation of the law might be arrived at. At present an architect should always take care to stipulate that he shall retain the drawings—copies of course may be furnished.)

ADDRESS WANTED.—Will Mr. Wm. Crake, who kindly offered to send us some old engravings, kindly send us his complete address?—as our reply to him has been returned through the Dead Letter Office this week.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.

"LEONHARDT," "Coila," "Aughrim," "Beamish Boy," "Simplex et Prudens," "Mayfly," "Boreas," "Economy," "Northumberland," "Nemo," "Tat," "Angle," "Nabob," "Milosis," "Pedro," "Abington," "Etna," "Jack," "Venator," "Lucilius," "First Attempt," "Buggins," "Streona," "Ars Longa," "Rab," "Ossian and Harp," "Bee," "Wulfruna," "Apex No. 1," "Transome," "Elean," "Cromaboo," "Recruit," "Chimo," "Hercules," "Glenco," "Tempus Fugit," "Towser," "Acute Angle," "Midas," "Brickbat," "Netsukie," "Cosmos, junr.," "Texas Bill," "Alban," "Civis Mundi," "Beaumont," H.M.S. Conway," "Westminster," "Midland," "Spare Time Well Spent," "Solus," "Ye Jumping Frog," "Ghost," "Rob Roy," "Young Albion," "Lotus," "Uncle Toby," "Bagged Ape," Uncouth Swain," "Faith," "Liso," "Hudibras." The remainder were acknowledged last week.

F. R. (The carriage or cart-house adjoining the smithy is intended for use in connection with either the wheelwright's shop or the smithy, and is simply a standing for carts and other vehicles. The instructions are clear enough. See reply to "G. C." A w.c. or e.c. clearly should be provided, and urinal.)—G. C. (1. No stabling for horses is asked for with the smithy; but, of course, standing room for, say, four horses inside the building must be provided as a matter of course. 2. No yard behind is asked for. There would be a space, no doubt, for carts and timber, but this need not be drawn on the sheet on account of space. 3. "One roof" means exactly what it describes. There may be dormers. The wheelwright's shop of course will have a roof of its own.)—A. GREIG. (Yes; an ordinary corner site, not an internal angle plot in the corner of a square.)—ALFRED YATES. (All drawings are returned in due course. You must wait your turn.)

Correspondence.

ARCHITECTS' AND ENGINEERS' REGISTRATION BILL.

To the Editor of the BUILDING NEWS.

SIR,—In response to the invitation of the Architects' and Engineers' Registration Act Committee, local honorary secretaries have already been appointed in the following places, for purpose of making known the object and scope of the proposed Act:—Ashton-under-Lyne, Brighton, Birmingham, Banff, N.B., Barnsley, Bath, Cheltenham, Cardiff, Cork Dublin, Dundee, Elgin, Exeter, Edinburgh, Gloucester, Godalming, Hull, Hastings, Jersey, Leamington, Llanrug, Liverpool, Norwich, Newcastle-on-Tyne, Penzance, Redruth, Ryde, South Shields, Southsea, Southampton, Torquay, Truro, Weymouth, Wrexham, Walsall, York.

It is proposed to appoint local secretaries in every important town in the United Kingdom, and I shall be obliged if gentlemen willing to act as hon. local secretaries in towns other than the above mentioned, will kindly communicate with me at once.

The duties will not be very arduous, the most important steps being to interview members of both Houses of Parliament in their localities, and to obtain signatures to a petition praying that the Bill may pass into law. When complete, the full list of local secretaries will be published.—I am, &c.,

EDGAR FARMAN, hon. sec.
39, King-street, Cheapside, E.C.
London, Dec. 6th.

SIR,—In pursuing the Draft Bill, I have been somewhat puzzled by certain clauses contained in schedule (C). They are these:

In the form of certificate requiring to be signed on behalf of the applicant the term of assistantship prior to January, 1887, is required to be entered. An asterisk from this clause directs attention to a note in which it is stated that unless the term of years is eight and upwards, a certificate of examination must be produced.

In the form of certificate requiring to be signed *by* the applicant, the term of years counts back from the date of the passing of the Act. This is also the evident rendering of Section XIX. (7) (*c*).

What is the meaning of this apparent discrepancy? If eight years of assistantship prior to the passing of the Act (which from all appearance will be 1888) is sufficient, then it would seem that the asterisk referred to would more properly have been placed in the form of certificate requiring to be signed by the applicant.

By the way, can assistants rely that this term of years includes apprenticeship? This question was asked in your columns several months ago, and was answered in the affirmative with apparent authority, but by one who did not write above his name. The Bill does not contain any reference to the matter.—I am, &c.,

MAKE SURE.

THE DRAUGHTSMEN'S PROVIDENT FUND.

SIR,—May I, as a member of the committee, be allowed to say a few words on the above subject, and to heartily endorse the remarks of "R. C. W. D." in last week's BUILDING NEWS.

I may inform those who are thinking of becoming members of the Society that everything is being pushed forward with all possible speed, and that a public meeting will be held at the earliest date, so as to commence the Society without delay. I may state that the Committee propose that the first 100 applicants for membership shall be admitted without paying the customary entrance fee.

Intending applicants, who are anxious to know the objects of the Society, should at once communicate with Mr. G. A. T. Middleton, the secretary, St. James's Hall, Piccadilly, London, and they will obtain all necessary information at an early date, as the rules are now in proof.

To give some idea as to whom will be eligible as members, I may say that the term "draughtsman" will include all those who are employed

in an architect's, civil or mechanical engineer's, or surveyor's, office, or who are in any way connected with the accessory arts.

The Committee will feel much obliged to anyone who will forward their names as willing to act on the Committee.

In conclusion, let me urge upon all those who are eligible to come forward in large numbers, so as to assure the success of the society. The committee are doing their utmost; but, of course, they rely upon outsiders to assist, and if they only receive the support they are entitled to expect, the society is sure to prosper.—I am, &c.,

S. Huntley Egan.

22, Hargrave-road, Junction-road, Upper Holloway, N.

Sir,—I am desired by the committee which has been appointed to draw up the rules for the establishment of the above Society to ask permission to state in your columns that these are now nearly ready, the only thing required being the sanction of the Registrar of Friendly Societies. As they have been drafted upon the same lines as those of a society which is already registered, it is contemplated that there will be little delay, and it is hoped that the Society may start upon a career of usefulness by the beginning of next year. Gentlemen who intend to join would much oblige by communicating with me at once, and I will send them a copy of the rules, together with the necessary forms of application as members. The first hundred members will be admitted without the payment of an entrance fee; but after that an entrance fee of 5s. will be charged to each. The tables upon which sickness allowance and life assurance will be granted have been decided upon as low a scale as is consistent with successful working. To secure an allowance of one guinea per week for the first 13 weeks during illness, and of half this sum for a further period of 13 weeks, a man aged 20 last birthday will have to pay 7s. 8d. a quarter; and to insure £25 to his successors at death will have to pay 2s. 5d. a quarter until he reaches the age of 65. Larger sums can be assured at sickness and smaller at death at similar rates. It is also in contemplation to form a loan fund, but the details of this have not yet been worked out. The committee are empowered under the rules to use 10 per cent. only of the premium receipts towards the expenses of management. This may not suffice during the first few months, and, therefore, I should be glad to receive special subscriptions to meet the initial expenses from members of the profession who wish well to the movement.—I am, &c.,

G. A. T. Middleton, A.R.I.B.A., M.S.A., Hon. Sec.

St. James's Hall, Piccadilly, W., Dec. 2.

ST. ALBAN'S ABBEY.

Sir,—I noticed with interest some remarks by "Goth," in the Building News of the 25th ult., and also a letter which appeared in your issue of the 4th, with regard to the restoration (as I have seen it termed) of St. Alban's Abbey.

I suppose there is now no hope—no possibility, in fact—of saving the building from the clutches of Lord Grimthorpe. It really appears simply to be a question of time and money whether he will be able to entirely rebuild the Abbey, or whether there will be some few fragments saved to enable future generations to (mentally) reconstruct it as a palæontologist reconstructs an extinct animal from a single fossil bone.

But, although it may not have any direct beneficial effect in the present instance, I do think some form of public or professional protest should be made against this vandalism, if only to prevent a like fate befalling any other of our old buildings. Imagine Salisbury or Lincoln being gradually rebuilt by some rich "amateur architect" who happened to be able to afford the amusement!

I inclose for your own inspection three prints from negatives taken a few weeks ago of the "condemned" north transept; the angle turrets have already been taken down. One shudders to think of what the transept will look like when it has been re-erected; possibly, it will be an exact replica of the present south transept, which although the Rev. Precentor Venables in his address to the Archæological Institute last August described it as "new, well-built, carefully-designed, and attractive," is not an erection that many other people of taste could, I think, say as much for.

It is, doubtless, from one point of view, a good thing that Lord Grimthorpe should spend his spare cash in promoting the building-trade; but why doesn't he raise these erections of his in his own garden, where he could enjoy the leisure contemplation of them himself, and where they would be comparatively harmless?

Hoping that the matter may yet be taken up influentially—I am, &c., H. L. Field.

Lattimore-road, St. Alban's, Dec. 6.

ASSISTANT SURVEYORS R.E. DEPARTMENT EXAMINATIONS.

Sir,—Judging from "Prospero's" remarks in your last issue upon the above subject, I conclude he is quite ignorant of the duties which the assistant surveyors or the district surveyors of the R.E. Department are called upon to perform. It may be that he has been misled by the term "surveyor," which, if it applies to us at all, does so in our capacity as building or quantity surveyors, and not as land surveyors, as levelling and land surveying are not included in the list of our duties as laid down for us in Vol. V. of the Army Regulations, which are as follows:—

(*a*) The superintendence of works in progress, and keeping up any purely professional records in connection therewith.

(*b*) Attending at quarterly or other inspections as may be directed. (This refers to inspections of buildings).

(*c*) The preparation of details for services not taken up by the district surveyor.

(*d*) The preparation of plans or designs and specifications when necessary.

(*e*) The measurement, in company with an engineer officer when practicable, of services not taken up by the district surveyor.

(*f*) Assisting or sharing in the duties laid down in Par. 999, as may be directed by the commanding Royal Engineer. (The duties here referred to are those of the district surveyor).

It will be seen from the above that the additional subjects which "Prospero" proposes should be added to future examinations are quite unnecessary, although I do not wish to be understood to mean that some knowledge of the subjects might not, at some time or other, prove of advantage to those professionally engaged in the R.E.D.—I am, &c.,

An Assistant Surveyor, R.E.D.

Sir,—I agree with "Prospero" that "Modern Sanitation" and the "Use of Surveying Instruments" might with advantage be added to the list of subjects set to candidates for Royal Engineer appointments. I think, however, that "Euclid" should remain on the list, although "Trigonometry" might be dropped. I would further propose that "Mechanics" and a "Modern Language" should form two of the optional subjects, and that "Specifications for Building Works" be added to the "obligatory" list.

Besides these additions to the list of subjects, there ought to be, in my opinion, a practical examination as to the properties, uses, and market values of materials. For instance, specimens of bricks, wood, iron, slate, cement, &c., could be set before the candidates as in some of the excellent examinations held by the Science and Art Department at South Kensington. This test, I need hardly say, should be compulsory.—I am, &c., Norseman.

SALISBURY CATHEDRAL.

Sir,—Francis Price, who for some twenty years was surveyor, or, as we would better express it, clerk of works for the repairs to this cathedral, published in 1753 a work, illustrated with plates, in which he gives in his own quaint, pendantic, yet interesting way, several tests which were applied to ascertain the perpendicularity of the tower and spire.

Sir Christopher Wren, in his survey of 1668, ordered the removal of some timbers in the tower and spire, that a plummet might be let fall from the highest part possible to the pavement, and a mark was made of the centre of the plummet on the pavement for future repetition; this was tested in 1681 and 1736 by the two Naishs, father and son, clerks of works, and found correct. Wren found there was a declination to the south of 27½in., and to the west 17½in.

It would be very interesting to know by later historians what testings have taken place, more especially late ones, and if the pavement mark be still there. When I visited the cathedral a few years ago, I was not then aware of this. Price himself plumbed the work in sections, and came to almost the same conclusion as Sir Christopher, and found the greatest declination in upper part of the spire. He also describes a very ingenious method adopted by Mr. Mill in 1737, which is better to give in his own words with its grammar and spelling.

"My Lord Bishop called in the judgment of James Mill, Gent. of London, who suggested another method, almost as easy to repeat as the former. To proceed the more exactly with this, we first found the true centre of the building, or rather the centre of the four grand legs. From this centre a line was produced due west, al least such a line as the form of the building pointed out to be so. The like care was taken to produce another line directly north, which was continued as far from the building as was manageable for a wall in the churchyard. At this place a triangle of long poles was raised, united at their tops and spreading at bottom. From a point on top a line, with a plummit of sufficient weight hanging by it, was let fall into a vessel of water, in order to hinder, as much as possible, the vibration of the line and plummit. The vessel of water and the poles was moved till it was judged that the plumb-line did rest upon the said north line. This being fixed, a lighted candle was placed upon the west line in the church that was produced from the centre; and this candle was moved till it was agreed by persons standing behind the triangle of poles, who could see the middle of the capstone, or ball of the spire, and the light of the candle, that they were cut exactly by the plumb-line. This agreeing by several viewings from behind the poles, the centre of the candle was marked upon the pavement, and measured sixteen inches and a quarter from the true centre, consequently the total declination to the west. This was done July 18, 1737, in the presence of my Lord Bishop and others."

He then says the west line was also continued as far from the building, &c., the triangle fixed, also vessel of water, plummet, &c., when it was found the total declination to the south was 24½in.

My method would be by trigonometry, by taking angles of elevation from the extremities of these E. and W. and N. and S. lines to the highest point of spire, when triangles will be formed, whose bases and angles at same are given, whence the sides can be easily calculated, the perpendiculars and their distances from centre.

Perhaps some of your contributors may suggest some other method.—I am, &c.,

Belfastiensis.

N.B.—A diagram at 4 or 5ft. scale, accurately constructed, with these dimensions and angles, would give the same.

A CORRECTION.

Sir,—I beg to call your attention to an error in a paragraph in yours of Nov. 25 *re* opening of church at Knottingley, which may do me harm, and would be glad if same is corrected. I only saw it this week.

It says: "Messrs. John Hall Thorp and Sons, Leeds, have done the joinery work." They only executed the clergy and choir stalls, which were a special gift. I took the whole of contracts for the restoration of the buildings and nave seats of pitch pine.

Messrs. Demaine and Brierly, of York, were architects.—I am, &c., T. Woolston.

Recreation-road, Stamford, Dec. 7.

Mr. Messant, Newcastle, who was employed by the Aberdeen Harbour Board to report on the defects in the new graving dock, has confirmed the theory of the harbour engineer that the action of sea water on the concrete has been the cause of the damage, to make good which he estimates that nearly £3,000 will be required.

Intercommunication.

QUESTIONS.

[9493.]—**Geology and Chemistry of Building Materials.**—Can some reader kindly inform me what is the reliable but not too elaborate work on the above subject?—Q. A. G.

[9494.]—**Hot Water Pipes.**—How can I calculate the size of boiler and length of 4in. pipes required to heat a church containing 300,000 cubic feet? A simple rule for all cases would oblige.—PACK.

[9495.]—**Water Supply.**—Would any of your readers kindly tell me what works on water supplies to towns a student might get and supply?—AM.

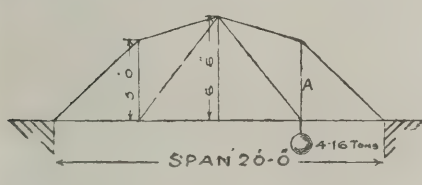
[9496.]—**The Albert Memorial.**—1. Has the gilding of the Albert Memorial been done with gold leaf? 2. Has anything been applied to protect the gilding against the influence of the weather? 3. Has the gilding required renewing up till now? 4. Which firm has contracted for the gilding?—J. GRIGENHEIM.

[9497.]—**Noiseless Outlet Ventilator.**—Can anyone recommend an efficient and noiseless ventilator for fixing to an air-flue from rooms? Those with mica flaps are objected to on account of the disagreeable noise they make.—NOISE.

[9498.]—**Pressure on Wall.**—What wind-pressure in pounds per square foot will a common brick wall withstand, 14ft. in height and 9in. thick, built in common mortar? For the purposes of calculation the cohesion of the mortar may be left out. Supposing the wind-pressure to be 40lb. per square foot, what thickness should the wall be?—X. Y.

[9499.]—**Concrete Floor.**—I have to make a building three stories in height fireproof. The floors at present are of wood. The length of building is 60ft., divided into six bays, 10ft. centre to centre; the width is 36ft., divided into three bays, 12ft. each, with two columns. I have to take away all the wood flooring and beams, and put in girders in place of beams. I propose to put small girders from end to end 6ft. apart, and put the floor 5in. thick of the best concrete that can be made. Will some reader who has had experience say the proportion to be used of broken brick and cement? Also, is it necessary to allow for expansion? I shall have to cut into the walls about 2in. for it to take a bearing. It is not a question of saving a ton of cement, or any trouble. There are so many "patent" concrete paviors about—one says this, another that—one does not know which to accept, so have decided to do it myself.—ANGLO-SAX.

[9500.]—**Strains in Truss.**—I should feel obliged



if someone would give a stress diagram for the above truss, due to the single weight of 4·16 tons at bottom? I should also like to know what it is that causes the compressive strain which is evidently acting in the vertical, A.—EDWARD BAYLEY.

REPLIES.

[9466.]—**Early Churches.**—If "Student" will get "An Essay on the History of English Church Architecture," by G. G. Scott, F.S.A., 1881, he will find in it a great deal of most valuable information about the early churches of Great Britain, with plans of several, including, I think, some of those mentioned in my former reply.—A. C. W.

[9471.]—**Music Hall.**—"A. C. W." has led your readers astray by his reference to an article on the construction of and regulations for music-halls. It is always better to quote by the week and year of issue, than by the page and volume. "A. C. W." refers us to the BUILDING NEWS, Vol. XXVI. p. 528, whereas it should have been the same page in Vol. XXXVI., the issue of May 16, 1879. The regulations for insuring the safety of audiences in music halls, adopted by the magistrates for Kent, were published in the BUILDING NEWS of Sept. 16, 1881.—E. W. H. P.

[9474.]—**Ordnance Maps.**—The following abbreviations are found on a 6in. Ordnance sheet, viz., the triangle with a dot is a trigonometrical station and the numerals signify the level, taken on the surface, given in feet decimally:—C R, centre of river for parish boundaries, &c.; Bolt, an iron nail driven into pitching or steining, serving as a "trig." station; G P, guide post; M S, mile stone. B S, boundary stone (parish, municipal, &c.); C. Tk. d., centre track of ditch; F W, face of wall for boundary; C S, centre of stream; C D, centre of ditch; B B, bottom of bank; 3ft. R H, 3ft. from root of hedge; S. P., side of pond; F P, footpath; ⊙ Pkt., picket (peg) with level taken on it; W, well; △, trigonometrical station; M H, man hole to sewers, reservoir, &c.; L K, lime-kiln; P O, post office; P, pump; B H, beer house; P H, public house; F. Br., foot-bridge; S P, signal post; M P, mesh post for barges, &c., to make fast. These are from a 6in. sheet that is by me, though I must admit there are many other abbreviations, no doubt. Could "P." give me the solution of the following in reference to boundaries, viz., "Def." and "Und."? I am well acquainted with the field-work of the 25in. sheets (of which the 6in. are reductions); but the draughtsmen in the office cut things down to a nicety, so much so that the public are quite lost for an explanation. I trust the information herein contained will throw a little light on the subject, and that "P." will communicate with me in the event of any further elucidation.—EDWIN S. PAYTON, R.E. Dept.

[9479.]—**Ecclesiastical Architecture.**—I should recommend "Alpha" to read Rev. Mr. Walcott's "Church and Conventual Arrangements." One of the peculiarities found in Benedictine Abbey churches is the separation provided between the choir and parishioners part of church or nave. The choir was often under the central tower, and was extended westwards. Sherborne Abbey and St. Alban's exhibit this distinction.—G. H. G.

[9479.]—**Ecclesiastical Architecture.**—Consult Dugdale's "Monasticon Anglicanum," Fosbrooke's "British Monachism," and Helyot's "Dictionnaire des Ordres Religieux." Benedictines, or Black Monks were founded by S. Benedict at Monte Casino, A.D. 530. They held all the cathedrals of the "new foundation," in England except Carlisle. The churches of Tewkesbury, Battle, Pershore, Selby, Glastonbury, Tynemouth, Croyland, and many others also belonged to them. Their monastic buildings included workshops of every trade and a mill, in order to render them quite independent of the outer world. Fergusson, in his "History of Architecture," says—"In the library of the monastery of St. Gall, in Switzerland, a plan of a great monastic establishment was found by Mabillon in the 17th century, and published by him in his 'Annals of the Benedictine Order.'" This plan does not pretend to represent any particular establishment, but is a "projet" of what was then considered a perfect monastery. It is, in fact, an illustration of the Benedictine system as applicable to Germany in the 9th century in its completed and most perfect form, and on this account is far more interesting to us than if it had been merely a plan of any particular monastery." The plan is given in Vol. II. of the above history, and also in the R.I.B.A. *Transactions*, Vol. III. new series.—A. C. W.

[9480.]—**Masonry and Stonecutting.**—I am very much obliged to Mr. John Powell for suggesting emendations to the text of my lessons, which he thinks will make them more in harmony with the usual terms used by practical masons in England, and before I publish the lessons as a textbook I should like to see them thoroughly revised by Mr. Powell and other practical masons. As to Mr. Powell's objections to the word "voussoir," I have some difficulty in making out wherein they lie. The question is simply this: *Is a cupola to be called an arch?* Until I hear that this is the proper way of defining a cupola, I beg to keep the word *voussoir* as being more convenient than the term arch-stone. As to the methods of stone-cutting discussed by Mr. Powell; the *first* was given by the Professor of the Ecole des Beaux Arts and the Military Polytechnic School of Paris, probably because it expresses the geometrical formation of the prism better than the other; but, as I have some experience in practical masonry, I naturally rejected that method as unpractical when teaching my pupils to work the stone. The reason why I inserted that method in my text is explained by my object in initiating my lessons of masonry. I beg to say that, when I proposed by lessons, I had no intention of teaching workmen the processes of stone-cutting; my ideas were limited to teaching *architectural students* the *geometrical methods* of masonry. The geometrical operations, by which the moulds for stone-cutting are prepared, are the same which the carpenter, the joiner, and the plumber use in preparing their working drawings; the science of masonry has, therefore, been in past times, and still ought to be the *foundation of architectural education*. It should be to the architect and to all craftsmen as familiar as the four rules of arithmetic. Although my class of masonry was intended for architectural students, it happens that several practical masons applied to join. At the present time, practical masons and architectural students are working side by side in my class. I was, at first, afraid that the kind of lessons I was giving to architectural students would hardly suit the requirements of the practical masons; but now I have found that the practical masons show an even greater interest in my lessons than the young architects. One of them, a master mason, assured me in my last lesson, Monday, 29th Nov., that there was hardly a mason in England who could prepare the moulds for stone-cutting as I do. He added that he has been for years trying in vain all kinds of places to learn, and that if I would only open a class for practical masons I should find hundreds would join. For what I know of masonry I am indebted to the hospitality offered me in Paris by the *Ancient Guild of Practical Masons*, and, therefore, I feel in duty bound to extend a brotherly hand to all practical masons who wish to learn. A class for *practical masons only* shall be initiated, to be instructed by practical masons as well as myself. Before ending these observations, I beg my young colleagues, the architectural students, to ponder what this last move means for them. They know that our grand cathedrals and abbeys were entirely designed by practical masons, and I can give them a quite modern instance of a practical mason becoming the leading architect of his day. About forty years ago a mason named Simon, of St. Gall, was working in St. Petersburg. A cupola was being built, and in the dinner-hour, as Simon was partaking of some bread and cheese in the masons' yard, he said to his pals that when the centring was knocked off they would do well to clear out of the place, for the cupola was sure to come tumbling down. This conversation was overheard by the brother of the Czar, who was visiting the works unawares. When the centring was removed the cupola did tumble down, and Simon was summoned before the Czar to explain the cause of the accident. The Czar was so struck by the intelligence of his answers that he confided to him the rebuilding of the cupola. Simon made from that moment a rapid fortune as an architect, and came back a wealthy man to his native place, St. Gall, where he died but lately. I know also other instances of masons, still living, becoming prosperous architects. Now, if the practical masons of England take to learning so eagerly as they seem to be inclined to do, is it not possible that they may become the architects of the future, and shove out of the field the gentlemen architects with kid gloves? The moral of these reflections is obvious. If the architectural students wish to hold their own later as architects, they must set to work seriously, and embrace every opportunity of learning which is offered them.—LAWRENCE HARVEY, Architect. (Teacher of the Class of Masonry, City and Guilds of London Institute).

[9482.]—**Products of Gas Combustion.**—The result of combustion by the atmospheric or "Bunsen" flame is shown by the following chemical equation, $CH_4 + 2O_2 = CO_2 + 2H_2O$; that is, one molecule of carburetted hydrogen, or common coal-gas, combining with two molecules of oxygen gives one molecule of carbonic acid, or carbon dioxide, and two molecules of water. With the illuminating flame you have a less supply of oxygen, and therefore have the following reaction—$CH_4 + O_2 = 2H_2O + C$; in the latter case the chemical action heats the free carbon to white heat, giving forth light, but which on coming to the surface of the flame combines with the oxygen of the air, forming CO_2, or possibly escaping altogether a free carbon or soot. By the above explanation it will be seen that carbonic acid is the result of both flames. Carbonic oxide, CO, is by far the most poisonous.—SCIENCE.

[9484.]—**Chesterfield Spire.**—I am able to give "G. C." some reliable information respecting this curious spire. It was my privilege to be acquainted with the late Mr. John Dixon, chief engineer of the Stockton and Darlington (the first) Railway, the first pupil of the celebrated George Stephenson. In conversation with him upon some timber construction, he intimated that he believed timber shrank endwise, and related the fact that when a young man he went with Mr. Stephenson to examine the spire for the local authorities, some of whom were afraid it was unsafe. After a very careful examination, in which they discovered thoroughly good construction and very little imperfection, Mr. Stephenson decided from all the appearances that some of the timbers had shrunk endwise, and being thoroughly secured and unable to move otherwise, the framework twisted. He was of opinion that it would go no further, and was perfectly safe. It looks more twisted from some points than others.—W. PEACHEY, F.R.I.B.A.

[9485.]—**Old Irish Fonts.**—If by this query is meant the old block basins in Brash's "Ecclesiastical Architecture of Ireland," we read that one of these rock-basins lies outside the church at Inniscultra, in Lough Derg; and others exist at Glendalough, Kilternan, and at the Well of St. Abban, at Ballyvourney. At Ballymeanig, Kilmalkedar, Fore Chapel, Faithlegg, Ballybacon, Killeshin, and other places are early fonts of Norman type. There is an early font in St. Canice's Cathedral, Kilkenny, that formerly belonged to Kells church in the same county.—HARRY HEMS.

[9485.]—**Ancient Irish Fonts.**—A few examples worth notice may be found, but in churches of Anglo-Norman origin at St. Davius, Naas (part a restoration), St. Andrew's, Dublin, Cathedral of St. Canice, Kilkenny, and some of similar pattern at St. Mary's, Kilkenny, and Gowran, Co. Kilkenny. Also a good font at Nicholas, Galway (Hiberno-Spanish). I have sketches of most of these.—J. DREW, Dublin.

[9486.]—**Earl Strongbow.**—The reputed memorial to the celebrated Strongbow is a monument in polished Purbeck marble (I believe), with a recumbent representation of the grim warrior lying thereon. It stands on the south side of the nave of Christ Church Cathedral at Dublin, and by its side is a smaller one, in the same material, representing the head, shoulders, and body of someone else. Tradition says it records the death of Strongbow's eldest son, whom the warrior chopped in twain with his sword, for the exhibition of cowardice in battle. It is but fair, however, to the stern father to say doubts have been entertained as to his having really cut the youth in two. Some accounts affirm that Earl Strongbow *only* ran his son through the body with a long sword! I spent a very pleasant morning recently in Christ Church Cathedral, in the instructive company of Mr. Thomas Drew, R.H.A., of Dublin, the cathedral architect, and a well-known gentleman who has done much for the edifice since the death of the late Mr. G. E. Street, R.A. Strongbow's monument used to be a spot over which some curious customs as regards local leases took place. Furthur, on the top of his "nob" (I mean the champion's head), there is a deep hole, and measuring an inch or two in diameter. A laughable custom connected with this opening was practised for centuries amongst the choir boys, and was religiously performed down to the time of the restoration. Any new juvenile addition to the choir was on the first possible opportunity taken solemnly to Strongbow's tomb, and there, surrounded by sympathising comrades, was made to put his nose into this hole at the top of the sculptured warrior's head. Then the question was asked, "Can you smell gunpowder?" Of course, the reply came sooner or later in the negative, when instantly the unfortunate lad's head was banged with great force against the marble one, the evident idea for this being by thrusting his nose further into the hole, to give him a better idea of the emptiness of the gunpowder theory. The crypt beneath the cathedral is now in admirable order. Mr. Drew has made it at once a local museum of the highest possible interest, and a campo sancta. Numerous old monuments line the walls, and the archæological and antiquarian remains carefully classified and arranged at the eastern end are of the highest value. This crypt is of rough masonry, probably prepared by the Irish masons themselves, a superstructure upon which the builders, who, it is believed, came from Glastonbury, afterwards built the cathedral itself. The masonry in this crypt, at some time or other was kept from sinking by innumerable wooden wedges driven in at frequent intervals between the joints of the stone. The crypt itself was very damp until Mr. Drew had it drained thoroughly. The curious result of drying the place, however, is that this multitude of wedges are naturally shrinking through the non-existence of the damp surroundings they have been so long accustomed to, and are now, at every hand, tumbling out of their old cracks. It may be instructive to discover what stone was originally used at Christ Church. The late Mr. Street thought it was Caen stone, but I believe few accept that theory now. Mr. Drew, however, does not believe the material, whatever it is, to be an Irish one. Where did it come from, then?—HARRY HEMS.

[9489.]—**Billiard-Room Light.**—The mode of lighting up billiard tables, as suggested by "J. M. H." is not only not new but quite antiquated, we having in our experience come across one or two billiard lights of that kind. We think if he were to adopt or recommend our system of lighting billiard tables with oil lamps he would find that it scarcely causes any shading of the table. You will see the style of lamp we use on page 16 of our price-list, which we shall be glad to send any reader. The founts of these being crystal glass, what little shade the burner occasions is overpowered by the light emitted by

its fellows.—Hennig Bros., 29, High-street, Bloomsbury, W.C.

[9491.]—**Valuation.**—The ground-rent is deducted from valuations of leasehold property. In freehold, of course the value of land is included.—G. H. G.

[9492.] — **Architectural Perspective.** — The second grade perspective hardly is a course for the young architectural assistant. In architectural perspective, the general course is to work from the plan of the building, and this is explained in Nicholson's and Ware's treatises on "Perspective." A good introduction to it will be found at the end of Newland's "Carpenters' Assistant," and in a small work by Chapman, "Introduction to Ground Plan Perspective."—G. H. G.

[9492.] — **Architectural Perspective.** — A thorough knowledge of the principles of perspective is most certainly useful to the architectural draughtsman, a good way to obtain which is a course of study at a school of art, but a much more ready and "rule of thumb" method than that taught in the schools is in general use among them, the latter being a great deal too complicated for practical purposes. I, however, always use a modification of it which I worked out for myself, and which I find answer very well in practice, and is very much simpler. There are plenty of handbooks published on the subject, and if "Station Point" does not wish to go very deep into the matter, I should think any assistant would give him the required information in "one easy lesson."—A. C. W.

LEGAL INTELLIGENCE.

Charge Against a Builder. — Henry Collins, builder, has been committed for trial by the Southwark police magistrate on a charge of obtaining goods on credit from Messrs. Measures Bros. and Co., iron girder manufacturers, being at the time an undischarged bankrupt. The defendant had dealt with the prosecutors since 1885, always paying cash until February, 1886, when he ordered goods amounting to £47. The transactions were understood to be for cash, but the money was not forthcoming, and had never been paid, and the prosecutors, on making inquiries, found that he was an undischarged bankrupt since early in 1885, and still remained so.

In re T. Bush Sage.—The bankrupt, who traded as a builder in Elvin-avenue, Paddington, applied at the London Bankruptcy Court on Tuesday, to pass his examination on a statement of affairs which showed liabilities £5,048, with fully secured debts £25,458, and assets £5,351. The bankrupt passed.

CHIPS.

The adjudications in bankruptcy in Tuesday's *Gazette* include the names of Frederick Smith, Coleman-street, E.C., builder, and James Forster, Leeds, builder.

A free library is about to be built at Denton, Ashton-under-Lyne, from designs by Messrs. T. D. and J. Lindley, architects, of the latter town, selected in competition.

The Chancellor of the Exchequer, Mr. Goschen, laid, on Tuesday, the foundation-stone of the Church of the Holy Cross, situated in Cromer-street, Gray's Inn-road. The church is estimated to accommodate 600 or 700 persons, and built at a cost of £8,000.

At a meeting of the town council of Linlithgow, held on Monday, Mr. Russell Walker, architect, submitted plans of the proposed new town hall and municipal buildings. The council approved of Mr. Walker's plans and report, and instructions were given to get offers for the work, so that the buildings may be proceeded with at once. Mr. Peter M'Lagan, M.P., Provincial Grand Master, will lay the foundation-stone of the new hall.

The Duchess of Albany opened, on Tuesday, the new Public Hall and Leopold Institute which have been erected at Slough. The building contains lecture, reading, and friendly societies' rooms, the cost of the structure amounting to about £4,000.

M. Philippe Rousseau, the still-life and animal painter, died in Paris, on Monday, at the age of 70. He was a pupil of Gros and Bertin, and some of his subjects were taken from La Fontaine's "Fables."

A meeting of the committee and suscribers to the memorial proposed to be erected to the memory of the late John Elder, of Fairfield shipyard, near Glasgow, was held at Govan on Monday, when it was agreed that the memorial should take the form of a statue to be placed in Elder Park, and that the work should be placed in the hands of Mr. E. J. Boehm, R.A. The cost will be 2,000 guineas, of which 1,700 guineas has been collected.

Mr. Thomas M. Lockwood, F.R.I.B.A., delivered a lecture at the Grosvenor Museum, Chester, last week on "The Architecture and Costume of the Fourteenth Century."

St. Andrew's Church, Pershore, was recpened by the Bishop of Worcester on Wednesday week after partial restoration, including the fitting of the chancel with choir-stalls.

STATUES, MEMORIALS, &c.

The New Wellington Statue. — The Prince of Wales, as president of the committee appointed two years ago to erect a new statue to the Duke of Wellington at Hyde Park Corner, which is to be called Wellington-place, has formally sanctioned the designs for the work which have been executed by Mr. Boehm, R.A., who modelled the statue, and by Mr. Taylor, of the Office of Works, who has drawn out the plans of the pedestal and the basement. The statue, like the old one now removed to Aldershot, is equestrian, and will be cast at Chelsea. It will stand directly opposite and face the centre of Apsley House. The pedestal will be placed upon a raised platform, 2ft. or 3ft. above the footway of Piccadilly, and will be surrounded by a margin of grey and red granite. The platform, 50ft. by 45ft., will be filled in with ornamental paving, and will also have a margin of granite. Steps of granite will run from this to what is at present a grass-plot; but which it is intended shall be asphalted. Around the outer edge trees will be planted.

WATER SUPPLY AND SANITARY MATTERS.

Wednesbury.—A special meeting of the Wednesbury Corporation was held at the sewage outfall works, Bescot, on Tuesday, for the purpose of inspecting the arrangements and seeing the machinery in motion. Mr. E. Pritchard, consulting engineer, explained the arrangement of the works, and the purification of the sewage. Gas having been generated by means of Dowson's economic gas system, two Otto's silent gas-engines in the engine-house were set in motion, Mr. Holt, Messrs. Crossley's representative, explaining the principles upon which they worked. The fact was commented upon that this was the introduction of the Dowson gas system into the district. Reference was also made to the experimental character of some of the processes and appliances. The system adopted is a partially separate one, the sewers containing sewage only, and the surface water passing along the open paved channels which the town possesses to the water-courses. The estimate is that 625,000 gallons (exclusive of surface or infiltration water) of sewage will be emptied into a brick chamber at the outfall where all floating matters will be removed, and the sewage will be treated in tanks (there being eight, each of 50,000 gallons capacity), with milk of lime, sulphate of alumina, and, if thought desirable, with proto-sulphate of iron also; and the effluent will then be conveyed to the land—an area of about twelve acres, laid out in level beds as filters—and from the land be discharged into the Tame. The sludge in the tanks will be compressed and prepared for removal to the orders of purchasers. The engine-house contains two 40-indicated horse-power Otto gas-engines, having direct-acting air compressors for the purpose of elevating the sewage, by means of Shone's ejectors from the low-level to the high-level sewers, and the engines also operate upon Westinghouse air compressors, and a vacuum pump for sludge pressing. In the pressing-room are two of Messrs. S. H. Johnson and Company's sludge filtering presses, each capable of pressing fifteen tons of sludge per day. These works will be fed by 27 miles of cast-iron and earthenware sewers, varying from 24in. to 9in. diameter, which are laid at different depths below the surface of the ground from 7ft. to 27ft. 3in., Shone's pneumatic ejectors having been placed at the low levels of the town. The Patent Shaft and Axletree Company has supplied the cast-iron pipes and special castings; and the Glenfield Company, Kilmarnock, the gas-engines, compressing engines, and machinery generally; whilst the construction of the sewers, the preparation of the outfall land, and the general work has been done by Mr. G. Law, Kidderminster and Wednesbury. The total amount of the loans for sewerage purposes is £45,000. The resident engineer has been Mr. C. Richards, Coventry, acting under the personal direction of the engineer, Mr. E. Pritchard, and his assistant, Mr. Fairlie.

The Vyrnwy Water Supply for Liverpool.—The quarterly return of the Water Committee of the Liverpool Corporation shows that the sum expended up to the 30th September last was £1,640,141 18s. 5d. Since the date of the last return the following contracts have been entered into:—Glenfield Company, Limited, Kilmarnock, valves, £200; Messrs. Cochrane and Co., Dudley, pipes for straining tower, £250; Glenfield Company, Limited, Kilmarnock, stand-pipes and three 30in. stopcocks, £170; Messrs. Cochrane and Co., Dudley, pipes for waste water course, Parc Uchaf, £1,500; Messrs. Clay and Sons, Ellesmere, iron centering for straining tower, £150.

An oak lectern, the work of Messrs. Cox, Son, and Buckley, has been placed in Christ Church, St. Alban's, as a memorial of the late vicar.

Our Office Table.

Professor T. Hayter Lewis, F.S.A., who has just returned from a visit to Constantinople, has written a letter to the Chairman of the Palestine Exploration Fund with reference to the sarcophagi recently found at Sidon, now at Constantinople, of which he was allowed by the Director of the Imperial Museum, Hamdi Bey, to see photographs. These sarcophagi, 10 in number, were found in churches 50ft. below the present surface of the ground; three are Phœnician in character, and the other seven of Greek design of different periods, carved out of Greek marble blocks. The architectural details of the latter seven sarcophagi are of the Greek type of the best period, without a trace of Roman influence, and the sculpture appears to be of the highest class. It is altogether different from the bold style of the Pergamos sculpture, and much more nearly resembles the beautifully delicate carving of the Parthenon frieze, of which the horses, the figures, and the drapery of the Sidon monument strongly remind one. All these Greek sarcophagi show large remains of coloured decoration, and confirm Hittorff's theories as to Greek polychromy as given in his work on Sicily. It will be months before the sarcophagi can be seen by anyone, as it is considered that it would be highly dangerous to expose them, however slightly, to the dust and damp of a Constantinople winter, as would be the case if they were uncovered before being placed in the building now being erected for their reception. The greatest care seems to have been taken to preserve the colouring and carvings from injury during their removal from Sidon.

Mr. Louis Samuel, the eldest son of the Agent-General for New South Wales, died at Sydney on the 29th ult., at the age of 26 years. He was educated as a civil engineer in the office of Mr. Moriarty, the Engineer-in-Chief to the Government of New South Wales, and seven years ago accompanied his father, Sir Saul Samuel, to England, where he studied for two years. He was engaged on important pier works at Tynemouth, and subsequently enlarged his experience of railway construction on the Lynn to Norwich line of the Eastern and Midlands Railway. On returning to New South Wales, about five years ago, though only 22 years of age, he tendered successfully to the Government for the construction of the largest graving dock in the Southern Hemisphere, at Biloeela, or Cockatoo Island, in Sydney Harbour. He was on the eve of completing this important work, successfully and unaided, when a career of high professional promise was abruptly ended. He had also undertaken other contracts of some magnitude.

The two national galleries at Edinburgh were opened on the 1st inst., after being closed throughout November for the annual overhaul, and contain several additions. Three works have been added to the collection at the National Gallery of Scotland—a large picture by the late Sam Bough, R.S.A., of a "Royal Volunteer Review," held before the Queen at Edinburgh a quarter of a century since, a gift by Mr. C. T. Combe; "Paralelsus, the Alchemist Lecturer," by the late David Scott, R.A., a loan; and "Cottar's Children," by Andrew Somerville. The additions to the Scottish National Portrait Gallery include the artist, P. Taylor's, portrait of himself, which is hung next his portrait of Burns; Mrs. Siddons, by John Wood; Patrick Fraser Tytler, the historian, by Sir John Watson Gordon; Thomas Thomson, the lawyer and antiquary; and a portrait by John Moir of Alexander, fourth Duke of Gordon; The Lord President presented to the Gallery a portrait by an unknown artist of his father, the Rev. John Inglis, D.D., of Tibbermuir, Perthshire, and Old Greyfriars, and for many years was the acknowledged leader of the "moderate" party in the church. Other works are a water-colour miniature on ivory of Samuel Halkett, the linguist, by C. Halkett, a sketch of William Dyce, R.A., from the pencil of David Scott, R.S.A., and several medallions of men of note.

We have received a "combination set-square," which has been invented by Mr. W. H. Dashwood Caple, a Cardiff architect, for the use of his fellow-practitioners and draughts-

men. Its object is to comprise in one set-square the advantages of two, giving the usual angles of 60° and 45°, thus rendering two separate squares unnecessary. The specimen sent us is in pear wood, rather too thick for comfortable use, and certainly too heavy for delicate work. Some architects may like the "combination"; but our main objection to it is that although the square itself gives a right angle of 9in. by 7in., the 45° and 60° are restricted to 5½in.; thus, while the instrument is of a really large size, it is only equal to two small set-squares, which would be far more easily carried—either in a case or the pocket.

Electric lighting *versus* gas-lighting was discussed at a recent meeting of the Manchester Association of Engineers, when Mr. J. R. Williamson read a paper on electric lighting from central stations. In reply to questions raised as to the results obtained in the application of electric lighting to mills and works, and the comparative cost of gas and electricity, Mr. Williamson replied that in the immediate vicinity of Manchester there were a score or more mills where the electric light was working successfully, and as to the comparative cost of gas and electricity, he pointed out that in one large mill, where lighting by gas had been replaced by 930 electric lamps, the cost over a certain period had been £362 for maintaining the electric lamps, as compared with £510 which had previously been paid for gas at the rate of 3s. 2d. per 1,000ft.

A new and attractive loan collection has been opened at the Municipal Art Gallery, Birmingham. Among the more popular works are Landseer's "Midsummer Night's Dream" and "The Sick Monkey"; Sir Frederic Leighton's "Hercules Wrestling with Death for the Body of Alcestus"; three works by Mr. Burne-Jones—"The Annunciation," "The Feast of Peleus," and "The Wheel of Fortune"; Holman Hunt's "Shadow of the Cross"; "The Last Muster," by Herbert Herkomer; Walter Crane's "Bridge of Life"; and Professor Richmond's colossal "Prometheus." Since the gallery was opened, just two years ago, two millions of people have visited it.

During the present week photographs have been on view at the Mansion House of Count I. de Lalaing's design for the Waterloo Memorial, which is about to be erected in the new cemetery at Evere, near Brussels, to the memory of the British officers and men who fell in the Waterloo campaign, and were buried in Belgium. Till now the tombs of these heroes have been utterly neglected, and many of them were simply interred in the farms round Mont St. Jean. A good site has been given by the municipality of Brussels, and the British Government have promised £500 to the cost of the monument, which is estimated at £2,000. The sculptor's composition comprises the mourning figure of Britannia, with her trident turned down pointing to the inscription on the rough slabs, at the head of which she stands erect, shield in hand, but with downcast head at the memory of a nation's loss. Four full-length lions are watching in crouching attitudes round the sepulchre, while here and there are ghastly memorials of the battlefield. The design is original in treatment, though it hardly records a victor's sorrow, and seems spoilt by a lack of vigour.

Sir Douglas Galton read a paper on "The Cause and Prevention of Smoke and Fog" at the Parkes Museum on the 1st inst. The lecturer said that black fog was entirely the result of smoke, and if each person would make his own individual efforts, light and air would cease to be obscured. Ammonia and sulphur were present in London air to a great and unnecessary extent. If we emptied our dustbins more frequently, and if we cleaned our streets properly instead of allowing such a quantity of horse manure to lie about, we should diminish one potent cause of fog. The blackness of the fog came from the smoke arising from incompletely burned coal. Fires and boilers were quite easily made smokeless either by proper care or mechanical stokers; but domestic fires caused most of the foul smoke, and the evil daily increased with the growth of the population. If the smoke nuisance was to be abolished, gas must in the first place be used for cooking. There were plenty of so-called smoke-preventing open fires; but they required care in putting on coals, and nobody exercised that care. All experience showed that open fires must be abolished. If smoke was to be avoided houses must be warmed by hot-air, hot water, steam, or gas.

An artists' exhibition was opened on Monday in the Art Gallery, Schoolhill, Aberdeen. The canvases hung number 500. Local artists are stronger in portraiture than usual, some of the more conspicuous being those by Joseph Farquharson, J. C. Mitchie, and W. Cadenhead, and the display of water-colours is the strongest yet seen in Aberdeen. Among the landscapes may be mentioned those by Alexander Mackenzie, "On the Coast of France," T. Bantry's "Findhorn" and "Lochnager from Calleen," and sketches from Tangiers by W. Guthrie. The *genre* pictures include works by W. B. Baird, Sam Reid, and Josef Israels; and the chief contributors of sculpture are Boehm, D. W. Stevenson, and T. Stuart Burnett.

The second annual meeting of the shareholders in Robert Boyle and Son, Limited, was held on November 23rd, when a dividend of 12 per cent. for the year was declared on the ordinary shares of the company, free of income-tax, one-sixth of the profits being also placed to the reserve fund, and a substantial balance carried forward to next year. Mr. Robert Boyle, the managing director, stated that there was a highly satisfactory increase in the business, which he attributed to not only the improved form of the air-pump ventilator they were now making, but to the fact that they had also tried as much as possible to meet the requirements of their clients with regard to cost and the quality of the articles supplied, the present form of the air-pump ventilator, though much more efficient, being now sold at about 50 per cent. less than previous and inferior forms, besides being made of a more ornamental character.

The experiment of giving short courses of lectures, free, in large halls in London, which is being tried this term under the auspices of the London Society for the Extension of University Teaching and the Gilchrist Trustees, is proving a marked success. Courses have been arranged in ten different districts in London, and halls as large as the Town Halls of Shoreditch and Bermondsey, holding from 1,500 to 2,000 people, have been full to overflowing. These lectures, which in the majority of cases are upon scientific subjects, are illustrated by the oxy-hydrogen lantern and experiments.

CHIPS.

The December issue of *Science and Art* contains an excellent portrait and a biography of Mr. Henry Adams, M.Inst.C.E., M.S.A., professor of engineering at the City of London College.

Sir William Fettes Douglas, P.R.S.A., distributed the prizes to the students attending the Life School of the Royal Scottish Academy on Friday, and delivered an address. The Chalmers Bursary was obtained by Mr. John Briggs and Mr. W. Marshall—equal. The prize for the best drawing from the life was given to Mr. David Noble; second prize, Mr. Alexander Hay. The Keith prize for the best work of a student in this year's Exhibition, Messrs. Duddingston Herman and William Fraser—equal. Maclaine Watters medal and extra prize, Mr. W. Milne; and Stuart prize, Mr. G. Denholm Armour.

A new hospital was opened on Tuesday at Ruabon, which has been built and furnished by Sir Watkin Williams Wynn, Bart., of Wynnstay. It has been constructed by Mr. Samuel, contractor, Wrexham, frem the design of Mr. Spaull, architect, Oswestry, at a cost of £2,500.

A school chapel at Murchington, near Chagford, designed by Mr. James Crocker, of Exeter, a resident in the parish, is in course of erection. The foundation-stone was formally laid last week.

The new (Halicarnassian) picture gallery, which Messrs. Charles Hallé and Comyns Carr are about to erect as a competitor for the class of exhibitions hitherto held in the Grosvenor Gallery, is to be built on a prominent site, we hear, in Piccadilly, and Mr. E. R. Robson, F.S.A., is to be the architect.

The Church of Holy Cross, Shrewsbury, built from plans by Mr. J. L. Pearson, R.A., on the site of an old church long in ruins, was consecrated on Monday. The work has cost £10,000.

MEETINGS FOR THE ENSUING WEEK.

Monday.—Leeds and Yorkshire Architectural Society. Annual Dinner.

Tuesday.—Society of Architects. 'The Relations of Architect, Surveyor, and Builder," by J. Leaning, St. James's Hall, Piccadilly. 7 p.m.

Institution of Civil Engineers. Discussion on "Electrical Tramways." 8 p.m.

Birmingham Architectural Association. "The Temples, Theatres, and Tombs of Pompeii," by W. Wallis.

Sheffield Society of Architects and Surveyors. "Registration," by J. W. Connon, of Leeds.

Manchester Architectural Association. "Scottish Cathedrals," by the Rev. R. H. Snape, of Bolton.

Wednesday.—Society of Arts. "Commercial Education," by Sir Philip Magnus. 8 p.m.

Friday.—Architectural Association. "The Proposal to Make Architecture a Close Profession by Imposing the Test of Examination and Registration," by T. G. Jackson, M.A. 7.30 p.m.

Institution of Civil Engineers. "River-Gauging at the Vyrnwy Reservoir," by J. H. Parkin. 7.30 p.m.

Edinburgh Architectural Association. Annual Dinner.

Architectural Association.—"The Proposal to Make Architecture a Close Profession by Imposing the Test of Examination and Registration." By T. G. Jackson, Esq., M.A. 7.30 p.m. Dec. 16.

ARCHITECTS', ENGINEERS', AND SURVEYORS' REGISTRATION BILL.

The ARCHITECTS' and ENGINEERS' REGISTRATION ACT COMMITTEE invite all who are interested in the Passing of the above Bill to CONTRIBUTE towards the NECESSARY EXPENSES incidental to the presentation of the Bill to Parliament.

If this appeal is met with a ready response by the profession, the Bill will be presented to Parliament early next session by

COLONEL DUNCAN, R.A., C.B., M.P.,

who has kindly undertaken to pilot the Bill through the House, backed by other influential members.

Subscriptions of all amounts will be acceptable, and all sums of £1 or upwards will be publicly acknowledged, and subscribers will be supplied with a Copy of the Bill.

Subscriptions may be sent to the Honorary Secretary,

EDGAR FARMAN, Hon. Sec.

J. WATSON MOYSES, B.L.,
ROBERT WALKER, M.S.A., A.M.I.C.E.,
HUGH ROUMIEU GOUGH, M.S.A., F.R.I.B.A., } Treasurers.

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The award of the gold medals and other prizes this year at the Royal Academy will take place on Saturday next, and the public will be admitted to view the students' works on Monday during the daytime.

The Metropolitan Board of Works have resolved that no surplus land other than that which has been let on lease should be sold until it shall have been in the first instance submitted to public auction.

Among the lectures to be given next year at the Royal Institute of Great Britain are three by Prof. Herkomer, A.R.A. These will be delivered on Thursday, Jan. 19 and 26, and Feb. 2, and will deal with the subjects "The Walker School," "My Visit to America," and "Art Education."

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TENDERS.

*** Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

APPLETHWAITE.—For new boys' school, St. Marys Applethwaite. Mr. R. Walker, Windermere, architect and surveyor:—

(Accepted tenders)
Mason work, walling, &c.:—
Atkinson, T. and M., Windermere.
Carpenters and joiners:—
Longmire and Robinson, Windermere.
Plumber:—
Pattinson, J. A., Windermere.
Plasterer:—
Pattinson, G. H., Bowness.
Painter and glazier:—
Heaton, R., Windermere.

CAMBERWELL.—For the erection of proposed parish hall, Camberwell, S.E. Mr. G. Hubbard, 23, Finsbury-circus, E.C., architect. Quantities by Mr. J. Sargeant, Grosvenor-gardens, S.W.:—

Patman and Co.	£3,543 0 0
Baalam Bros.	3,085 0 0
Holliday and Greenwood	3,077 0 0
Chappell, J. T.	2,964 0 0
Braid, A. and E. (accepted) ...	2,745 0 0

CHEDDAR.—For the restoration of the ancient Market Cross, Cheddar, Somerset. Messrs. Lingen Barker and Cross, architects:—

Accepted tenders:—
Mason:—Ford, Cheddar.
Carpenter:—Scourse, Cheddar.
Ironwork:—Spratt, Cheddar.
Plumber:—Shore, Cheddar.

DARTFORD, KENT.—For repairs and improvements to 12 cottages at Stone. Mr. St. Pierre Harris, A.R.I.B.A., 1, Basinghall-street, E.C., and Orpington, architect and surveyor:—

Hodges	£425 0 0
Gilham, R. W.	350 0 0
Knight	320 0 0
Hewitt (accepted)	289 0 0

ENFIELD.—For constructing roads and sewers at Little Park Estate, for Mr. A. Dixon:—
Jackson, J., Enfield (accepted).

ENFIELD.—For making up Gessolin-road, for the Enfield Local Board of Health. Mr. W. Ketteringham, surveyor:—
Jackson, J., Enfield (accepted).

ENFIELD.—For constructing roads and sewers, for the Eastern Counties Estates Exchange, on their estate at Ponder's End:—

Pizzey	£447 0 0
Marshall	444 0 0
Catley	438 0 0
Nicholls	435 0 0
Potter	410 0 0
Trueman...	399 0 0
Bell	398 0 0
Bloomfield	395 0 0
Jackson, J., Enfield	312 0 0

FENTON, STAFFS.—For the erection of a governor house at the gasworks, for the local board:—

Yoxhall and Heath (accepted) ...	£50 0 0

GLASGOW.—For the erection of a hydraulic elevator to the council chamber at the Municipal Buildings, for the city council. Mr. W. Young, London and Glasgow, architect:—

American Elevator Co. (accepted)...	£700 0 0

HARROW WEALD.—For house, Bentley Priory, Harrow, Middlesex, for the Rt. Hon. R. L. Powell. Mr. J. F. Curwen, Kendal, Cumberland, architect. Quantities by Mr. J. Sargeant, Grosvenor-gardens, S.W.:—

Staines and Son	£4 341 0 0
Kirby	4,290 0 0
Miskin, C.	4,164 0 0
Bentley, J.	4,156 0 0
Waterman, G. and J.	4,069 0 0
Larter, F.	3,986 6 0
Turner and Co.	3,747 0 0
Hanson, A. and B.	3,722 0 0
Holliday and Co.	3,698 0 0
Chappell, J. T. (accepted)... ...	3,669 0 0
Braid, A. and E.	3,665 0 0

For stables to above:—

Chappell, J. T. (accepted)... ...	1,200 0 0

(No competition.)

HACKNEY.—For laying down new block flooring in the infants' department of the Wilmot-street School, Hackney, for the London School Board:—

Duffy, M. C., and Son...	£637 13 0
Bendon, T.	550 0 0
Spencer, E., and Co.	530 0 0
Wood Block Flooring Co.	438 10 0
Chappell, J. T....	406 0 0
Frankenberg and Co., Kennington Park-road (accepted)	325 0 0

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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1719.
FRIDAY, DECEMBER 16, 1887.

BUILDING CODES AND COVENANTS.

THE rapid filling up of areas in towns renders necessary the control of some authority for the public benefit. A hundred years ago it did not matter much how a man built: the spaces for building were large, the rights of light and other easements were not so likely to be interfered with or invaded, lofty buildings were unnecessary because land was cheap and plentiful, bad drainage did not affect a closely-packed block of houses; and although there were reeking cesspools and polluted ditches, the great oxygeniser, air, was abundant and pure. Certainly London and many of our provincial cities were anything but models of cleanliness or wholesomeness, if we accept the accounts of historians and others—the streets were narrow and the houses crowded together; but two or three minutes' walk would bring the dweller into the country. This crowded condition of the old cities is to be explained partly by the want of good roads, and facilities of communication. They were so bad that the towns were condensed and huddled up within a small compass; only the wealthy had their conveyances. But a century ago the population was not a twentieth of what it is now, and, therefore, bad building and sanitation was limited to a few. Now a whole town or district may become infected through a system of drainage being imperfect, and hundreds in a dense neighbourhood may suffer from obstructed light or the erection of objectionable buildings or manufactories.

The Public Health Act enables any urban authority to come to terms with any person for the making of roads, which will become, on completion, maintainable by the inhabitants of the district; or to take over private streets when sewered, levelled, and metalled, by which powers the extension of our towns has been controlled. There is a code of Model By-laws which the Local Government Board have recommended for the use of local authorities, which have been adopted, with certain modifications, in most towns out of London; but it is silent on two very important points: the height to which a new building may be carried without inconvenience to adjoining properties, and the obstruction of light. Strange to say, that while there are rules to regulate thickness of walls up to 100ft., and rules for the maximum height of chimneys, there is no rule as to the permissible height to which new buildings—such as factories, shops, and warehouses can be carried in crowded neighbourhoods. The sections of the above Act which give power to urban authorities to regulate the line of buildings by setting them back to a general building frontage, has been highly beneficial; but there is certainly more required to prevent inconvenience and the invasion of the rights of adjoining property-holders by new building owners. Almost, if not quite, as much inconvenience may be experienced by a man building a house or a warehouse of twice the height of his neighbours' premises, as if he had built in front of his house. For example, a building owner erects a workshop or factory on his ground at the back of a house of four or five stories, obstructing the light of his neighbours, and blocking out their view. They may be in such a position that they cannot obtain any redress; they have not a prescriptive right of light as dominant owners, though the new premises may cause a material darkening of their rooms, besides a deprivation of sunlight in the gardens. In one instance of which we have knowledge, a large storehouse for wines and spirits was built at the rear of a private house in a country town, on the south side of the gardens of other houses in the street, the effect of which was to deprive the neighbours on the north side of sun and prospect, and to materially damage the value of the properties on that side. The gardens became damp and cold, and nothing would grow under the shadow of the building. Difficulty was experienced in letting the house nearest the huge blank wall, yet the owner and tenants had to suffer. There was no regulation to prevent the story from being carried up above a certain height, though four houses suffered by the act of one occupier. Corporations often let vacant land bordering new roads without any restrictions as to building upon it, greatly to the detriment of adjoining house owners and injury of their business, an instance of which we recorded the other day in an action by a company to obtain an injunction or recover damages against a building lessee of the Birmingham Corporation for shutting out their light by erecting a building twice the height of the older premises, which had also been let by the same authority. It was little solace to the disappointed owner of the overshadowed house to be told that he might have known lofty business premises would be built one day on the opposite corner. The same plea could be made use of on every occasion when a lofty house came to be built close to a lower one. The law only steps in when the older house can be shown to have an indefeasible right of light gained by prescription.

In these cases we have a strong reason for thinking that more use should be made of restrictive covenants where the law is defective. Why should the owner of small houses suffer by an adjoining owner erecting business premises that create considerable discomfort? A judge of the Chancery Division has power to inquire into any damage sustained by a person when the value of the houses injured is small; why should not a corporation have similar discretionary power to award compensation to the owner who has not quite acquired a right of light, but who has materially suffered from the erection of business premises of great height. If in letting land on lease for building, care was taken to insert properly worded restrictive covenants there would be less injustice committed by building owners. The vendor of land often does not see clearly his own interests, in the desire to let the estate, and only merely nominal restrictions are introduced in the agreement, such as that the buildings are to be erected of a certain value, that certain businesses or trades are not to be carried on, and that the lessee is to contribute towards the cost of road-making, &c. Vendors, however, often are the first to break faith with the lessees. They let adjoining land to tenants who carry on objectionable businesses, or they allow spaces that ought to have remained open, and under which idea the lessee had been induced to take land, to be built over, affecting prospect and light. A very common cause of complaint against the landowner is that after the best plots of land have been sold, he allows small and inferior houses or tenements to be built on adjoining land, thereby seriously injuring the property. Of course this injury "cuts both ways," but it always falls heavily on the lessee. With regard to the height of buildings, additions of bay windows and conservatories, and carrying on of trades, covenants are not inserted, and much injury is done to those who have taken lots. As illustrating the kind of questions that arise, and the liabilities of those who take land and have entered into covenants, a case of some importance came before Justices Cotton, Fry, and Lopes—an appeal by the plaintiff from the judgment of the Vice-Chancellor of the County Palatine of Lancaster. The plaintiff was owner, as tenant for life, of an estate at Broughton, and sought to enforce a covenant entered into by a predecessor of the defendant, which provided that no building upon the plot of ground in question should be used as a public-house. The defendant had notice of that covenant when he purchased the property. The Vice-Chancellor dismissed the action, on the ground that on other parts of the estate similar covenants had been waived by the plaintiff or his predecessor in title. In the deed of conveyance there was a covenant that the defendant would not erect a public-house or carry on the business of an innkeeper amongst others. A house was built, and an outdoor beer license was granted to it. The plaintiff pleaded that, of the eight fully-licensed houses on the estate, five of them were conveyed before 1847, before the tenant for life came into possession; another of the houses—the hotel—was sold without the insertion of any such restrictive covenant; and in every case the houses had been opened before the date of the assignment to the defendant, and not one had been opened since. Moreover, the plaintiff and his agents had constantly objected to any fully-licensed house being opened. The counsel submitted that in no point of view could one waiver of a particular covenant in a particular part of the estate be a waiver or release of the covenant as to another part. There had not been one fully-licensed publichouse opened since the defendant purchased. After hearing the other side, who contended that there had been a continuous breach of covenant since the date, by the establishment, of works, their lordships reversed the decision of the Vice-Chancellor, and granted an injunction restraining the defendants from using the premises as a publichouse, but not interfering with the defendant selling beer off the premises.

The case is of interest, as showing how scrupulously necessary it is on the part of landlords to allow of no relaxation by which a waiver may be established. In large estates, as this was, near Manchester, it was impossible always to maintain the same restrictions throughout. One part of the land may be of less value as a residential neighbourhood than others, and the restrictions as to certain businesses would not equally apply. The deed of conveyance is generally left to the lawyer; but the mode of securing the benefit of restrictive covenants is that persons who purchase land in plots should agree amongst themselves, and with the vendor, that they and all claiming under them respectively will observe and perform the covenants. A general deed to this effect, to be entered into by all the purchasers, is necessary, appended to which is the schedule of conditions and restrictions. Much uncertainty and unpleasantness would be obviated if owners of land were to sell or let only under these conditions.

PUBLIC ELEMENTARY SCHOOLS.

GOVERNMENT Departments have not a very enviable reputation amongst architects, and the official rules and Blue-books they issue relating to buildings requiring Government grants, or those over which they have a control, are scarcely ever received with favour. Those who have had to satisfy the requirements of the Ecclesiastical Commissioners, the Education Department, or the Local Government Board, have no very kindly feeling toward the dictation, sometimes arbitrary, and the "officialism," often wearisome, that characterise those departments of the public service. If the Government rules are still troublesome, and cause delay and hinder original suggestion, they are at least more concise and practical than they were. We have on our table the "Rules to be Observed

in Planning and Fitting up Public Elementary Schools," a Blue-book of a little over four pages, and which is published at threepence. Comparing it with the older forms, we find a general adherence to the requirements as to dimensions, though the new rules are thrown under headings and less open to misconception. To embarrass the architect with a large number of rules is often to defeat the object to be attained, and we therefore think it wise not to hamper the designer with too many dimensions. In planning any building a great deal must always be left to circumstances, and in a given room the number that can be conveniently accommodated will depend on the position and relation of the doors and fireplaces. In school-rooms there is at least one deciding element, and that is the desk to be used. The desk is, in short, the *unit*, for it is upon the number of desks or groups that can be arranged with economy and convenience that the proportion of the room and the accommodation will depend.

The lighting is another point, though quite subsidiary to the desk, in laying down the shape and size of a school-room. Thus, as a school-room has to be regulated by the desks in length, it is only necessary to define a proper width. The rule says : "The proper width for a school-room is 18ft. to 20ft., or 22ft. If the width does not exceed 20ft., groups of three long desks must be used ; if the width is 22ft., small desks, five rows deep, must be used." This is an indispensable rule, but hardly worded with clearness.

Sub-section (*a*) says : "Accommodation is calculated by the number of children seated at desks and benches"—information that ought properly to have been placed first, as indicating the principle upon which accommodation is determined. Another sub-section states that "wasted space cannot be considered." It would have been certainly more convenient to have placed the particulars relating to desks and benches after the rules as to school-rooms, as the length of latter depends entirely on the allowance for each scholar ; in the Blue-book these particulars come after "Sanitary Arrangements" —surely an error. The architect naturally wants to know, after the width, what length his school-room is to be, and to find out this he must know what lengths the benches and desks should be. The allowance per pupil is 18in. (in the dual desk the usual length is stated to be 3ft. 4in.), so that the length of each group should be some multiple of 18in., with gangways of 18in. between the groups. The number of groups is not given, but in the old instructions it is stated that a separate school-room is to be built when more than five or six groups are necessary. The dual desk gangways are 1ft. 4in. In the old rules, a copy of which is before us, the 18in. allowance is given for the junior classes, and not less than 22in. for the senior classes ; the length of each group, therefore, would be some multiple of 18 or 22in., a table of the lengths of groups and accommodation being given, also a plan of the arrangement. This plan is not given with the present rules. Another of the new rules is important to remember : "No benches and desks should be more than 12ft. long, and no group of long desks should contain more than three rows of benches and desks." A greater number of rows entails more effort on the part of teacher, who has to raise his voice. Each group is to be separated from the contiguous group and from the wall by an alley of 18in. ; "*or* from the wall" is a little error that might lead to misconception.

Going back again to the rules for school-rooms, there are very necessary regulations respecting the position of doors and fireplaces. In rooms for children above 7 years of age, they are to be so placed as to allow of one side of the room being left free for the groups of benches and desks. A very important factor in the planning of elementary schools is the lighting. A clause says : "No school-room lighted from one side only can be approved." Taken in connection with another rule under "Windows," that the "light should be as far as possible admitted from the left side of the scholars," makes it appear very difficult to plan a school-room at all. A large end window to the left of the groups of desks is essential for light ; but so are windows on both sides—that is, windows at both ends, or windows opposite in the side walls. It goes on to say, "All other windows should be regarded as supplementary, or for summer ventilation. In cases where left light is impossible, right light is next best. Where neither is possible, the light should be admitted from a high point." So that, in short, the meaning is that left light is most essential, and must be obtained, and there should be windows as well on two sides for ventilating purposes. Hygienic authorities on lighting object strongly to windows facing the scholars, as it throws the teacher's face into the shade, and the scholars' books also ; a light from behind is also bad, as the pupils are in their own light. It follows then, from these considerations, that end windows are of most importance, but that one of them to the left of scholars should be the largest.

Class-rooms are calculated in a different manner. The rule says they "are calculated at 10sq.ft. if not providing accommodation for more than 60 children," which means —if there is any meaning at all—10sq.ft. of floor space per scholar ; the minimum size of class-room is fixed at 18ft. by 15ft. A class-room for 60 children would thus be a room, say, 20ft. by 30ft. ; six rows of dual desks are allowed in such a room. If the desks are longitudinally placed in a class-room, the width should not be less than 16ft. A very necessary regulation is that class-rooms should never be passage-rooms from one part to another, and their number should, where practicable, equal the number of classes in the school-room. The rules for class-rooms would have more conveniently followed those of school-rooms, and such structural details of walls and roofs placed somewhere at the end ; the arrangement is certainly not good. The rule as to desks, instead of coming after sanitary arrangements, with which it has nothing to do, ought to have followed that referring to schoolroom. Before the rules are issued, we should advise these alterations to be made. The rules cannot be too explicit. It is needless to refer to the height of school and class rooms, which are, as usual, not to be less than 12ft. if ceiled at the level of wall-plate, and if area is more than 360ft. super., 13ft. ; if more than 600ft. super., then 14ft. ; but if the room is ceiled to the rafters and collars the walls must be at least 11ft. high and 14ft. to the ceiling. Brick walls are to be at least one brick and a half, and if of stone 20in. in thickness. It is important to remember that, in case a central hall is adopted, the area of it is not to be calculated in the accommodation nominally provided. The instructions about ventilation and warming are very general ; provision for fresh air is to be made apart from open windows and doors, and a separate air-chimney in the stack as an outlet is recommended to each room. The sanitary regulations appear to be the same as in the old form. Near the end we come to infant schools, which ought to have been placed after the rules for the senior school. The accommodation is calculated at 8sq.ft. per child, after deducting useless space. The teachers' house, and particulars as to loans conclude the book. The Education Department require a block plan to a scale of 20ft. to the inch, showing the drains and their fall, boundaries, &c., a plan of each floor to a scale of 8ft. to an inch, showing internal fittings ; sections, and at least four elevations and a detailed specification.

In connection with this subject we may refer to a few facts in the report of the School Board for London for the year. We gather that during that time, ended Lady Day, 1887, the Board were engaged in the purchase of 49 sites. According to the table prepared, the total cost, including legal and surveyors' charges, amounts to £2,153,327 12s. 5d., and, as the schools provide for 345,000 children, the cost of site per head is £6 4s. 10d. After giving a list of 18 new schools opened during the year, the report states that 361 schools had been erected at Lady Day last, the average cost per head being—for school buildings £10 19s. 9d., and for furniture 10s. 7d. These figures scarcely give the actual expenditure. The tenders for seven new schools show an average cost per head of £11 19s. 3d., and the cost of enlargements, which are becoming yearly necessary in several schools, shows an average cost in some cases of over £15 per head—the cost being increased owing to the original buildings not having been devised for extensions. A great deal of unnecessary expenditure has been entailed in the building and fitting up of many of the schools ; but the London School Board have by this time learned by experience, and their future course ought to be guided by it.

ROYAL ACADEMY PRIZES, 1887.

THE following is a complete list of the whole series of awards :—

Historical painting, "Captives," gold medal and travelling studentship (£200), Arthur T. Nowell ; landscape painting, "Sunset after a Storm," Turner gold medal and scholarship (£50), Arthur Trevethin Nowell ; landscape painting, "An Old Water Mill," Creswick prize (£30), Stephen Briggs Carlill ; painting of a figure from the life, silver medals, 1st, not awarded ; 2nd, William Farran Littler ; painting of a head from the life, silver medals, 1st, Minnie Jane Shubrook ; 2nd, Maud Porter ; copy of an oil painting, "Man in Armour," by Van Dyck, silver medals, 1st, Arthur Claude Cooke ; 2nd, Thomas Henry Jones ; copy of a landscape, "The Lock," by John Constable, R.A., silver medal not awarded ; cartoon of a draped figure, "Demosthenes on the Sea Shore," silver medal and prize (£25), Alfred Bernard Sykes ; design in monochrome for a figure picture, "Jehu and Jezebel—2 Kings, ix. 30-33," Armitage prizes, 1st (£30 and bronze medal), William Farran Littler ; 2nd (£10), Walter Stanley Paget ; design for the decoration of a portion of a public building, "Summer," prize (£40), William Ernest Reynold Stephens ; drawing of a figure from the life, silver medals, 1st not awarded ; 2nd, Herbert James Draper ; set of six drawings of a figure from the life, 1st, prize £50, Charles Thomas Rudkin ; 2nd (£25), Stephen Briggs Carlill ; 3rd (£15), William Farran Littler ; 4th (£10), Percy Short ; drawing of a head from the life, silver medals, 1st, Joseph Walter West ; 2nd, Mary Catherine Abercombie ; drawing of a statue or group, silver medals, 1st, not awarded ; 2nd, not awarded ; drawing of a statue or group, prize (£10), Lydia Bacon King ; perspective drawing in outline (open to painters and sculptors only), "The Exterior of St. Paul's Church, Covent Garden," silver medal, Edith A. Cooper ; line engraving of a drawing of a figure from the life, gold medal and prize (£25), no competition ; composition in sculpture, "An Act of Mercy," gold medal and travelling studentship (£200), George James Frampton ; set of three models of a figure from the life, 1st prize (£50), William Goscombe John ; 2nd (£20), William Ernest Reynold Stephens ; model of a design, "An Episode of the Deluge," 1st prize (£30), William Goscombe John ; 2nd (£10), Arthur George Walker (disqualified, owing to having received the same prize in 1885) ; design for a medal, "A Prize Medal for a School of Art," silver medal, not awarded ; model of a figure from the life, silver medals, 1st, John Rollins ; 2nd, James Nesfield Forsyth ; model of a statue or group, silver medals, 1st, Andrea C. Lucchesi ; 2nd, Charles John Allen ; model of a statue or group, prize (£10), William Henry Prosser ; design in architecture, "A Railway Terminus," gold medal and travelling studentship (£200), Robert Weir Schultz ; set of architectural drawings, "St. George's Church, Bloomsbury," silver medal, 1st, Percy Norman Ginham ; set of architectural designs (Upper School), prize (£25), William Leck ; set of drawings of an architectural design (Lower School), prize (£10), William Alford ; perspective drawing in outline (open to architects only), "The Caryatide Portico of the Erectheum," silver medal, no competition.

The Landseer scholarships in painting and sculpture, of £40 a year each, tenable for two years, given for the best work done in the examination for passing into the second term of studentship, have been awarded—in painting, to Ernest W. Appleby and Herbert James Draper ; in sculpture to William Goscombe John and William Ernest Reynold Stephens.

The subject for the Gold Medal and Travelling Studentship in the Architectural School was a railway station or central terminus, to be built without the usual adjunct of a huge hotel as a mask to the front façade. Some of the competitors, realising the difficulty of rendering the end of so necessarily vast a building, comprised as it must be of one great central nave, and covered by a single

roof of one wide span, with anything like the usually recognised types of architectural effect, sought a solution of the problem by introducing towers, either centrally placed or as flanking features to the main façade; others, with high mansard-roofed and meaningless pavilions, endeavoured to produce an ambitious composition worthy of the occasion; while a few competitors, discarding such expedients, emphasised the approaches to their station either by inclosing a grand forecourt with colonnades and covered ways, or by introducing ingeniously contrived raised terraces and inclined roadways. In planning, a considerable variety of arrangement was displayed, too; the main idea, however, of a station in this respect being in all of the designs fairly well realised. Roughly speaking, the main difference consisted in the mode of placing the booking halls and waiting rooms, some competitors wisely contriving them in front of the station, and others, with less judgment, placing them on one side. The question, however, mainly resolved itself into the architectural treatment adopted, and herein, as might be expected, an almost unlimited diversity of taste and idea was displayed in the nine designs submitted in the competition. The prize was unquestionably well competed for and, no doubt, on the whole, it has been deservedly won by Mr. Robert Weir Schultz, though there are many points in the next design, No. 331 (said to be by Mr. W. Leck) which merit recognition. The chosen design, an evident study of the Terminus at Paris of the Northern Railway of France, acknowledges the great roof which, by the nature of things, dominates the whole composition, and the author grapples with the bigness of scale thus imposed upon him in a massively muscular way, while with a few telling features he gives us a façade marked by breadth of treatment and an air of practical utility. If there is not, however, any marked degree of originality in his work on this occasion, Mr. Schultz is to be commended for his refined study of detail. The great pediment at the end of the central nave is crowned by a clock panel, with sculptured figures on either side representing "Night" and "Morning." The end window below this feature is a vast semicircular opening, divided ingeniously with iron uprights and transoms, and the walls are of brick, relieved by bands of stone. Over the principal entrance, which is in itself somewhat dwarfed by the colossal lions on either hand, are the Four Winds carved on the wall, after the fashion of the tower of Andronicus Cyrrhestes at Athens. Flanking the central gable are groups of figures supporting globes. The "entrance" and "exit" archways are at the extreme ends of the main front, and the refreshment rooms, &c., occupy a low range of buildings treated in a Renaissance manner in front of the great booking hall. The absence of a cross-section showing the construction of the station roof is conspicuous in all the designs.

No. 331 is clearly a fine design, somewhat more architecturalesque and gracefully worked out. The gable at the end of the nave roof shows as before, but here is treated as a pediment, having an outline which is commonplace, and of poor proportions. In the centre sit salone the vulture-tortured Prometheus as patron of physical power. At one end of the building rises a well-grouped tower, elegantly detailed and beautifully drawn, with flanking pavilions, having rather shapeless pediments over their elevations, and standing somewhat in advance of the tower. The square-headed entrances are ill proportioned, and do not accord with the arched openings for carriages. No. 332 is gaunt in idea, and ill-considered; indeed, its author, Mr. E. H. Sedding, has clearly not given sufficient time to the working out of his composition. Its plan, too, is not good. The raking loggia sloping up the sides of the flanking walls in front is unhappy and restless in effect, while the overbearing proportions of the big central arch crush the arcade below. No. 333 shows the arched iron girder construction of the great roof over the station, which is placed between two cleverly-treated towers surmounted by domes. A great fore-court leads to the fine entrance portico outside the booking hall. The end wings ranging beyond the towers are too disconnected, both in scale and effect, from the main structure to be pleasing. This set is admirably drawn. No. 334 has a central tower with high-roofed pavilions to the right and left of the screen of hotel-like buildings. The plan seems poor, and the roof of the station has no connection with the show buildings, which are isolated from it in front. No. 335 reminds one of a Casino, with its nondescript style of architecture, devoid at once of repose and regardless of moderation. Its detail is extremely well drawn, and is, in its way, refined and studied. The tower suggests a copy of Messrs. Aston Webb and Bell's campanile, which was placed in front of their Imperial Institute design, to its great detriment. The sloping ways which form an approach to the Station are a feature, too, in this composition. No. 336 is exceedingly poor, smacking of an American hotel, with an endless series of bedrooms. No. 337 is quite one of the best designs in the competition, with a fairly good plan and nicely drawn elevation, at once dignified and enriched with well-placed statuary. The detail, however, is unworthy and meanly rendered. No. 338 is the last and, perhaps, the least important of the whole series; but the author has a sense of the relative value of solids and voids, notwithstanding his common-place design. Mr. Percy Norman Ginham wins the Silver Medal for a set of carefully-measured drawings of Hawksmoor's church of St. George's, Bloomsbury, built in 1731, with its truly fine portico and most ridiculous steeple, planned, it is said, from the description in Pliny of the tomb of King Mausolus in Caria. St. George, represented by the figure of King George I., surmounts the structure, whence the epigram:

> "When Harry the Eighth left the Pope in the lurch,
> The Protestants made him the head of the church;
> But George's good subjects, the Bloomsbury people,
> Instead of the church made him head of the steeple."

Hogarth figured this tower in "Gin Lane," and now the building has been measured for the Royal Academy Silver Medal. Street "improved" the interior of this church some years ago, and Mr. Ginham has carefully measured the altar and baldacchino, a feature of which Hawksmoor was very fond. The font is curiously placed in an apse on the east side of the church, the chancel facing north.

The money prize for the year in the architectural schools is given to Mr. Wm. Leck for a design illustrating a street front over a fish shop. The style is French Renaissance of early date, and the façade is surmounted by a shaped gable rising by the side of a conically-roofed circular tower. The detail is good, and the drawing no doubt is the best of the series. Mr. Wm. Alford's "School of Art," which wins a £10 prize, is clever; but the majority of the designs exhibited as the work of these classes is very poor and characterless. Mr. Thomas Maclaren's sketches from Italy and Pompeii form one of the best sets of architectural studies ever shown at the Royal Academy. Mr. E. H. Sedding shows also his series from York, Winchester, and Salisbury, drawn in pencil with much feeling; but without much sense of energy, as compared with Mr. Maclaren's work. Mr. A. Bernard Sykes' masterly cartoon of "Demosthenes by the Seashore," which so deservedly won the R.A. Silver Medal for a draped figure, is one of the best works in the exhibition. Mr. W. E. R. Stephens' decorative prize work is also an admirable composition.

THE SOCIETY OF ARCHITECTS.

THE third ordinary meeting of the Society of Architects for the present session was held at St. James's Hall, Piccadilly, on Tuesday evening, Mr. H. Roumieu Gough, ex-president, in the chair. Six nominations for membership were read. The CHAIRMAN called attention to the fact that a petition in favour of the Architects' and Engineers' Registration Bill, to be introduced next session by Col. Duncan, C.B., M.P., was lying upon the table for signature. A letter of condolence was ordered to be sent to Mr. Edmund Woodthorpe, M.A., on the recent death of his father, the well-known district surveyor, on the motion of the CHAIRMAN, seconded by Mr. W. H. SETH-SMITH, the former remarking that the late Mr. Woodthorpe was one of the members of the Institute who took a warm interest in the Society and its work.

THE RELATION BETWEEN ARCHITECT, SURVEYOR, AND CONTRACTOR.

A paper on this subject was read by Mr. JOHN LEANING, and will be found on p. 892. At its close

Mr. SETH-SMITH proposed a vote of thanks to Mr. Leaning for his instructive paper. Its very technicality was, he thought, one of the chief merits of the lecture, which was so full of practical information that it could not fail to be interesting. He had known Mr. Leaning for many years, and knew that his practical knowledge, ability, and business habits qualified him to deal with the subject. As to the conditions of contract, it was very difficult for them as architects to bind themselves to any particular form, for it was not uncommon for clients to send forms drawn up by their solicitors, which were, as a rule, more stringent than that known as the Institute form. The latter was often objected to; but he, like the lecturer, approved of it. However careful an architect might be, extras would often crop up, and in alterations to old buildings, for instance, were almost unavoidable, as no one could foresee the state of work till opened out. It was of the utmost importance that architects should be particular in their specifications, both in the general portion and in the provision of definite sums. Where certain items, such as ironwork, were ordered of special firms, a building agreement should be made with such firms for delivery by a given date so that no delay was caused to the builder.

Mr. J. T. HOLLAND seconded the motion, which was supported by Mr. W. ALLPORT, who said that one Scotch architect formerly practising in London used to make all drawings to a ¼in. scale, and all details to a ½in. scale, giving as a reason for the unusual scale, that he did not like builders' foremen to measure off his drawings; but wished them to accept the figured dimensions. The mode was much better than the common one of adopting any scale for details which would just fill the space in the sheet available.

The CHAIRMAN remarked that one useful clause in a contract was to stipulate that the contract drawings, specifications, and all other papers, were the property of the architect, and were to be returned to him in good condition on the completion of the undertaking. As the client signed this contract as well as the builder, all question as to the ownership of the drawings was set at rest, and no client would object to enter into such a contract if it was explained to him by the architect at the outset. The plan of numbering all rooms instead of naming them saved much work in preparing the specification and quantities, and lessened the chances of mistake. Although it was usual among professional men to name an architect of good standing as arbitrator in case of dispute, it would, as Mr. Leaning had suggested, be preferable to appoint a surveyor, as disputes generally turned on questions of extras and omissions. It should be the endeavour of architects to set clients to agree that the quantities should be made the basis of the contract. As to the best form of contract, his own plan was to make the tender a contract, and to refer in it to the drawings, specification, bills of quantities and conditions, and when it was stamped it became a legal document. Contracts drawn up by solicitors were too wordy, and there was some risk of alterations and omissions slipping in undetected.

Mr. R. O. ALLSOP suggested that to all references to special articles to be provided for

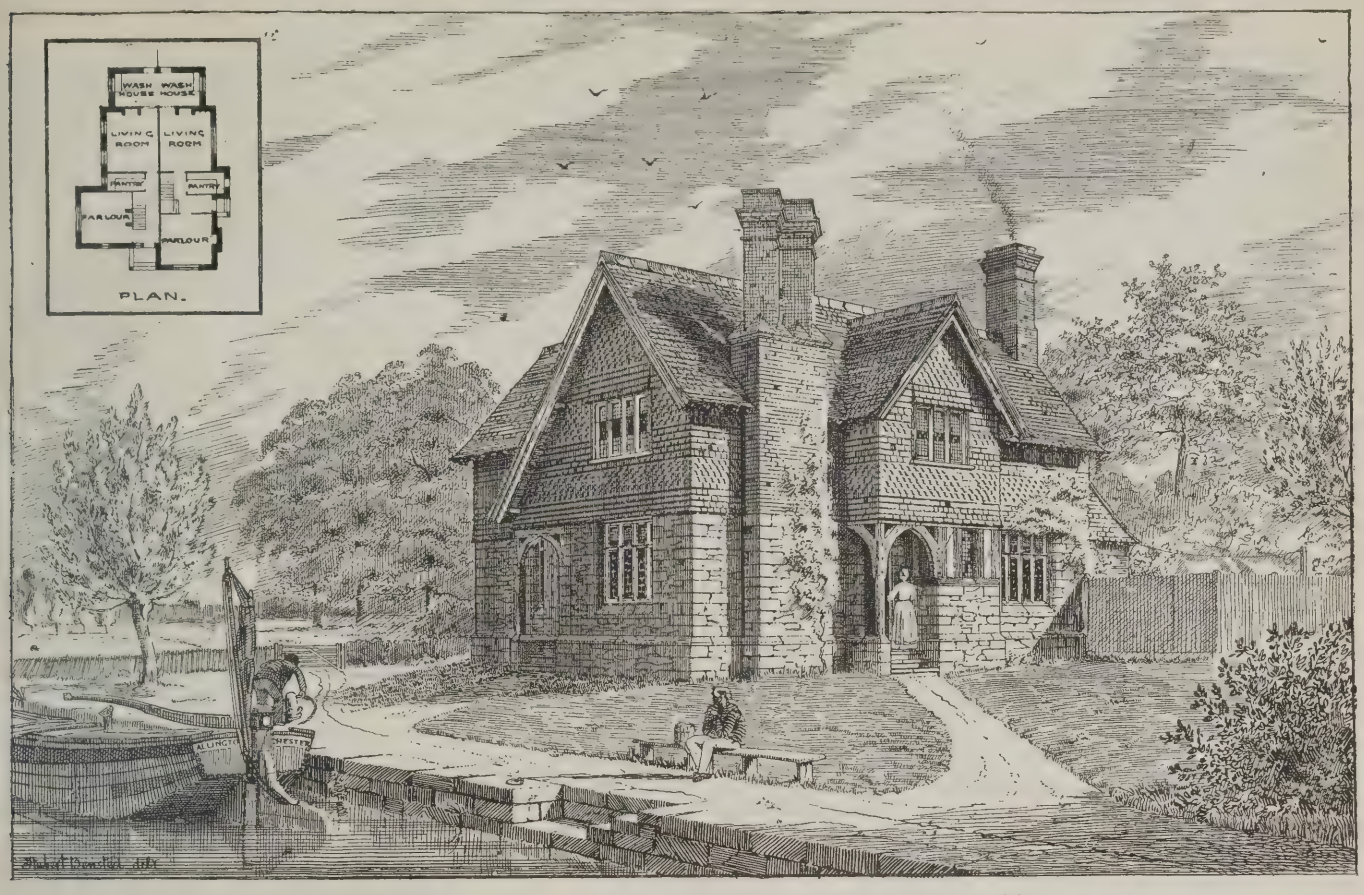
should be added the words "p.c., allowing for cartage, fixing, and profit."

Mr. Leaning, in reply, said he had constantly adopted the usage as to "p.c." of provisions, and a quibble rarely arose. Where the contractor had to take trouble in procuring a fitting specified as "p.c." he ought to be allowed the usual profit, say, of 10 or 15 per cent. on the item. As years went on quantity surveyors naturally grew more liberal towards builders. He agreed with Mr. Seth-Smith that it was impossible to tell the condition of old buildings until one began to take them down, and a tender based on specifications for such work must be more or less uncertain.

THE RELATIONS OF ARCHITECT, SURVEYOR, AND BUILDER.*

I PROPOSE to offer a few comments upon some of the points of the architect's and surveyor's practice—considerations which may help to make a contract work smoothly, and to bring it to a successful issue. And first, as to uniformity of practice. In comparing the work of architects and surveyors with that of solicitors, for instance, a striking difference at once presents itself. We find all the procedure in the initiation of an action settled and uniform, all the forms referable to some accepted type, and the facts being known, the majority of the cases of legal process may be taken up at any stage of their progress by any qualified solicitor, and continued with a certain amount of confidence as to what has gone before; but to adopt the work of an architect or of a quantity surveyor is a widely different matter. The variety of *their* methods is very great, and before one can take up either in course of its progress, much investigation, much more than should be necessary, is inevitable. I do not think this should be so. Up to a certain point the initiatory process of all building undertakings might be, and should be, alike, and I think the advantages would be great and unquestionable. It is not difficult to furnish a reason for this condition of things. It is only to repeat what has so often been said of late, that we have no system of architectural education worth the name, nor shall we have until some central organisation authoritatively constituted shall furnish such machinery as shall impart the necessary instruction in science, forms of professional practice, the principles and history of art, and such subjects, all of which may be taught with as much certainty and precision as the principles of mathematics. The diversity of action is largely referable to ignorance of the best methods. A certain amount of training, to be tested by examination, upon which permission to practise shall depend, should be made imperative. A moment's consideration of what experience means is sufficient to convince us of this. In the early stages of our work we have all known what it was to dissipate our energies in unprofitable, ill-considered effort; now we go direct to our ends with a certainty which nothing but knowledge and practice can afford. Facility has been acquired through a long series of painful mistakes and shortcomings, all of which, under a better system, might have been avoided. The experiences of a quantity surveyor, seeing, as he does, the work of many different architects, gives him somewhat favourable advantages for its criticism. The surveyor, of course, sees many different styles of drawing and various degrees of finish. I may say, in passing, that I offer these opinions with deference to the architectural ability I see around me. As to the scale of drawings, I think the most embarrassing, characteristic of a set of drawings is a great variety of scales in one set. Sometimes the drawings for one building range through almost all the varieties. Most surveyors have had to deal with the drawings of a building in which one had $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1in., quarter full size, full size. Considerable errors have arisen from this diversity, such as inadvertently using $\frac{1}{8}$in. for $\frac{1}{4}$in. scale drawing. The scale of $\frac{1}{4}$in. to a foot is most unpicturesque, and unless much much useless labour is expended upon it has an ugly, bare effect; it costs more, too, which is a consideration. The most widely useful scale is $\frac{1}{8}$in. to a foot, and I think the balance of opinion is greatly in favour of this. The details may be to any larger scale, but I think they should all be over $\frac{1}{2}$in., as this is generally too small to be of much use. General drawings often usurp the functions of the specification; it is best that they should have nothing upon them beyond what is absolutely necessary. Considering the prevailing impression as to the inadequacy of the payment of architects, it has often surprised me that so much unnecessary labour should be bestowed upon working drawings, such as colouring, which means nothing, and is solely for effect. Some drawings display all the finishings, as doors, framings, cornices, skirtings, &c. Some draughtsmen even go to the length of back-lining their drawing, an absurd practice. The respective advantages of thick and thin lines has been argued often enough; those who use thick lines are greatly in the majority, and I quite agree with them. The neglect to finish a set of drawings until the work has considerably advanced is a dangerous habit in many ways. Unfinished drawings are a source of legal danger, and cannot have been properly considered until they are finished; moreover, the ultimate expenditure of time is invariably greater. Another weakness of draughtsmen is the making of the sections through the easiest parts of the building; not putting the sectional lines on the plan, or putting them on without distinguishing letters. Elevations, I think, are best described by the points of the compass, and it is certainly most convenient. Elevations may be highly finished much more reasonably than plans. A roof plan is often omitted in the preparation of a set of drawings. When the roofs are at all complicated this often involves alteration and consequent extra work. A plan of the drains should also be supplied; these are often a subject of provision which is generally of insufficient amount. The best drawings that come before me are carefully figured, and this should always be done, especially the ground plan. All the dimensions should be of the carcase—that is, openings and rooms should be in the clear of the brickwork, heights of stories from top of joists to top of joists. It is a good plan to avoid repeating the dimensions of the same thing on another plan; if you make a mistake it gives everyone more trouble than no dimension at all. Drawings may often be much increased in usefulness by indicating by a red line on the elevations the levels of the floors. The distinction on plan between ventilating and smoke flues is often a convenience. A letter V on the former is sufficient in large buildings; flues are sometimes numbered with advantage. Number your rooms, if possible, and consecutively; you will shorten your specification by so doing. Numbers are more easily described then positions. The quantity surveyor sees specifications of various qualifications and construction. Want of precision of statement and absence of systematic arrangement are the most frequent defects. Of course, when one does not know what one means, it is specially difficult to make others understand. Unnecessary repetition is another common fault—the same phrase frequently repeated, which, judiciously placed, might have served for the whole document. Everything is to be done in a proper manner, or a workmanlike manner; but none of these clauses will compare with specific directions as to how the work is to be done. A proper or workmanlike manner may mean so many different things. The only sound preparation for specification writing is a thorough knowledge of construction; without this any specification must be vague. I am sure I need not appeal to you to avoid clauses which shall not catch the builder. There is a tendency in this direction, induced, no doubt, by the desire of the architect to protect himself from extras, and the eagerness of the building owner to obtain more for his money than he has any right to expect. A moment's thought is enough to show us how much harm one may do to a builder in this way. Clauses which provide alternative methods of work or qualities of materials are frequent causes of dispute. If you offer alternatives, let it be clearly understood that the decision—the selection—shall be yours. But to consistently carry out the principle that the exact cost of the building shall be represented by the lowest tender, some rather comprehensive clauses are essential: as that contractor shall keep foundations clear of water; be responsible for all accident to the projected building and adjoining ones affected by the contract works; shall fill up all old drains and cesspools; shall insure from fire, &c. But it is most unfair that contractor should be made liable for increased foundations beyond those specified and shown on drawings; and in the majority of cases, the simple precaution of digging a few trial holes will show beforehand what is necessary. It must not be too readily assumed that every obligation can be transferred from building owner to contractor. The work to party-wall will often vary beyond any reasonable expectation, and there are obligations as to lateral support and general damage to adjoining buildings, which cannot be transferred, whatever the contract may provide. It is beyond the intention of this paper to deal with legal aspects; but I may mention the cases "Hughes v. Percival," "Dalton v. Angus," "Lemaitre against Davis," all of which bear upon these points. But whatever your practice may be in such matters, it is unquestionable that an estimate is always unduly increased by a specification or bill of quantities which provides for throwing such obligations upon the builder; he invariably, and quite naturally, makes himself safe on these points by including an exorbitant sum to protect himself. Another important consideration is, what conditions you shall adopt. For general fairness and comprehensive scope I do not think any are to be preferred to those published by the Institute. There has been some talk of their amendment; but I do not think they will be much altered. Taking these conditions in their order:—Condition 1 provides that the work shall be done according to the true intent and meaning of the drawings and specification, and whatever cases of discrepancy occur the architect shall decide which shall be followed. Some conditions go further than this, by adding "Should anything necessary to the perfection of the work have been omitted in either drawings or specification, or both of them, the same shall be deemed to be included in the estimated price, as if the same had been shown or set forth in both." Such a clause imposes an obligation on surveyor and builder which they should not be subjected to: it is properly a building-owner's risk. Conditions 2 and 3 are in substance so commonly adopted that they require no comment. Condition 4 provides for the supply of drawings and specification, maintenance of a foreman on the works, and forbids sub-letting work except by permission. Some architects stipulate for the return of all drawings, tracings, models, &c., furnished for the purposes of the building, without copies being kept—a kind of assertion of architectural copyright. The clause as to sub-letting is practically dead. Very few buildings indeed, are erected without sub-contractors, and the architect's permission is hardly ever asked for. Whatever the architect may see and know, I believe he will always save himself trouble if he avoids any legal recognition of the sub-contractor; the opposite course will be almost sure to compromise him in one way or another; but this need not prevent a sub-contractor being made use of in the settlement of accounts, when he can probably furnish valuable information. Condition 5 requires no comment. It gives the architect right of access to the works and power to dismiss obnoxious workmen. Condition 6 forbids deviation from contract except by order, defines order for extras, and provides for delivery of day accounts. Written orders for extra works should always be given. Some architects have a book like a certificate book for this purpose—an easy and commendable plan, as the foil forms a register of extra works. I need not remind you that when the conditions stipulate for a written order, its non-existence is quite sufficient legal warrant for refusal to pay for the work in question; but part of the condition which provides for the delivery of day accounts during the week following that on which the work was done is rarely enforced—but it should be, for it is an admirable check. Some builders price the items in each day account. I advise architects to refuse them if priced; the rates are best arranged at the settlement of accounts. There are various works which are properly charged in the form of day account. Works of incidental pulling down and alteration should

* By John Leaning, M.S.A. A paper read before the Society of Architects at St. James's Hall, Piccadilly, Dec. 13, 1887.



A PAIR OF COTTAGES, ALLINGTON LOCK.

always be allowed in this form. The builder's common practice is to combine several pieces of work in one account (presumably that they may be the harder to check). Each piece of work should be kept separate. You can then, if you desire to do so, check it by approximate measurement. The result of experience is probably to modify that complete prostration of mind which besets the young surveyor at his first sight of a voluminous day account. I must confess, after seeing so many of various kinds, that I am even now occasionally lost in astonishment over some of them, as many of you are, gentlemen, I don't doubt. In the majority of cases the time is overcharged—the fact is, a foreman is put on the work to make it pay, and the retention of his employment depends upon it. Some builders give a foreman a percentage, besides his wages, upon the amount of a contract which proves profitable. One should not wonder, under the circumstances, that day accounts are swollen, and this without any specific instructions by the master builder; indeed, I am convinced that generally he gives directions to the contrary. In these remarks I make no imputation upon the honour of builders as a body; the majority of those with whom I am acquainted are men whose words and actions may be relied on; but that is not the point at issue. Your schedule of prices should define the treatment of foreman's time, cartage, lodging money, tool sharpening, and charges for scaffolding. Condition 7 provides that variations shall not vitiate the contract, and states that such works shall be priced according to schedule of prices annexed, or at fair measure and value. This requires modification: it is best to provide that the contractor shall deposit a copy of the priced bill of quantities, or of his original estimate, and that extras and omissions shall be priced at the original rates or analogous ones. Condition 14 provides for free access of persons other than the contractor and employed by building owner, and that contractor shall afford facilities. It is well to define these facilities by stating that it is to include the ordinary scaffolding and ladders. Special scaffolding is better specifically described with the work for which it is required. Clause 15 provides for time of completion and penalty. As a general rule the most equitable application of this clause is the extension of the time in the proportion that the amount of variation (often the total both of additions and omissions) bears to the amount of contract. In attempting to enforce the clause for liquidated damages you will have to prove loss, and you must exclude wet days from your calculation. In this connection it must not be forgotten that by an extension of time for completion you condone the offence, and lose your right to take possession of the works.

(To be continued.)

PAIR OF COTTAGES, FOR THE LOWER MEDWAY NAVIGATION COMPANY.

THESE cottages are being erected at Allington Lock for the accommodation of the *employés* of the company. The lower story is of Kentish rag stone, with dressings of artificial stone, left as it comes from the mould; the upper story is of tile-hanging on quartering. Mr. Hubert Bensted, of Maidstone, is the architect, and the work is being carried out by Mr. John Froud, jun., of the same town, at a cost of £474.

THE FURTHER REGULATION OF THEATRES, &c.

AT the meeting of the Metropolitan Board of works the other day the draft of a Bill was submitted by Mr. Selway for the regulation of theatres and music-halls, and of other public buildings in the metropolis. The purpose of the Bill is to enlarge the powers of the Board in enforcing conditions which would minimise the risk of fires in theatres and other public buildings. The committee was authorised to confer with representatives of the theatrical and musical professions. Mr. Augustus Harris, lessee of Drury Lane Theatre, who represented the views of theatrical managers, thought such a conference would lead to no practical result, and that they objected to any further powers being acquired by the Metropolitan Board for the regulation of places of public entertainment. In addition to inspecting and enforcing these legal powers in respect of a number of music-halls, the Board had dealt with 41 metropolitan theatres, and those engaged in the work of inspection had been astonished at the cupidity of managers in allowing such places to remain. Since the powers vested in the Board were called into operation four theatres had been closed, one reconstructed, and in 27 others alterations had been made. The Bill now promoted gave the Board increased powers of inspection and a further authority to order structural alterations in the interests of the public safety. At least once a year, and oftener if required, the officials are to be allowed to inspect all theatres and music-halls in the Metropolis. The Bill also enabled the Board to deal with club premises used for public entertainment. The powers conferred on the Board enabled them not only to insist on structural alterations being made in accordance with their suggestions, but that those alterations were kept in the stipulated efficiency; that the staircases are not obstructed by pay-boxes, or the gangways blocked by chairs, and to have proof that the exits opened outwards, and were not sealed by unnecessary fastenings. The Bill had been promoted at the request of the Lord Chamberlain, and it would be an advantage to the licensing authority to be in possession of the Board's certificate as to the safety of any place of amusement. If the Bill ever passes, we hope it will be made certain that the Board's officers will administer it impartially. Some recent statements made by Mr. Augustus Harris—which have been commented on by the daily papers, but to which, as they are at present *ex parte*, we do not care more definitely to refer—are, to say the least, disturbing.

The Victorian Government rail contract, for the supply and delivery of 41,500 tons of steel rails and 2,100 tons of steel fish plates in Melbourne, has been awarded to Messrs. M'Lean, Brothers, and Rigg (Limited). It is understood that the whole of the work will be placed in the North of England.

A new pulpit and reading-desk have just been put in the Congregational Church, Salisbury, replacing temporary fittings which have been in use since the church was built in 1879. They have been executed by Mr. Harry Hems, of Exeter, from designs by Mr. Abley, of Salisbury. The pulpit is of Beer stone, lined with oak panel work, and the reading desk is of carved oak.

CONTENTS.

Building Codes and Covenants... 889
Public Elementary Schools 889
Royal Academy Prizes, 1887 890
The Society of Architects 891
The Relations of Architect, Surveyor, and Builder ... 892
Pair of Cottages, for the Lower Medway Navigation Company 893
The Further Regulation of Theatres, &c. 893
Our Lithographic Illustrations 894
Sketches from Italian Churches 894
Exhibition of Art and Industry 894
Competitions 894
Wayside Notes 915
The Doorway of San Petronio at Bologna 915
Western Association of American Architects 916
Sir Frederic Leighton on Tuscan Art 916
Elliott's "Perfect Simplex" Metal Weather Bar ... 917
Marble and Marble-workers 917
Art Workmanship Competition 917
Architects' and Builders' Diaries 918
Building Intelligence 918
Engineering Notes... 918
Architectural and Archæological Societies 919
Schools of Art... 919
Correspondence 919
Intercommunication 921
Statues, Memorials, &c. 921
Legal Intelligence... 921
Stained Glass 921
Our Office Table 922
Meetings for the Ensuing Week 922
Trade News 922
Tenders 923

ILLUSTRATIONS.

CITY OF LONDON COURT, GUILDHALL BUILDINGS.—NEW CLUB, WIVELISCOMBE.—FOUNTAIN, WALTON WELL, OXFORD.—DETAILS OF NORTH PORCH, CHRIST-CHURCH, HANTS.—HOUSES AT HEATON, NEAR BRADFORD.—BISHOP BRIDPORT'S MONUMENT, SALISBURY.—SKETCHES FROM ITALY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW CITY OF LONDON COURT, GUILDHALL.

The portion of the new Court building now in course of execution occupies the sites of the old Court, the Land Tax Offices, and the Tap of the "Guildhall Tavern." It will ultimately, on the expiration of a short lease, be extended over the site of No. 84, Basinghall-street, the new building having been designed to cover the entire area. On the ground floor will be offices for clerks and bailiffs; on the upper floor the Judge's Court, 45ft. by 26ft., and the Registrar's Court, 35ft. by 25ft., each with a private room attached, and approached by a separate stair and entrance. The general entrance will be in the centre of the façade to Guildhall-buildings, and will open into a hall and staircase, giving access to the offices on the ground floor and to the Courts above. In the basement will be lavatories and stores for books, papers, &c. The style is Late Gothic, similar to the styles adopted for the Library and the new Council Chamber. The external moulded work will be in Portland stone, with grey granite plinths; the walling of Kentish rag. Internally, the hall and staircase will be of Bath stone, the open roof of oak; the Courts will have wainscot panelled ceilings. The plan has been designed with the view of obtaining ample space and plenty of light, with good ventilation. The warming will be effected by means of hot-water coils and pipes. The amount of contract is £13,637; architect's estimate, £14,500. The architect is Mr. Andrew Murray, A.R.I.B.A.; and the builder Mr. James Morter, of Stratford. The following is the ground floor plan:—A, public entrance and staircase hall; B, public; C, process and hearing and general clerks; D, chief clerk; E, accountant; F, strong room; G, safe closet; H, Registrar's entrance; I, public waiting-room; J, bailiffs; K, high bailiff; L, Judge's entrance. The first floor plan is as follows:—A, Judge's court; B, Judge's room; C, Judge's lavatory; D, Judge's staircase; E, public staircase and landing; F, Registrar's Court; G, Registrar's room; H, Registrar's lavatory; I, Registrar's staircase; J, counsel; K, robing-room; L, lavatory; M, attorneys; N, lavatory; W, X, Y, Z, site of No. 84, Basinghall-street, and will form extension of Court buildings in six years.

NEW CLUB, WIVELISCOMBE, SOMERSETSHIRE.

This building is being erected as a local Jubilee celebration; the foundation-stone was laid on Jubilee day by Mrs. W. Hancock. The building is being carried out in local stone, with Ham Hill dressings, the half-timber being in solid oak. The architect is Mr. T. W. F. Newton, 121, Colmore-row, Birmingham, and the builder Mr. S. Richards, Wiveliscombe.

FOUNTAIN, WALTON WELL, OXFORD.

The inscription on the tablet will perhaps best give the *raison d'être* of this memorial. It runs as follows:—

"With the consent of the Lords of the Manor this drinking-fountain is erected by Dr. William Ward, to mark the site of a celebrated spring known as Walton Well, adjacent to the ancient ford-way called Walton Ford."

The architect is Mr. H. Wilkinson, Dover, and the work has been exceedingly well carried out by Mr. James Clifford, mason, Oxford; the carving by Mr. McCulloch. The stone used is Portland.

NORTH PORCH, CHRIST CHURCH, HANTS.

There is nothing of interest to be said about the North Porch, Christ Church, Hants, as the subject is so well known. The drawing forms one of a series made by Mr. Irwin and myself during a short stay in the neighbourhood. The porch was restored, we believe, by Mr. Ben. E. Ferrey, jun., some years back. It has a fine parvise over, used by the monks as a school and reading room in their day.—Percy G. Stone.

SEMI-DETACHED VILLAS, HEATON, NEAR BRADFORD, YORKS.

These villas, built for Mr. John Maddocks, occupy a commanding position in the most fashionable suburb of Bradford. They are built of pitch-faced delfstone wallstones, relieved with sandstone ashlar dressings, and covered with green Westmoreland slates. The contracts have been executed by local builders, the architect being Mr. Herbert Isett, of Bradford and Wigan.

BISHOP BRIDPORT'S MONUMENT, SALISBURY CATHEDRAL.

Salisbury Cathedral, begun in 1220 and finished in 1258, is well known to be one of the purest and most beautiful of our cathedrals. It contains many features deserving of careful study of the student of architecture, and none more interesting than the fine tomb, of which we give an illustration, which is built in the form of a shrine, and is replete with taste and fancy. It commemorates Bishop Bridport, whose death took place but a few years after he had completed and dedicated his beloved church.—Fred. W. Richardson.

SKETCHES FROM ITALIAN CHURCHES.

CHOIR STALLS, ST. MARIA MAGGIORE, BERGAMO.

The choir stalls of St. Maria Maggiore, Bergamo, are an admirable specimen of the woodwork of the latter half of the 15th century. The carving, although profuse, is very delicate, and the intarsia work extremely rich, some of this being the work of Fra Damiano da Bergamo.

WEST DOOR OF ST. FRANCESCO, BOLOGNA.

This beautiful example of North Italian Gothic, with the typical protecting canopy of the period, dates from the latter half of the 14th century. The west façade was never completed, as was generally the case with churches of that period, but the whole structure is now undergoing complete restoration.

SCALA MINELLI, VENICE.

This staircase, the work of the end of the 14th century, is built of red brick and white stone. The stairs wind up for another story, and are then covered with a domed roof. The palace to which this appertained originally belonged to the Contarini del Bovolo, and afterwards to the family of Minelli. It is now used in connection with the hospital adjoining.

WEST DOOR, OR' SAN MICHELE, FLORENCE.

There are two west doors to this church, the one illustrated being the northernmost. The work dates from quite the end of the 14th century, and the tracery, although rich *en masse*, lacks purity of detail. The moulding section E is a detail of the four bases to main shafts. That marked B is of an amulet above on shaft, and from which the cusped hood springs. Edgar H. Selby.

EXHIBITION OF ART AND INDUSTRY.

The Exhibition by London Apprentices, opened at the People's Palace, Mile End-road, last Saturday, by the Prince of Wales, is a promising beginning of what may be expected by organised efforts. The exhibition is divided into 15 classes, and includes printing and its allied branches, lithography, engraving on wood and on metal, bookbinding; various kinds of decorative art, such as woodcarving and painted decorations, designs for fabrics, embossing on glass; the arts related to cabinet-making or furniture, scientific instruments, and various trades connected with building and wood-working. Confining our attention to the latter branches, we notice at the top of one of the annexes a model interior, the combined work of members of various classes, from a design by Mr. F. Jacob, the instructor of the cabinet-making class. The grate (slow-combustion) and chimneypiece, with overmantel, the cosy seats, all painted white, and the wall-papers and drapery, are in good taste and harmonious colours. Some models of staircases by G. Down, John Davis, G. F. Jackson, and G. Stone are very creditable works. The small flight, with circular string and handrail (760), and the Gothic newel with moulded cap and base (757) show clever workmanship. In masons' work we note a buttress-head and panel (773); a stone-carved window, by J. Smart, from the Polytechnic classes. In plumbing several examples of hand-made traps, lead set-offs, lead pipe bending and bossing, and a model of a stack of soil-pipes with siphons and vents, by John J. Green. Bricklayers' work is represented by a model of a chimney, by H. Piper; a Venetian arch by Horatio Cansick; and a semi-arch moulded in the reveals by Alfred Hone. These specimens are all executed by apprentices. In furniture, we see a handsome brown oak sideboard of good character, with carved panels and mirrors, by an apprentice of five years (W. Rutter); also a pedestal table by Albert J. Carter, and several other specimens. Several examples of wood-carving are exhibited, for which the National Silver Medal, bronze medal, and other prizes have been awarded. These are by A. Norfolk, Williams, and G. W. Taylor. The panels and capitals sent by the School of Art Wood-Carving, City and Guilds Institute, are carved in pine and walnut, and are very creditable. Specimens of plasterers' work, including a doorway, pilasters, and capitals, and panels in Italian Renaissance, are the work of John W. Baker and Chas. A. Winter. Iron and general metal-work include some good examples of blacksmiths' and brass finishers' skill, and there are several nice specimens of wrought ironwork and *repoussé*. Especially noticeable are the specimens of chased and embossed ornament by Jas. R. Stebbing.

COMPETITIONS.

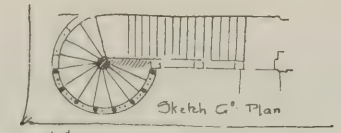
Birmingham.—After a year's consideration, and with professional assistance, the committee of the new Baptist Church, Moseley-road, Birmingham, have selected Mr. Ewen Harper, architect, of 57, Colmore-road, Birmingham, to carry out the work at a cost of about £4,000. The other competitors were Mr. J. A. Cossins, Messrs. Ingall and Son, Mr. Hughes, Mr. Sutcliff, and Mr. Newton.

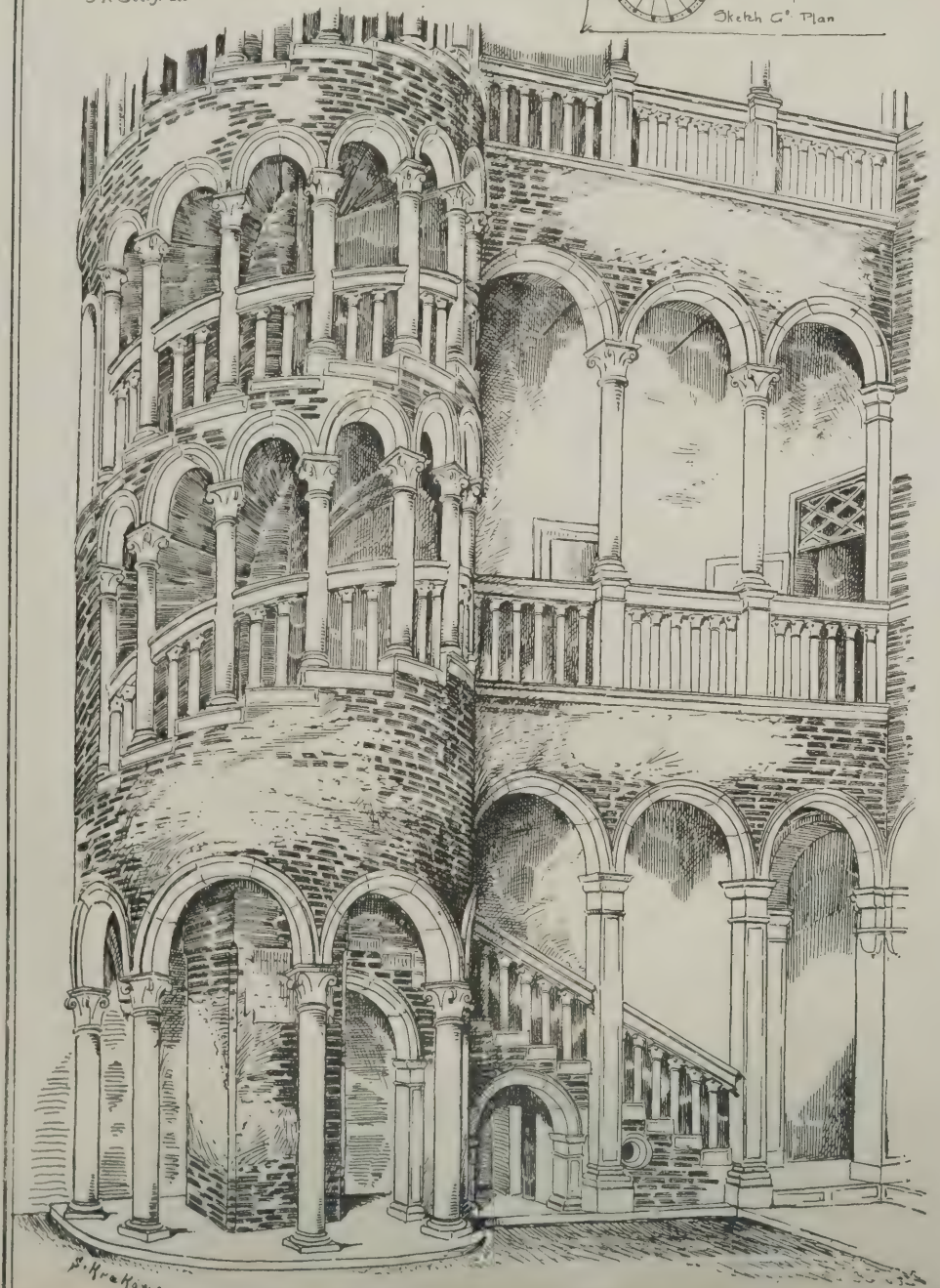
Indianapolis.—We draw attention again to the competition for the Soldiers' and Sailors' Monument at Indianapolis, of which we gave full particulars in our issue of Oct. 28 last, in this column. The advertisement—owing to a mistake of a clerk on the other side of the water—has only reached us this week. A good many English architects have already had sets of particulars from us; any who still desire can do so by sending three stamps for postage. The secretary, in his letter to us, says that though unfortunately the time is now short, yet, as comparatively few drawings are wanted, some English architects may like to compete.

An inquiry was held at Wath, Yorks, on Friday before General C. P. Carey, of the Local Government Board, with regard to an application from the local authority for sanction to borrow £10,000 for works of sewerage and sewage disposal. Mr. C. H. Johnson, C.E., of Sheffield, produced and explained the plans.

Scala Minelli S Paternian
~ Venezia ~

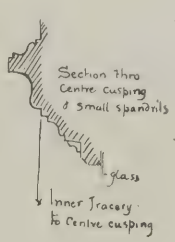
E H Selby. del.





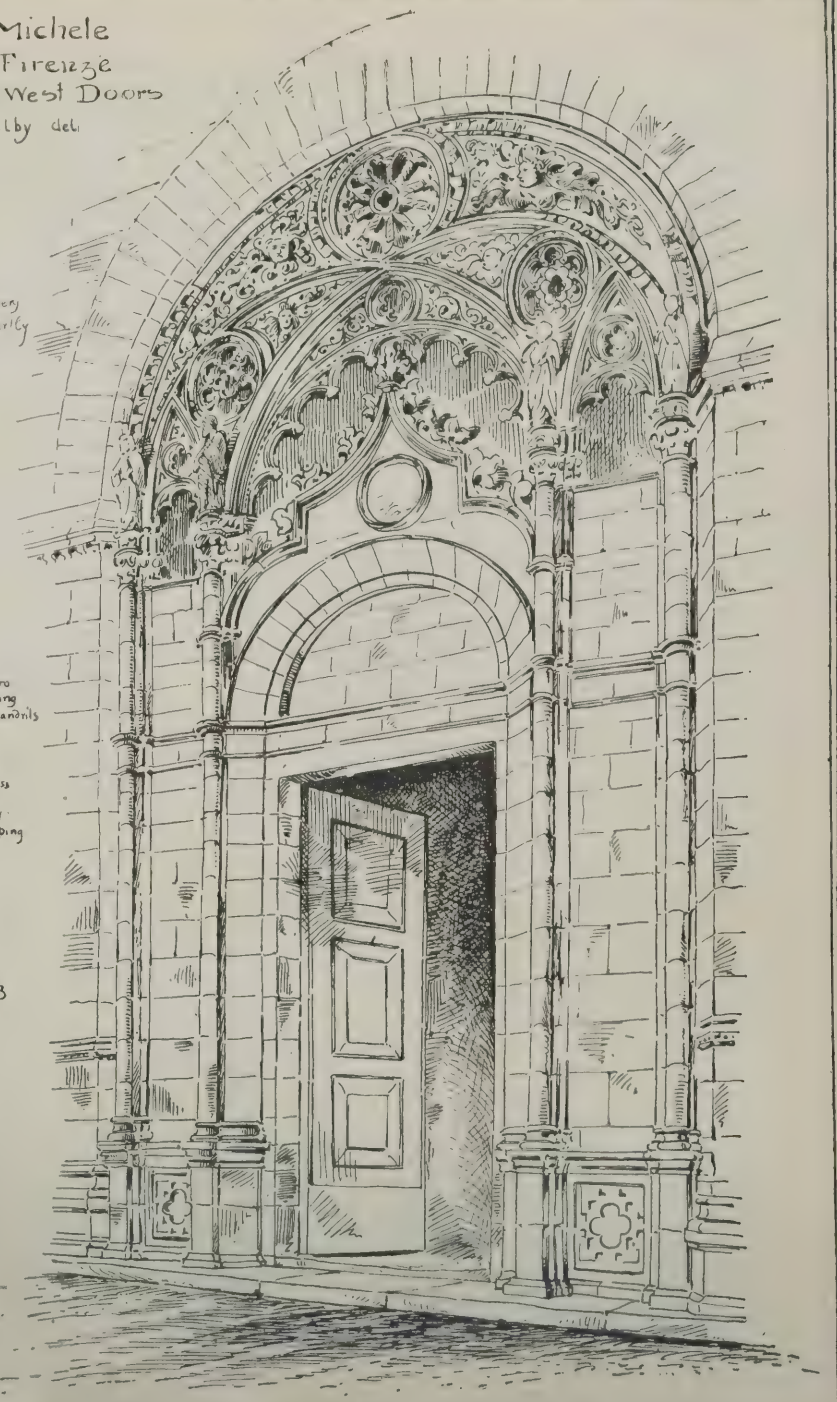
Or San Michele
Firenze
One of the West Doors
E H Selby del.

N B The Tracery has been partly restored



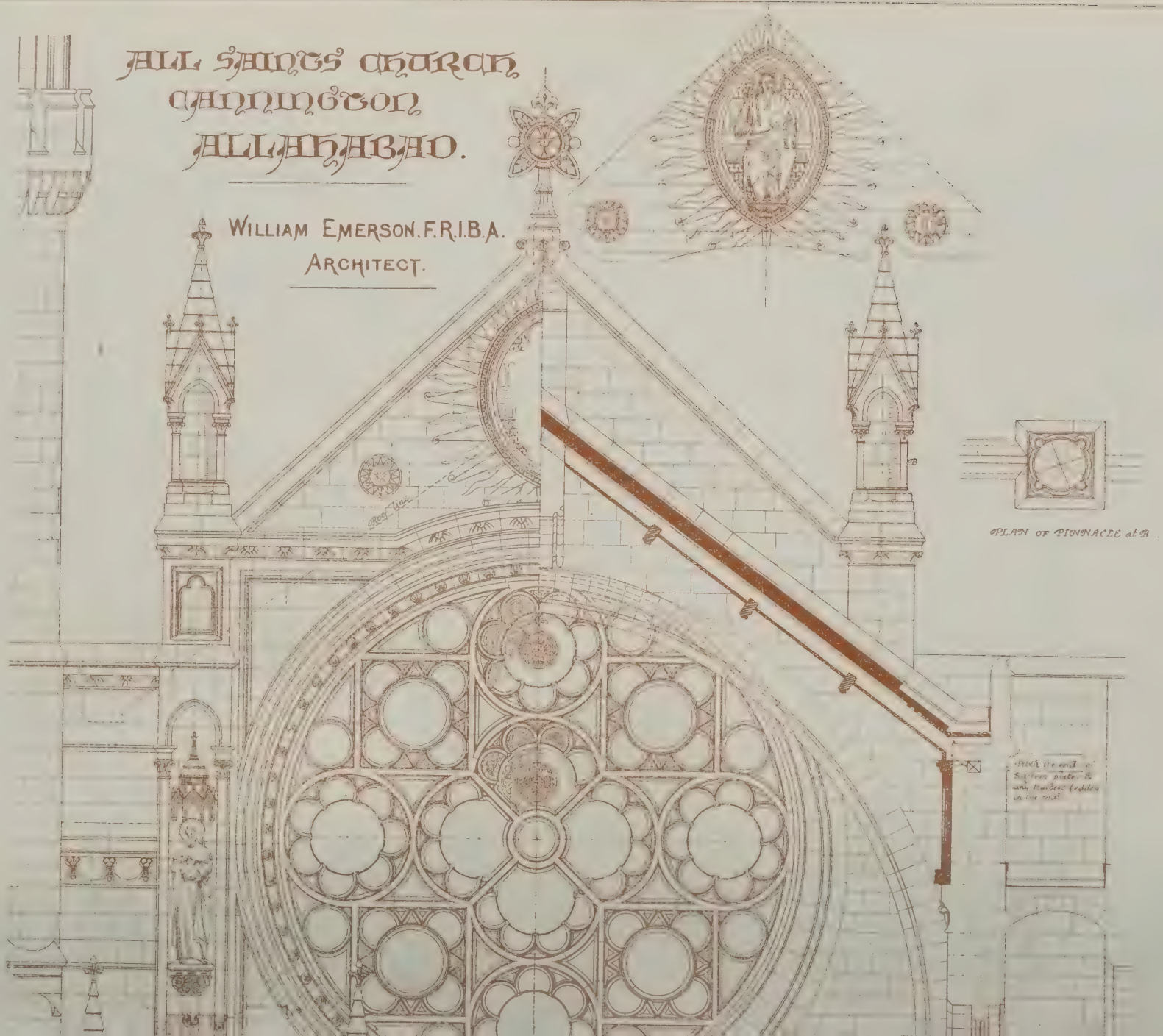






ALL SAINTS CHURCH CANNINGTON ALLAHABAD.

WILLIAM EMERSON, F.R.I.B.A.
ARCHITECT.



HALL OUTSIDE

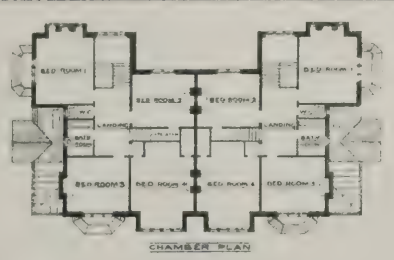
WEST ELEVATION

HALL INSIDE

Photo-Lithographed & Printed by James Akerman, 6 Queen Square WC

Houses at Heaton near Bradford Yks

Herbert Isitt. Architect
Bradford & Wigan



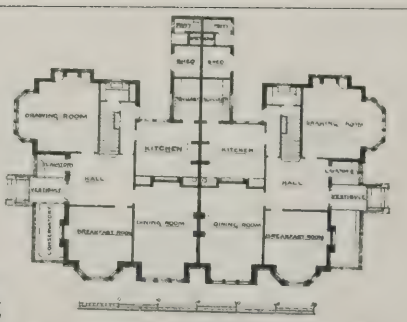
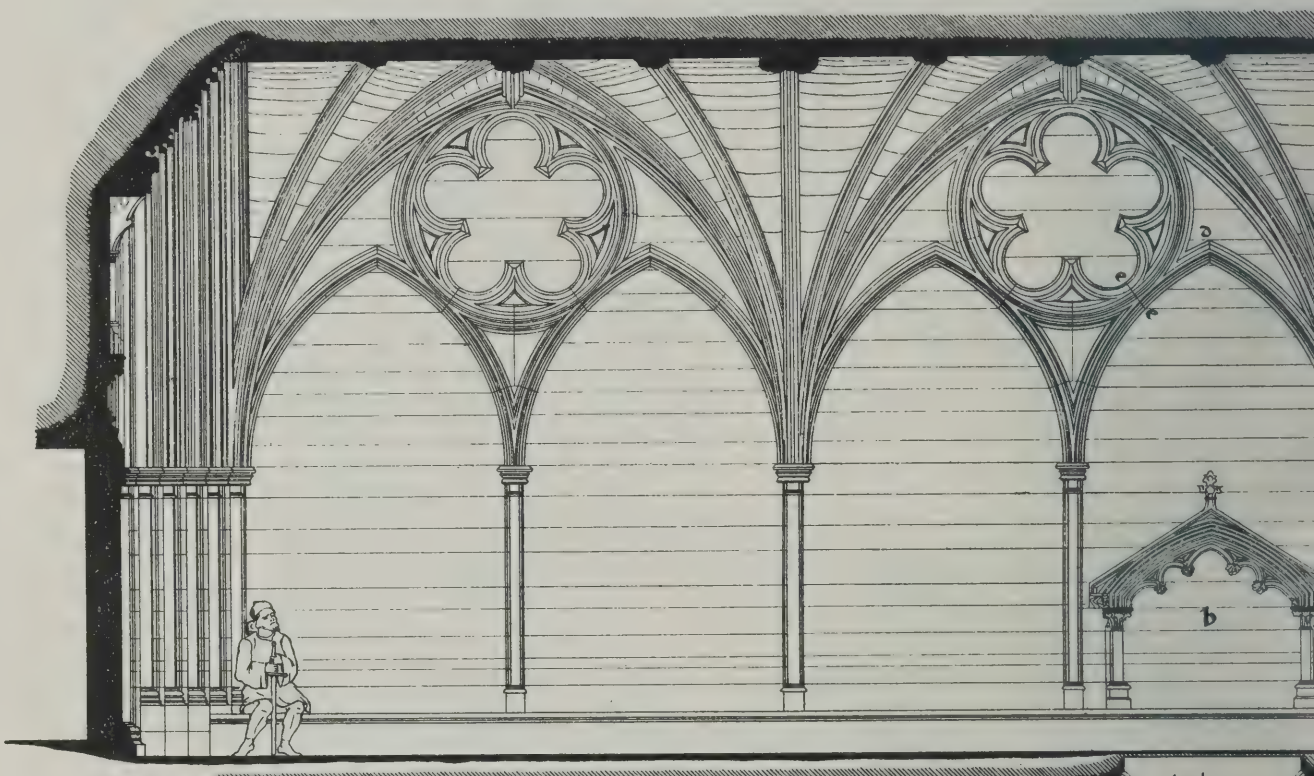


Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

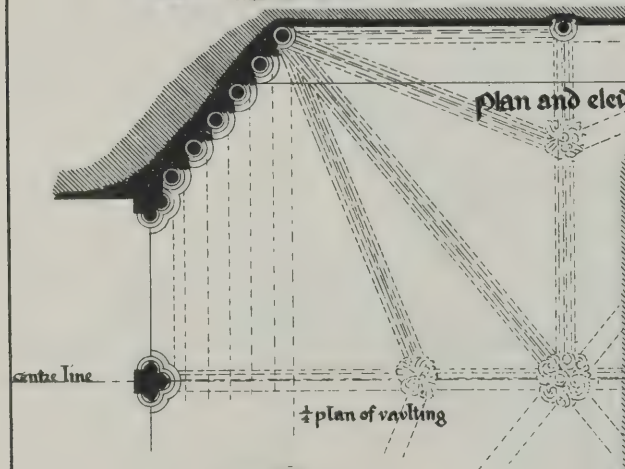
CHRIST-CHVRCH·HANTS·

Details of North Porch.

Scale



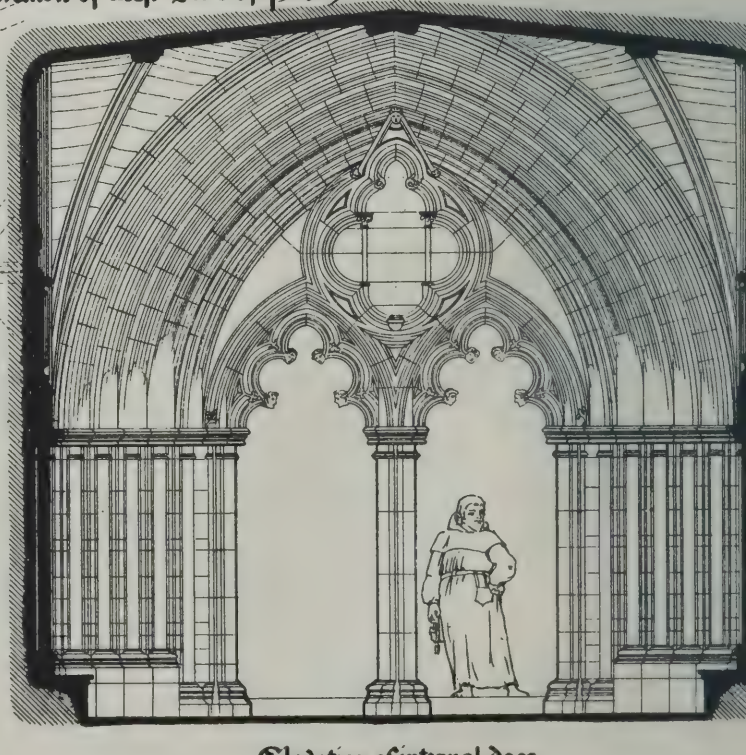
plan and elevation of West Side of Porch



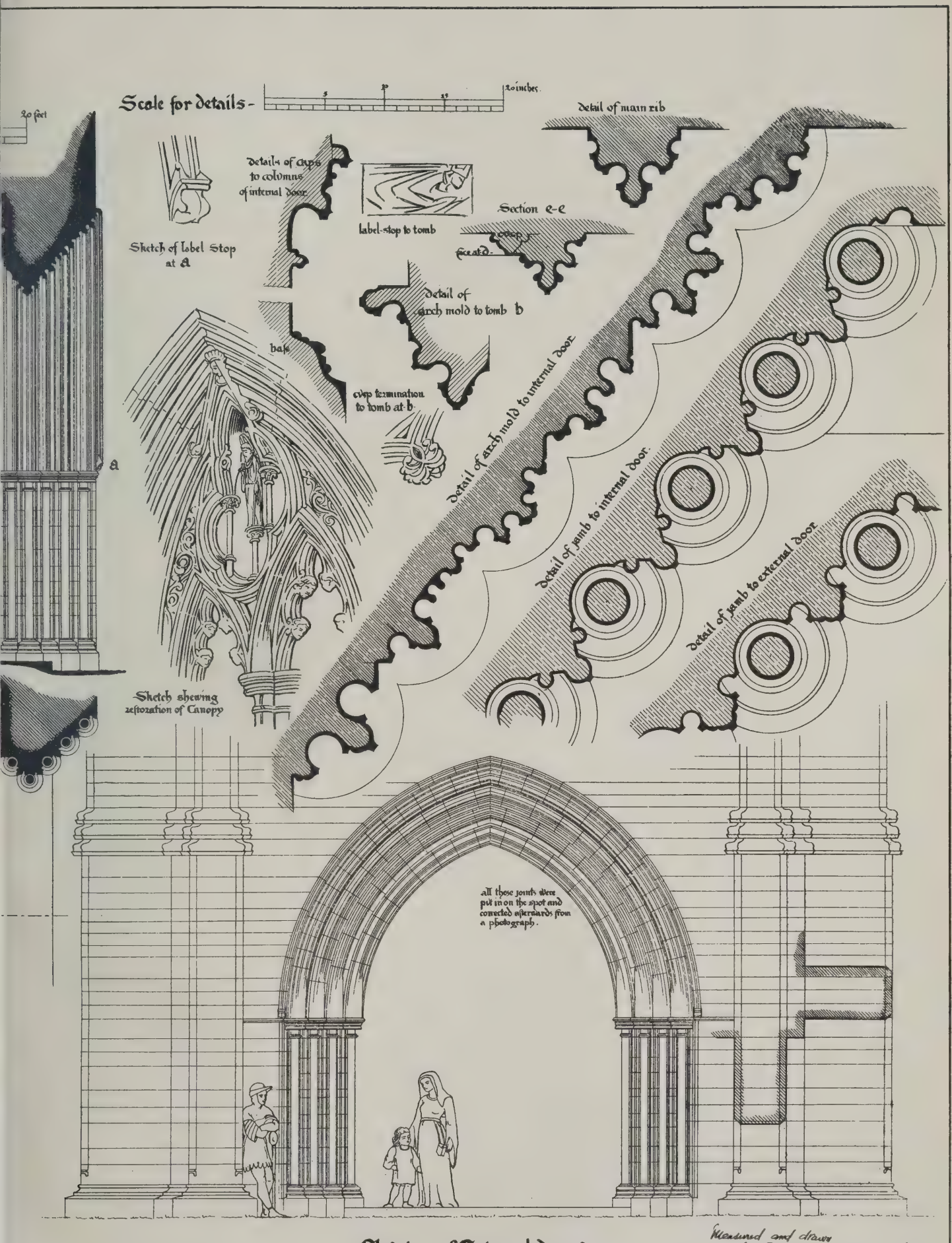
½ plan of vaulting



Sketch of Porch from SE



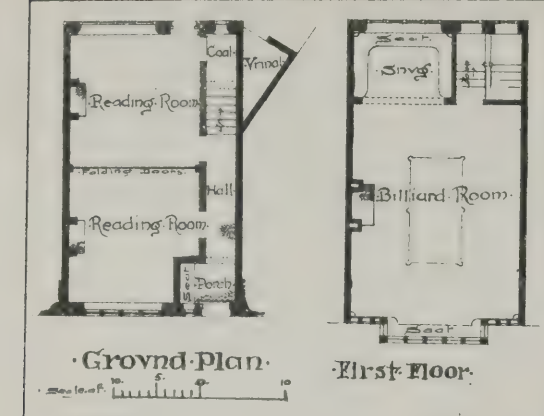
Elevation of internal door



Elevation of External doorway

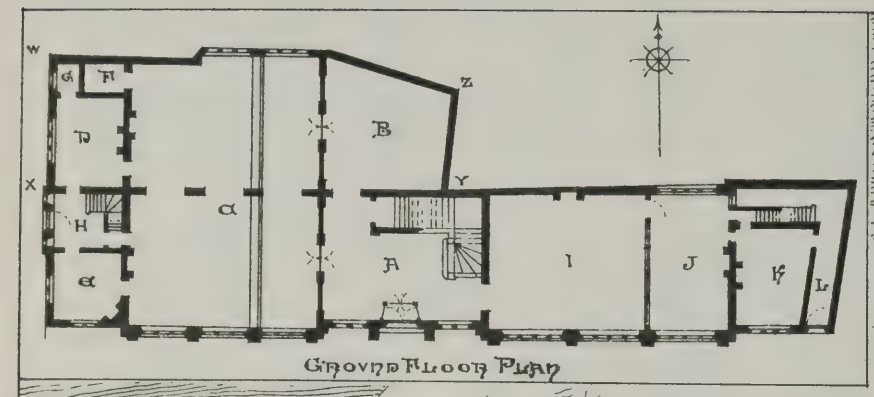
Measured and drawn by Percy Stone & Charles Innin 1884

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



New Club, Wiveliscombe.

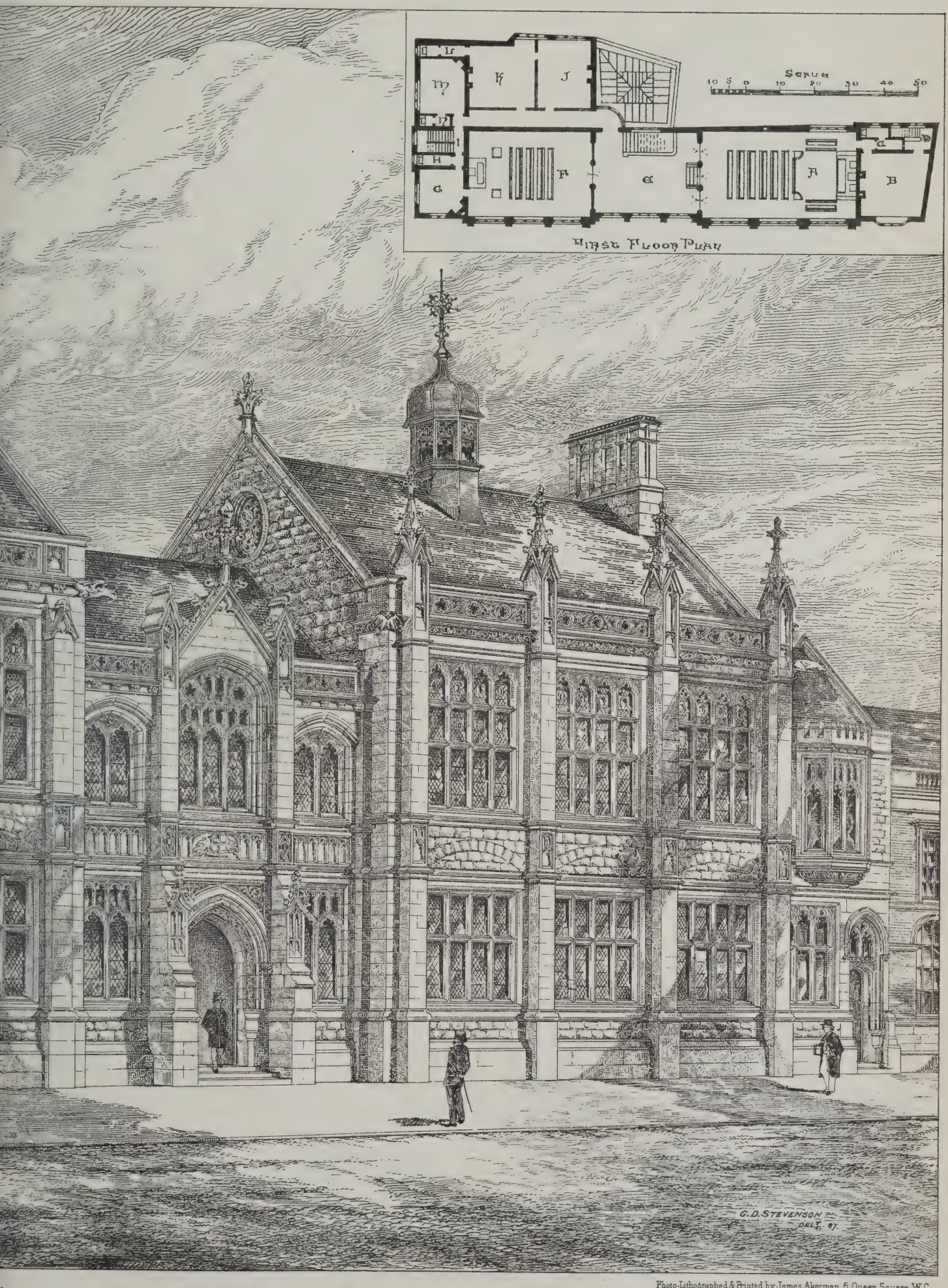
T.W.E. NEWTON, ARCHT
Birmingham.



GROUND FLOOR PLAN

CITY OF LONDON · COURT

ANDREW



VIEW · FACING GUILDHALL · BUILDINGS

RRAY · A · R · I · B · A · ARCHT

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C

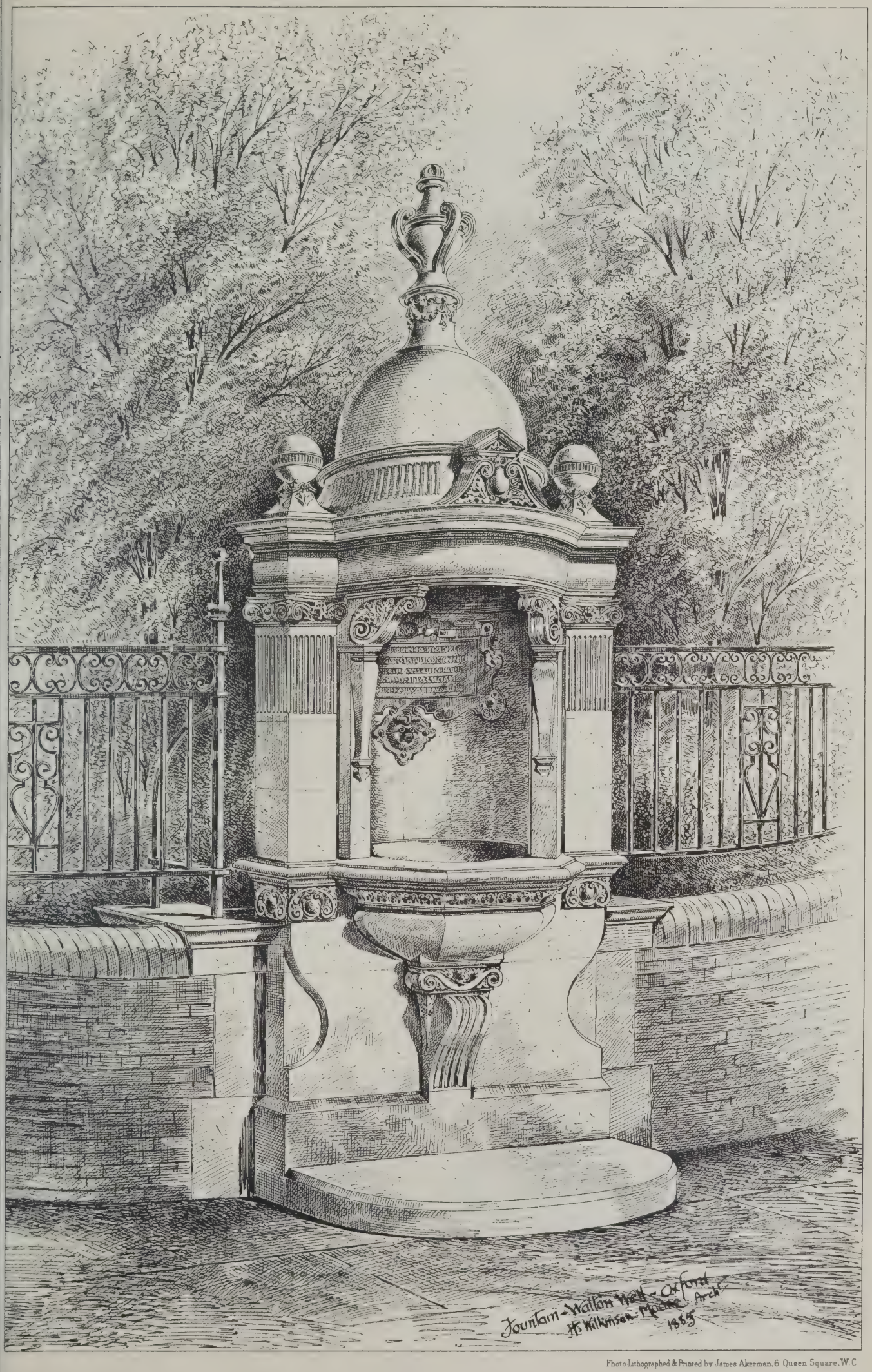
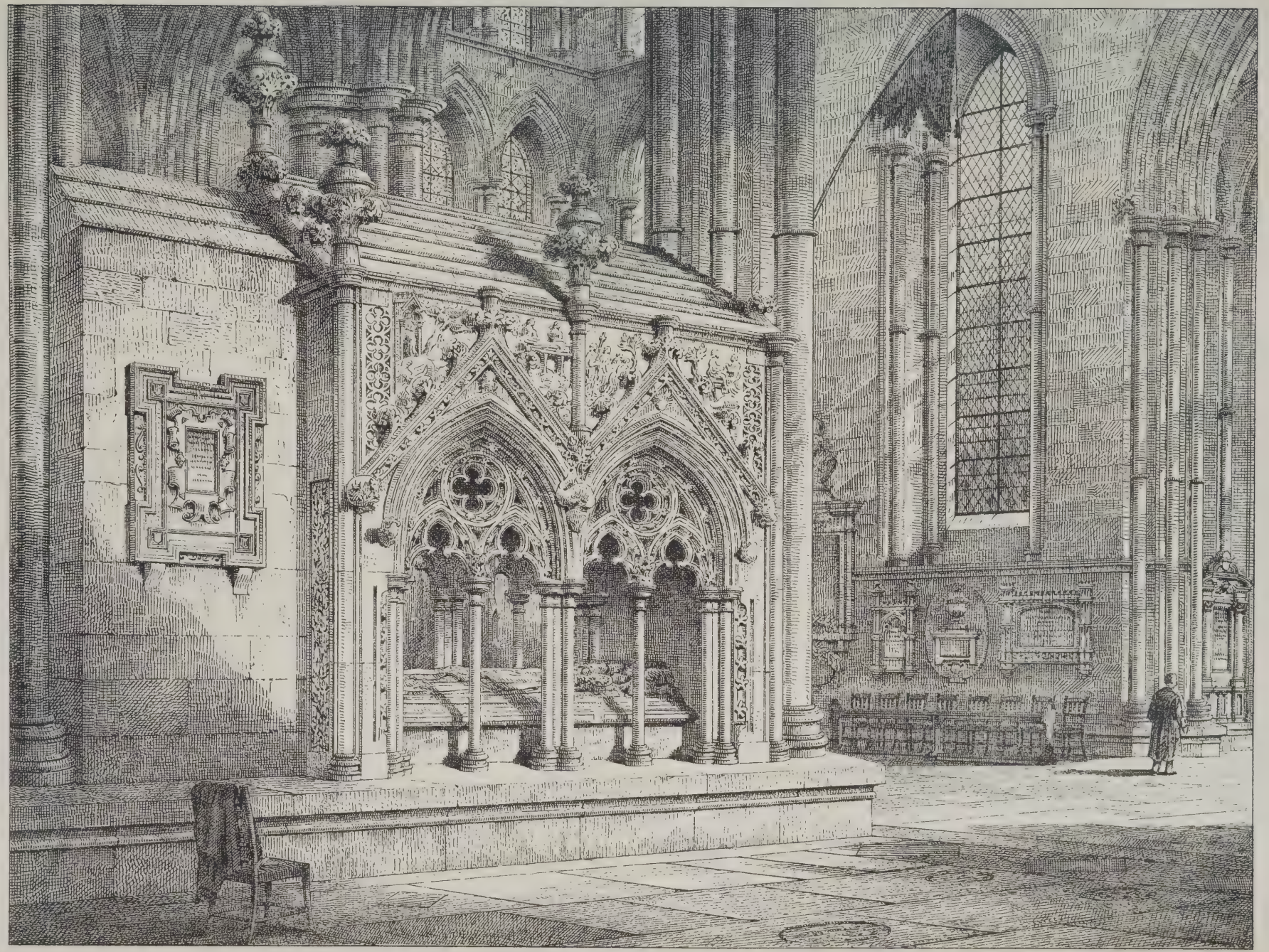


Photo-Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

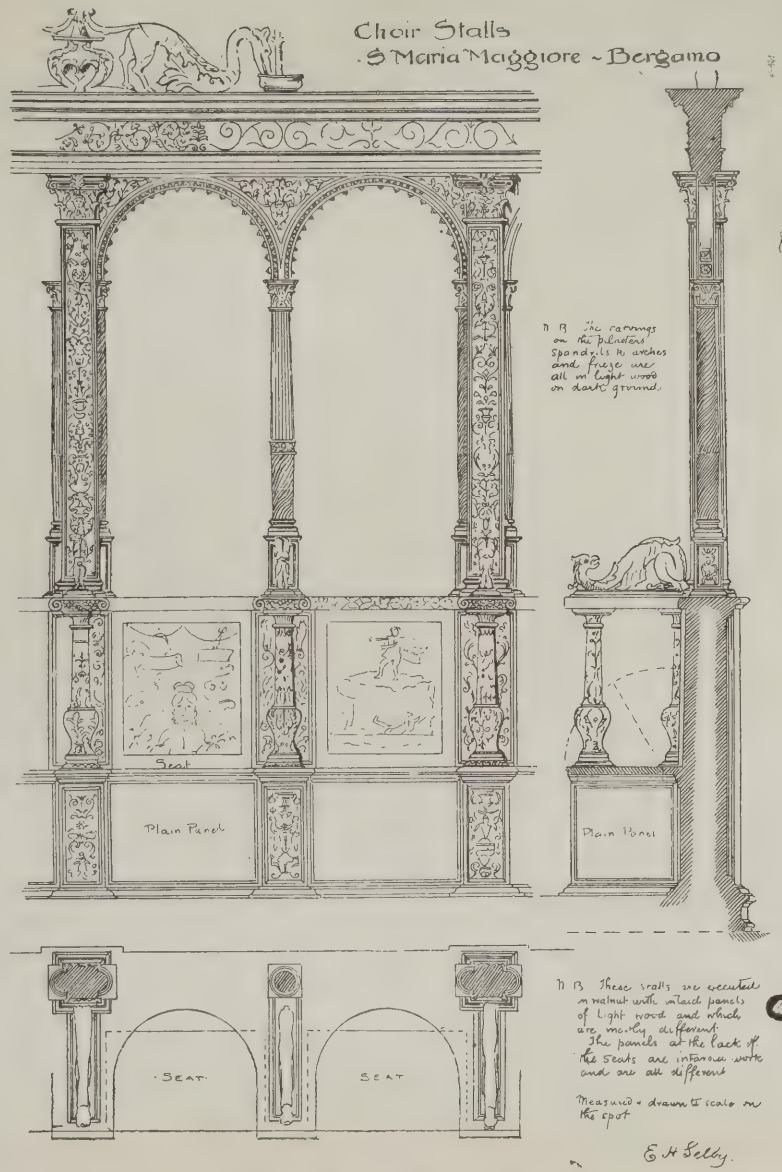


BISHOP · BRIDPORT'S · MONUMENT · SALISBURY · CATHEDRAL

DRAWN BY · F·W· RICHARDSON

Photo-Lithographed & Printed by James Akerman, 6 Queen Square W.C.

Choir Stalls
S Maria Maggiore ~ Bergamo



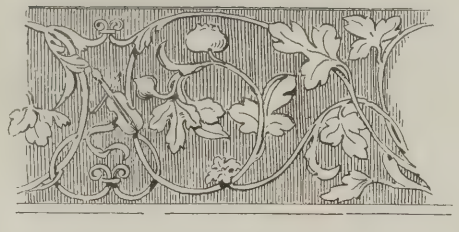
N B The carvings on the pilasters Spandrils to arches and frieze are all in light wood on dark ground.

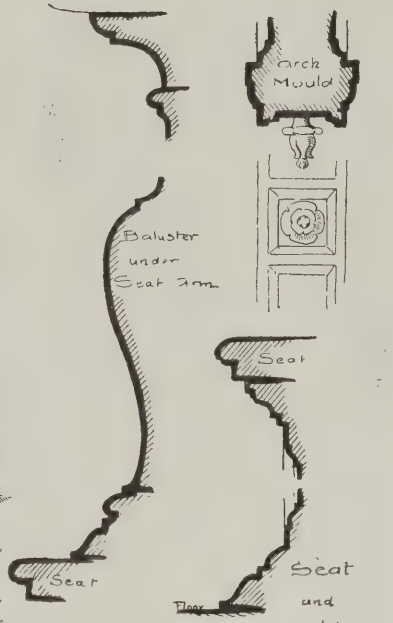
N B These stalls are executed in walnut with inlaid panels of light wood and which are mostly different. The panels at the back of the seats are intarsia work and are all different.

Measured & drawn to scale on the spot

E H Selby.

Scrap of Frieze Enrichment

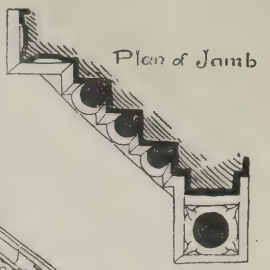




Seat and Moldings

Details to Choir Stalls

West Door of S Francesco Bologna



E H Selby

WAYSIDE NOTES.

SIR FREDERIC LEIGHTON'S address to the students at the Royal Academy had, said the *Times*, all the characteristic merits and defects of his various discourses upon art. "The style is too ornate. Too many topics are started without being discussed. The catalogue of names enumerated is too lengthy. Too much ground is touched upon to be occupied, except with a golden haze. Perpetually, on Saturday evening, his hearers must have mentally been plucking at his sleeve, and begging him to pause upon one of the peaks to which he had led them before winging his flight to another." Nevertheless, the reported speech must have proved interesting reading to many. That which is too highly condensed for an oration does not appear so in type, when we can ourselves rest awhile upon each peak, and gaze upon the prospect below, leisurely enjoying the evergreen fields of Tuscan art, and that of Florence in particular, the history of which, in the brilliant enthusiastic address of Sir Frederic, assumed all the charms of a romance.

I found time to run into the Royal Academy on Monday, and glance at the exhibition of the students' work. There was quite a gathering present, though, as usual, the room devoted to architecture did not attract many visitors. Perhaps they can hardly be blamed, in this instance. A *railway station* is not a subject that suggests to the average Englishman any great material loveliness. Visions of ungainly roofs, bulky iron trusses, and dull masses of blackened stock-brickwork come before one, looming out of clouds of steam from screeching locomotives. But to the professional man there was considerable interest in examining the designs of the competitors for the £200 Travelling Studentship. True, there was nothing that *quite* came up to Sir Gilbert Scott's work at St. Pancras; but then the R.A. students had no mammoth hotel to hide the ends of their station roofs. The inevitable vast iron roof proved a stumbling-block to all the competitors. Try it how they would, it was a regular *bête noire*. It was amusing to notice the way in which they endeavoured to get over the difficulty. The successful competitor, Mr. R. W. Schultz, had compromised matters; the author of a very creditable Grecian-looking design hid it with a pediment; while many others had openly confessed it, and endeavoured to make a thing of beauty of its ungainly wheel-like framework of iron and glass.

The problem is not a new one; but it still lacks a satisfactory solution. A big hotel has smoothed matters for the architects of most of our great London termini. As regards the *plans* of the competitors for the Travelling Studentship, many of the designs were conceived without regard to that daily morning and evening rush which is the chief feature of all great railway stations. I should say most of the competitors had never had a season ticket on any of the London trunk lines. In spite, however, of this insufficiency of points of egress and ingress, there were many redeeming features in the designs. Moreover, it was rather a thankless task for the competitors. Indeed, it was a very curious subject. Few architects are called upon to design railway stations; and, according to Mr. Ruskin, their services should not be required on buildings where rush and hurry is the order of the day—a view, however, from which I beg most respectfully to differ, having regard to the beautiful (!) specimen of railway station architecture at London Bridge, S.E.R.

So the old stones of Temple Bar are going into the country for a change of air! Who would have thought the venerable gate, which for so long marked the City boundary, would one day be re-erected in the park of a successful London brewer? It is now just about ten years ago that the Griffin usurped the place of the arch which Sir Christopher Wren erected in 1670-72. But softly! Let us not loudly mention Sir Christopher's name in connection with the old Bar. The shade of Inigo Jones might be upon us, with an indignant protest that, in the year of grace 1636, *he* prepared a design for a new Temple Bar—the said plan being still extant—which, to his exceeding chagrin, was never carried out. Looked at in the light in which the late Mr. Jones may be supposed to have regarded the question, it would appear that, *seniores priores*, Inigo should have had the job. Still, there is some consolation for the Jones family, in knowing that their illustrious namesake produced, or has the credit of having produced, a charming riverside water-gate. The authorship of the Adelphi edifice is still an unsettled point, is it not?

"The Metropolitan Board of Works Theatres Bill" was submitted, in draft, to the Board last Friday. It does not appear to have met with the approval of London theatrical managers. We cannot, however, express surprise at this, as the passing of the Bill would, it is hoped, at once put an end to many of their expedients for house-packing. First and foremost, I would recommend to the notice of the authorities the highly dangerous practice of fitting up hinged seats over stepped gangways, so common in many theatres, at least in inferior parts of the house. But this fact only makes the practice the more fraught with danger, as in such places there is the greatest rush in cases of panic.

Mr. Ralph Nevill's lecture at the R.I.B.A. did not seem to meet with the universal approbation of his audience, in spite of the many suggestions contained in it; so we may look for some heated discussion on Feb. 6, till which date comment on Mr. Nevill's paper is adjourned.

The suggestion made by Mr. Nevill that the *ellipse* would furnish the best form for the plan of a theatre staircase, does not seem to me a very practical one. Such a feature may be made very handsome, architecturally, as we may see in Mr. Waterhouse's beautiful marble staircase at the National Liberal Club*; but, as Mr. Emden said, there would be many objections to its employment for theatres. Besides the one he particularly mentioned, there would be a fertile source of danger in the fact that the treads are of ever-varying breadth. Consequently, in a struggling crowd, numerous persons would lose their foothold and stumble, since many would never know for certain where to put their feet down. This objection is magnified when we come to consider that the weaker individuals would be pushed about from side to side of the staircase—from narrow tread to broad tread, and *vice versâ*.

This question of theatre staircases is very interesting and important; and it is to be hoped there will be some valuable suggestions made at the adjourned discussion. While I think Mr. Nevill's elliptical staircase is bad, I cannot bring myself to like Mr. Emden's straightaway flights. A certain number of landings must surely be beneficial; as, also, a change of direction to prevent over-crushing. The weight of a struggling, pushing crowd must be enormous, and it can only be counteracted by a change in direction; but there ought to be something that should plainly indicate the direction to be taken. The tortuous "rat-hole" staircases of the average theatre gallery are the class to be avoided; but it is possibly in a happy medium between this type and the straight fore-and-aft kind that the most practical theatre staircase may be found.

I have to confess that I only saw the marble staircase at the National Liberal Club a day or so back. What a little gem it is! Of course, we ought to discount somewhat from our impressions as to the architectural merit of the composition for the fact of the exquisite nature of the materials employed in its construction. But even if we do, and imagine the staircase to be executed in plain stone and brickwork, it would still be a beautiful object. As it is, in all the glory of its many-hued marbles, it is certainly one of the loveliest things of its kind that one could expect to see. By the bye, it may be entertaining to the reader to know that I was recently most seriously assured that Mr. Waterhouse had taken the idea for the beautiful *faïence* work at this building from a certain miserable little piece of work of a provincial architect!! Bedowell-joggles!!! Happily I recovered the shock to my nervous system.

* This is not a true ellipse, but sufficiently like one in general appearance.

I attended the meeting of the Society of Architects last Tuesday. The paper by Mr. J. Leaning was of a most practical nature, as the reader of this week's "B. N." may judge for himself. The lecturer's genial manner made it quite a pleasure to listen to his discourse on scales, drawings, contracts, p.c. values, &c. Unfortunately, the miserable wet weather caused the attendance to be rather small. Nevertheless, there was an interesting discussion of the paper, and we had a few "wise saws and modern instances"—one of the latter, about a Scotch architect who adopted a ⅛ scale because he did not wish the contractors to measure from his drawings, did not seem to me to show any great wisdom on the part of the worthy Scotch gentleman. Surely, ⅛ scales are not so rare that a contractor cannot obtain one for love or money? Perhaps the architect inserted a clause in the specification that "No ⅛ scales were to be brought on the job." (!)

I fear your correspondent, Mr. H. L. Field, must make the most of the days that remain in which a little of the old work is left at St. Alban's. Protest seems futile, or there would be a rich field for the operations of the S.P.A.B. in protecting the stones of the venerable Hertfordshire abbey.

GOTH.

THE DOORWAY OF SAN PETRONIO AT BOLOGNA.

THE most recent addition to the Architectural Court at the South Kensington Museum is a plaster cast of the central western doorway of San Petronio, at Bologna. This church is a favourable example of the red-brick Gothic architecture of Northern Italy. It is the largest edifice of the kind in Bologna; but even in its present extent it is little more than half the length originally intended — 385ft. as against 750ft. in the first design. The church was founded in 1390, in honour of San Petronio, the first bishop, and the great doorway was executed by Jacopo della Quercia, in 1425; the architect of the building was Antonio Vincenzi. The vast size of this doorway has needed all the available wall space in the great Architectural Court, and the work forms a fitting pendant to the "Puerta della Gloria," of Santiago di Compostella, the famous portal of Mateo, on the other side of the Court.

Surrounding the arch from San Petronio are 32 half-figures of patriarchs and prophets, and on the imposts carried across beneath the arch are statues in full relief of the Virgin and Child, San Petronio, and San Ambrozio. In the architrave are five subjects from the New Testament, treated as bas-reliefs, and a similar number of subjects from the Old Testament, from the Creation to the Deluge, occupy the pilasters on either side. Vasari tells us that the artist devoted twelve years to the execution of this work, and that its completion filled the Bolognese with astonishment. The proportions of this magnificent doorway are somewhat marred by the scale of the plinth mouldings, which are carried across all the lines of the arch, and which, though well adapted to the entire façade, seem unwieldy when taken in connection with the entrance above. Moreover, the great height of the arch renders it a matter of difficulty to examine the figures of the Virgin and Child, and companion Saints, and the fine bas-reliefs in the frieze. It is said that Della Quercia has introduced his own portrait among the patriarchs, and that the figure in the archivolt wearing a chaplet of oak-leaves is the one in question. This splendid piece of casting has been executed for the museum by Lelli, of Florence, at a cost of £875, which compares very favourably with Brucciani's work at Santiago, which cost the Government £2,300.

Mr. Thomas L. Watson, F.R.I.B.A., of Glasgow, read a paper on "Fire Prevention and Exits from Public Buildings" before the Architectural section of the Philosophical Society of Glasgow on Monday night. We regret that pressure on our space prevents us from giving this week the paper, which referred to the points that should be kept in view with reference to safety in designing a theatre, and to those particulars in which, in Mr. Watson's view, the designer should be controlled by regulations.

The trustees of St. Leonard's Charity, Newark-on-Trent, has elected Mr. George Sheppard, the borough surveyor, as their surveyor.

WESTERN ASSOCIATION OF AMERICAN ARCHITECTS.

THIS flourishing Association of American Architects held its fourth annual session at the Grand Hotel, Cincinnati, O., in the third week of last month. At the opening meeting on Wednesday, Nov. 16, Mr. John W. Root, president, delivered an inaugural address, in which he remarked: "Idea is the crying need of our modern architecture. In England, if we may judge by the illustrated periodicals, architects are pitiably fortunate in having so far passed us as not only to be sadly lacking in ideas, but to be utterly unconscious of their imbecilities." The annual report referred to the movement now in progress having for its aim the establishment throughout the States of a uniform form of building contracts, to which we have referred elsewhere, and added: "At the Convention of the American Institute of Architects, held at Chicago last month, a committee was appointed, with instructions to meet a corresponding committee, to be appointed by the Western Association of Architects for the purpose of determining, if possible, a practicable plan for consolidating into one body all the architectural associations of the United States. It is the opinion of your Board of Directors that such consolidation would be of the utmost value to our profession, and it recommends the appointment of such committee." The report of the committee on the organisation of State associations showed that such associations had been formed at Nashville, Tenn., Milwaukee, Wis., Birmingham, Ala., Louisville, Ky., Detroit, Michigan, Rochester, N.Y., and New Orleans, La. Regular meetings had been held in all States but Indiana, and the committee recommended that the association in that State be abandoned. Mr. Louis H. Sullivan, of Chicago, then read the report of the committee on a standard of professional requirement. The committee proposed that the policy of the Association should be broad and democratic; that it should not set up factitious barriers against those who ask for admission; that the Association should seek to count among its members every thoughtful, earnest, ambitious man in the profession; that it should desire its strength and stability to be derived from the standing and capacity of the average man; that while welcoming the fervour of youth, it should cherish the honourable record of old age; that, above all, it should not place its standard for admission higher than it was itself prepared to exemplify. It was assumed as a paramount consideration that the applicant's record, were it short or long, should prove honourable; 2nd, that he evidenced fair artistic, constructive, or executive skill; 3rd, that his admission should necessitate an expressed pledge upon his part to sustain by individual effort a sound standard of professional bearing. The committee believed the time was now ripe for the promulgation of a code of ethics which should define a desirable and practicable relationship of the members of this Association to each other, and to the incorporate body: a code which should indicate the degree and nature of the self-respect and good faith of this Association. They therefore earnestly recommended to the Association that a committee be appointed to prepare such a code, and that its report be considered at the Convention of 1888. The committee further recommended the following form, for application-blanks, which may be found of interest to the councils and committees of English architectural bodies:—

——, 188—.

To the Board of Directors, W. A. A.:—

My full name is ——
My business address is ——
The name of my firm is ——
I have practised the profession of architecture for —— years.

The accompanying photographs (unmounted), numbered respectively 1, 2, and 3, show completed buildings erected from my plans and under my supervision.

No. 1 is a [here give general description of building, giving also name and address of owners and contractors.]
No. 2, do.
No. 3, do.

The accompanying letters, numbered 1, 2, and 3, are from the respective owners of the above buildings, and endorse my character and proficiency.

We, members of the W. A. A., hereby endorse Mr. ——. ——'s application for membership. We know him personally; we believe him to be worthy of membership.

——.
——.
——.

Applications are to be considered by the Board of Directors, who will vote "yes" or "no" by letter-ballot, of which the following is the draft recommended:—

Office of Secretary W. A. A., —— ——, 1887.

DEAR SIR,—Please vote by striking out the alternative word under the heading "vote," and return this sheet to me at your earliest convenience.

Vote.	Applicant.	Lay Endorsers.		Endorsing Members.	
Name.	Address.	Name.	Occu. Address.	Name.	Address.
No.	Yes.				
No.	Yes.				

——, Secretary W. A. A.

By order Board of Directors

——, Chairman.

The report was accepted.

The following resolutions were offered by Mr. Louis H. Sullivan, of Chicago, and adopted:—"That the Board of Directors be empowered and instructed to proceed hereafter in matters of election to membership, upon the basis of the report of the Committee on Raising the Standard of Admission of Membership. That a committee be appointed to prepare and submit at the next annual convention a Code of Ethics." The committee on a "Uniform Contract for Builders" recommended a uniform contract, but not a uniform specification. A committee was appointed to confer with the committee of the American Institute of Architects on the architectural consolidation of all existing societies, to make a report in detail for submission to all members. New officers were elected as follows: President, Sidney Smith, Omaha; vice-presidents, J. F. Alexander, Lafayette, Ind., and W. C. Smith, Nashville, Tenn.; treasurer, Samuel A. Treat, Chicago; secretary, Normand S. Patton, Chicago; directors, John W. Root, J. J. Flanders, Chicago; G. B. Ferry, Milwaukee; C. F. Schweinfurth, Cleveland; W. R. Forbush, Cincinnati.

SIR FREDERIC LEIGHTON ON TUSCAN ART.

AFTER the distribution of the prizes on Saturday night, the President delivered his biennial address, taking as his subject the art of painting as developed in Tuscany, which he remarked presented to us the most homogenous and comprehensive image of Italian culture in all its aspects from the 14th to the 15th Century. In his two previous addresses to the Academy students, Sir Frederic Leighton reminded his hearers that he had surveyed first the evolution of art in Egypt, Assyria, and Greece, and, secondly, its development in Etruria and Rome. In art painting was as characteristically an Italian form, as sculpture had been the pre-eminent expression of the genius of the Greeks. The President glanced at the human material on which this Tuscan art worked, and at the evolutions which marked the progress and development of the human race during the eight centuries between the fall of Imperial Rome and the rise of the Renaissance movement, pointing out that all the invaders of Italy, with the exception of the Saracens and Normans, who came by sea, were hordes who poured into Italy over the Alps, and the traces of whatever modifications the Italian races underwent must therefore be sought for chiefly in the northern and central portions of the peninsula. Rome was indeed a marked instance of the persistency of racial characteristics. Unconquered by the Lombards, occupied for a short space only by the Goths, strengthened by the influx of Italian refugees, Rome sustained little modification in the characteristics of her inhabitants, and the old sterility endured also in the things that concern the graphic arts; and even in the days when enthroned once more, Rome wielded the sceptre of the Christian world, when she gathered within her walls all that was great in art and letters, no solitary flower of native genius rose to grace her name, unless the word genius may be used in connection with the name of that brawny and prolific plagiarist of Raphael, Giulio Romano. Another instance of heredity, the President continued, is offered in Tuscany. Her race did not escape the alloy brought by foreign immigration. Nevertheless, while in the field of art the new amalgam produced an infinitely nobler and more exquisite flower than had grown on her soil in the old Etruscan days, the two distinct elements in Etruscan art—one delicate and graceful, the other harsh and almost Assyrian in its rudeness—assert themselves curiously in the art of Christian Etruria. Meanwhile, however carefully we may seek in the history of a people, the fecundating or the sterilising influences of certain sets of conditions, the source of the artistic gift, the secret of its permanence or its periclitation, will ever remain obscure. Of which obscurities here are two illustrations: The Ligurian was not an artist, the Venetian was; who shall say why? Again, what artist of really conspicuous mark have the two Sicilies sent forth? None, absolutely none; for we shall scarcely give that title to Salvator Rosa, a painter harsh and gloomy, like the Spanish rule under which he was born, whose painted work seems almost in scorn of the bright heavens under which he wrought. Let us now glance at the various formative influences under which Italian art rose and became supreme. The first which claims our attention, one common to all the nations of Europe, is the great spiritual revolution produced by the advent and triumph of the Christian faith. In the place of joy in the ideals of bodily perfection, loathing of the body and its beauty, a yearning for a life in which the flesh should be shaken off, became the moving forces that shaped its creations. The outward change was correspondingly complete. The forms of classic art were an embodied heresy; and, henceforth a gaunt ungainliness of form was to express the doctrine of the depravity of the flesh. A truer balance and a clearer insight was eventually restored; but the influence of Christianity did not cease to prevail in art in the form of the spirit of human sympathy. The growth of the free communities had, in the 13th century, a great influence on art and life, and before the middle of the 13th century these communities reached a level of prosperity and civilisation unknown in any other country. They were raising in their cities splendid edifices, sacred and civil, public and private, and carrying out great engineering works in their subject territories. And as in external dignity of life, so also in letters and art, they were in advance of the rest of the world. Among these young commonwealths, Florence was the most conspicuous. In the general stir of bracing civic life the genius of the Florentines had expanded on every side. In art, Andrea called Pisano, though not a native of Pisa, Arnolfo di Lapo, Cimabue, Giotto, and a host of others placed within the 13th century the name of Florence on a pinnacle from which it has not been dethroned. But the days of golden freedom were not of long duration in the cities of Italy, and by degrees these communities fell, one by one, under the rule of despots who, by prowess or by craft, or both, had seized the reins of power. This span of Italian history contains, then, two epochs—that of the republics and that of the despots; but changes not less momentous and far-reaching marked the domain of art and letters. The period embraced between the close of the 13th and the first quarter of the 16th century falls into three distinct divisions:—The first is the age of Dante, Petrarch, and Boccaccio, an age of creative production; the second, the age of the first triumphs of the humanists, one of reception and assimilation; and the third, ushered in by Lorenzo Magnifico and Poliziano, once more a period of productiveness, spontaneous and national, but bearing the stamp of the revived spirit of antiquity. To this revival of the spirit of antiquity the name New Birth, or Renaissance, is given; and, as this great intellectual revolution profoundly affected the course of Italian art, we will look at it first for purposes of future comparison, in its bearing on literature. The Renaissance movement is the result of two distinct currents of force. One was the spirit of intellectual revolt against the bonds of scholastic theology, and an impulse to reassert the dignity of man and to rehabilitate the world, and the other a new-stirred consciousness of a great intellectual inheritance. The general course of intellectual development which marked this Renaissance movement out is reflected in the development of art during the same period. The production, both in sculpture and painting, of the middle period of the 13th century has a character of transition. In painting, the works of Cimabue and of Duccio are still impregnated with the

Byzantine spirit, and occasionally reveal startling reminiscences of classic dignity and power. In sculpture, the handiwork of Nicolo Pisano is full of the amplitude, the rhythm, the virility of classic art. It contains the tokens of a new life in art, but little sign of a new artistic form—it is not a dawn; it is an after-glow, strange, belated, and solemn. In the art of Giotto and the Giottoists the transformation is fulfilled. It is an art endowed with an exquisite instinct of the expressiveness of form, but untrained in the knowledge of concrete facts. Within the outline of these general characteristics individuality found sufficient scope. Local particularities of temperament were reflected in local artistic production; in the work of the Florentines we trace that grave sobriety which so strongly marked them in the early days of their republican freedom. Among the Siennese, on the other hand, the love of splendour and luxury peculiar to them translated itself in the gay profusion of gold adornments which, in their pictures, bespangled and enriched the gorgeous raiment of their virgins, saints, and angels. The main external characteristics of this early phase of art, however, are a keen sense of the expressiveness of form, which translates itself in beauty and flow of line, ignorance of the facts of nature resulting in drawing empty as well as inaccurate, and a complete indifference to landscape, with which it deals symbolically rather than by imitation. Soon, however, the agencies which were at work in the world of general culture made themselves felt also in art. Of ancient painting, nothing, of ancient sculpture little only, was before the artists. And so it happened that artists were compelled to go to the study of nature. Another feature of the period was the free and unchecked development of the individual. Accordingly, the study of the individual forced itself upon the artist, and the acuteness of observation, innate in the Tuscans, became manifest in a marvellous subtlety in the rendering of individual character. Such portraits as those of Mellini and Palmieri, the medals of Pisanello, and the frescoes of Massaccio and Ghirlandajo will at once occur to you. Whether they use the pen, the pencil, or the chisel, the Florentines of the Renaissance are unsurpassed in their vivid portrayal of individual men. In its turn the scientific spirit took possession of the arts. Anatomy was pursued with zeal. Perspective, too, was keenly studied—a science especially indispensable to men whose love of architecture as an adjunct to figures amounted almost to a passion, and was in great measure the outcome of the haunting impression of architectural grandeur produced in them by the sight or by the accounts that reached them of the stupendous ruins of ancient Rome. And in the train of perspective the cognate mysteries of foreshortening claimed their votaries and exercised a fascination of which, indeed, the results were sometimes not a little ludicrous. By the side of this scientific fever the joy in re-discovered nature manifested itself in a new delight in landscape. Thus to Tuscan artists the new movement brought the love of nature and the light of science. While the revived classicism for some considerable period affected but little the outer form of their art, it largely modified from an early date the subject matter with which artists dealt; but under Tuscan pencils pagan themes gradually assumed a thoroughly changed complexion. But the action of this complex movement on artistic development varied in its conflict with the Mediæval spirit according to the human stuff on which it worked. The various operation in the province of art of the two main motive forces of the Renaissance may be best illustrated by reference to the work of three typical artists—Leonardo da Vinci, Raphael, and Michael Angelo. Of the scientific impulse we see the fullest expansion in that miracle of many-sidedness. A never-sated hunger for knowledge in every form, a desire ever burning to lift up the veil from every secret of creation, possessed and marked him through life. The hidden structure of the bodies of men and of animals, the structure of plants, the ways of rushing waters and of wandering winds, and every riddle in the book of nature were objects of his ardent curiosity and unwearied study. But we cannot, in this strange man, separate the scientific investigator from the artist. The same haunting sense of mysteries unsolved led him now towards scientific prophecy and now to the creation of a type of human beauty more subtle and complex than any the world had seen before. The influence of the revival of classicism, both in its spirit and as a form of æsthetic expression, is seen at its meridian in Raphael. Whatever was best in the classic spirit was absorbed and eagerly assimilated by him, and imparted to the work of his best day that rhythm, that gentle gravity, and that noble plenitude of form which are its stamp, and proclaim him the brother of Mozart and of Sophocles. In these two artists we see the afflatus of the Renaissance in two distinct forms—in its avidity of research with Leonardo, in its classic serenity with Raphael. The greatest, far, of all three, on whom, as an artist, the old world had no direct hold or influence, though it coloured his intellect by blending into his Christian orthodoxy some tinge of Platonic mysticism was Michael Angelo. His contact with the Renaissance as an artist is traceable only in the scientific spirit and its interest in man; for to the artist Michael Angelo, who saw in the human form a dim reflection of the Divine beauty, man was the all-absorbing and exclusive object of study. All else was indifferent to him; to him a plain mass of green or grey sufficiently signifies the earth. Giotto himself is not more scornful of its charms. And this is to be noted of Michael Angelo as distinguishing him from Raphael—the type of human form which he lifted to the fullest expressional force is the last development of a purely indigenous conception of human beauty, whereas the type which we know as Raphaelesque is a classic ideal warmed with Christian feeling. Sublimely alone as Buonarroti's genius stands, towering and unapproached, like some unscaled, heavenward, mountain peak, it does but mark the highest summit reached, in the magnificent continuity of its evolution, by the purely native genius of Tuscan art. In his grave the art of Tuscany was buried; no flower grew over it. When he died in 1564, one Florentine of genius was still alive—wild Benvenuto, to whom a short span was yet allowed. For a few years longer a Venusti, a Bronzino, a Daniele da Volterra remained to show how dull a thing art may become when the soul has gone from it and rhetoric replaces feeling. For a few years yet good Giorgi Vasari, king of chroniclers, strutted in garments which he believed to be his master's; and then final night closed over the art of Florence. The light of Italian art passed from the valley of the Arno to Venice. One last point, and one not without interest for artists, remains to be briefly noted. Whatever noxious influences crept in under the cover of the humanistic movement fastened far less on the art than on the literature of Italy. The profession of the great mass of the humanists, said the president in his closing remarks, in the days of the middle life of Michael Angelo, had become a synonym for corruption. How different a spectacle is afforded to us in the field of art! The Renaissance was to it a new birth, indeed, and profoundly affected it; but affected it in the main to its strengthening—never to its ethic degradation. The material on which the new spirit impelled it to work often lacked the moral elevation of that which had inspired the Art of Giotto and of Lorenzetti; but how dainty and how decent is the mirth, how pure and free from every taint the joy of life appears! I call up before my mind, in bright procession, the profuse treasures of Etruscan art, and in vain I look in all that varied pageant for one unwholesome work. Rather, I see in it dignity, throughout unfailing; often a vein of sadness; here and there, among the most impressive of its triumphs, a male severity and a sublimity of strain such as had not winged Italian poetry since the death of Dante. These things I see in Tuscan art, of which it may be said, as truly as the art of Greece, that whatever was highest and purest in the spirit of the people from which it flowed found in it a faithful image and an adequate expression. Let it be our care, my young friends, that one speaking at some future time of this our English art may say a like thing with equal truth.

A large Odd Fellows' Club is to be erected in the centre of Oldham, from the plans and under the superintendence of Mr. A. Banks, architect,

ELLIOTT'S "PERFECT SIMPLEX" METAL WEATHER BAR.

MR. SAMUEL ELLIOTT, of the Albert Joinery and Moulding Mills, Newbury, has brought out a metal weather bar, which is certainly simple, and, we think, is as nearly perfect in its action as may be; at any rate, it is more efficient than any other we know of, and should certainly obviate the principal objection to the use of casements. The lower bar is in sectional shape something like the letter L, and is screwed into a groove formed in the sill, the highest side of the bar being on the outside; or it can also be screwed on to an ordinary sill without forming any groove at all. The bar is pierced in one place at the bottom, and a hole is also bored through the sill to carry off the condensation or other water that may accumulate in the bottom of the bar. The top bar is somewhat similar in shape, but of a smaller section, and is screwed into a rebate formed on the outer edge of the casement. This bar is also pierced to convey the condensation down through the bottom rail. The lower external angle of this bar is bevelled to form a drip, which is fixed flush with the bottom edge of the rebate in the sash. The long edge of the bar fixed on the casement laps on the top of the long edge of the bar fixed in or on the sill, and forms the outside joint of the casement; consequently the short edge of the small bar touches the inside face of the sill bar.

MARBLE AND MARBLE-WORKERS.*

THIS little book will be of real service to architects and builders. There is no other like it in existence, and Mr. Lee has conscientiously expended a good deal of labour to make it complete and accurate. In the course of his business he has visited the principal European quarries, and has become practically acquainted with the various methods adopted for the raising and working of the material. Early in the present year he contributed several papers upon this subject to the Building News, which our readers will remember. These form the basis of the present work, which is a really valuable little addition to the technical literature of architects and masons.

ART WORKMANSHIP COMPETITION.

AT the rooms of the Society of Arts an interesting exhibition of decorative painting, *repoussé* and chased work in metal, ornamental bookbinding, and painted glass is to be seen. Messrs. Powell and Sons, Whitefriars, obtain the second prize for a painted glass panel of "Music," from a design by Mr. Henry Holliday. The figure of "Music," with wreath, is gracefully drawn; the drapery, by John E. Penvarden, very delicate in tint, also the lines; and the background, by A. Lawrenson, very effective in design and colour; the blue sky and foliage at the back of the head of the figure being an appropriate ground to the tender and expressive face. Alan Cooper, of Birmingham, shows a well-treated head-light subject, "St. Mary," and the Glass Decoration Company a window screen, crystallised by W. R. Pullen, and painted, designed, and fired by Birch. In the glass-blowing class are some very choice specimens of Venetian character, including some very beautiful lead glass opal vases, jugs, and dishes by workmen in the employ of Messrs. Powell and Sons. The first prize is won by T. Smith, W. France, and W. Watkins for some very delicate specimens of vases, with scroll and frilling, and a lead glass opal dish on scroll foot, tazzas of lead glass; the second prize, for a soda lime vase with scroll, is by J. Hughes. A. Johnston, and H. Hart.

The inlaid work is a large class. We see a lady's workbox inlaid with 16,000 pieces of different woods; another with 2,000 pieces of twelve different sorts. The third prize goes to T. Spalding for three table tops. The specimens of decorative painting on wood and other materials include a very tastefully designed piano-front in walnut, having a centre panel, with figures representing "Vocal and Instrumental Music." The figures are painted with considerable feeling and delicacy, and the colours are nice. Side scroll panels fill up the

* Marble and Marble Workers. By Arthur Lee. (London: Crosby Lockwood and Co.)

front. The artist is John Eyre, of Battersea, S.W. Jas. Law sends three panels of floral design, one of a sunflower on dark wood. H. Mennier, Chelsea, has an ornamental screen, carved and painted; and Cornelius Crane, Hull, a painted canvas screen of good design, in flat ornament, one of the best works of the class. We cannot admire the ten panels imitating inlaid woods; the motive is wrong, but as a work of artistic execution they are unsurpassed; they are sent by W. Oldfield, of Coventry, and are intended for room or furniture decoration. G. D. Sumpter's (Cricklewood) imitation of mosaic on marble is a wonderful example of engraving and painting. The colours are quiet, and the resemblance to mosaic excellent. As an example of imitation decorative painting on wood, the lacquer panel which takes the first prize, by Thos. W. Hay, Paddington, is very creditable. The panel is intended to imitate a Limoges enamel subject or medallion of Bacchus and the Tyrrhenians, the embossed framework and figures are in toned gold and imitation lacquer work. But why imitate Limoges or lacquer? We admire the artistic result, but not the imitation. A case of bookbinding, showing many ornamental covers, is of interest. The first prize goes to T. G. Cobden-Sanderson, Hendon, for "The Germ," bound in green morocco, with a rich floral design tooled all over it in gold. A binding in red morocco, tooled over with a gold device, and another in blue, are to be noticed for their elegant design and ornamentation. The second prize is awarded to T. Mäuller for "Mireille," bound in orange-coloured morocco, ornamented with a design in gold, with inlaid Venetian green morocco, in style of 16th century. The *repoussé* and chased metal-work forms another important class. A. Hubert, Chelsea, sends a very choice collection of specimens in silver and other metals, including steel *repoussé* plate for cards, head of Christ and four cherubs in steel, a *repoussé* panel for a Bible or prayer-book, and several other specimens. A first prize, too, is given to R. Holloway, Birmingham, for a capital of column in hammered gilding metal, showing considerable delicacy of handling, and we notice a *repoussé* curtain for fire-grate by W. Bullar (taking a second prize), and some very nice plaques and shields in brass and wrought iron, by Charles Letheren, of Cheltenham—one of them a plaque of "Lot's Wife." The exhibition is well worth a visit.

ARCHITECTS' AND BUILDERS' DIARIES.

NO architect or builder, we imagine, ever uses any other diary in his business nowadays than those published by Messrs. Hudson and Kearns, and the wonder is how we all got along before their introduction. We ourselves should miss the date-indicating blotting-pads more than any other office adjunct. These are so well arranged and so handy that one gladly commits to their keeping all memoranda with the certainty that in due time they will jog one's memory with the faithfulness and persistency of an alarum. The new issues for 1888 are in all respects worthy of their predecessors. For the first time we think the publishers fail to advise us of any change, and the reason, we honestly think, is that they have approached so near perfection as to render none necessary.

The day for holding the professional examinations of the Surveyors' Institute has been postponed from the 9th to 23rd of April next. Names of applicants must be sent in to the secretary before the 14th January next.

The Corporation of Rochdale have just completed considerable alterations and additions to a building (originally erected as a workhouse, but now not required for that purpose) purchased by them for an infectious diseases hospital, and have made ample provision for dealing with fever and smallpox cases. The work of conversion has been carried out from the plans and under the supervision of Mr. S. S. Platt, A.M.I.C.E., borough surveyor, Mr. W. Smithson, his chief assistant, acting as clerk of works.

On Monday, Col. Rich, of the Board of Trade, finally inspected the Pontypridd, Caerphilly, and Newport Railway, which is to be opened for passenger traffic to-day (Friday). The railway places Newport in direct communication with the coal and mineral fields of the Rhondda Valley.

Building Intelligence.

Bracknell.—The Bracknell Jublilee Memorial Hall was opened by H.R.H. Prince Christian on the 8th inst. This building has been erected by Messrs. Green Bros., builders, of Colnbrook, near Slough, from the designs, and under the superintendence, of Mr. J. T. Lawrence, architect, of Leighton Buzzard, Beds. The whole of the bricks were supplied by Messrs. T. Lawrence and Son, the noted T.L.B. rubbers being used for the gauged and carved work, and the walls faced with their dark red-brown pressed bricks, the gables and other parts being relieved with diaper and moulded bricks made by the same firm. The roofs are slated, that over entrance lobby having stamped copper hips and flat, with moulded curb, the copper work being carried out by Messrs. Braby and Sons, of Euston-road. The closets are fitted with "Jennings" pedestal vase closet apparatus, and the lavatories with marble top and patent valves. The whole of the building is lighted by gas, the fittings being made by Messrs. T. Brawn and Co., of Birmingham.

York.—Special services were held in the Church of Holy Trinity, Micklegate, York, on Sunday, in connection with the opening of a new chancel and vestry. The work has been executed from designs prepared by Messrs. Fisher and Hepper, architects, York, and the cost amounts to £1,800. The new chancel is built in the Perpendicular style, and is one of the largest in the city. The roof is covered with green Westmoreland slates. The walls on the exterior are faced with stone, and on the interior are plastered and coloured above the window sills, below which they are faced with dressed stone. The roof is of deal, stained dark, divided into panels by moulded timbers and plastered, and is supported by moulded principals resting on carved stone corbels. The vestry is on the south side, and the organ-chamber is built over it. The choir seats accommodate 16 men and 22 boys. The floor of the chancel is laid with encaustic tiles. A pulpit, executed out of the old oak from the nave roof, has been placed in the nave. The total increase of accommodation is 84 sittings.

CHIPS.

Mr. Charles Pring, builder and contractor, of Exmouth, met with a serious accident on Saturday afternoon. He is carrying out a large building contract at Sidmouth, and was going there to pay his men in a spring cart, accompanied by Mr. Hine, a stonemason, who is doing the ornamental stonework of the building. In going over Peakhill the horse ran away, throwing Mr. Pring out of the cart, when he received serious injury to his head and was rendered insensible.

A carved oak eagle lectern, a replica of one supplied to the English church at Neuilly, near Paris, has recently been executed for Tunstead Parish Church by Messrs. Jones and Willis, of Birmingham and London.

The Shrewsbury Town Council have applied to the Local Government Board for power to borrow £25,000 for carrying out a new scheme for improving the water supply of the town.

The Bradford Town Council has determined to carry out a scheme for supplying the electric light to the public buildings and to those firms in the business part of the town who require the light. The present expenditure for that purpose is limited to £15,000, and it is estimated that the cost to the private consumer will be just double the cost of gas. The electric cables will be laid underground.

A high-level water supply is being commenced for Brixham at the cost of the local board. Mr. Philip Hayman is the contractor, and Mr. William George the clerk of works.

The Smethwick Local Board has received and accepted (a motion of regret being passed) the resignation of the office of consulting surveyor from Mr. W. Harris, who has held that post for over ten years.

Following our example, the nucleus of a National Portrait Gallery for France is being formed in the Rue de Valois, Paris, by M. G. Castagnary, the new Director of Fine Arts. An endeavour will be made to bring together at least a thousand portraits of distinguished Frenchmen, and it is intended to hang them in a gallery of the Louvre.

Engineering Notes.

Society of Engineers.—The thirty-third annual general meeting of this Society of Engineers was held on Monday night, at the rooms of the society, 9, Victoria Chambers, S.W. The chair was occupied by Professor Henry Robinson, president. The following gentlemen were elected as the council and officers for the ensuing year, viz.:—As president, Mr. Arthur T. Walmisley; as vice-presidents, Mr. Jonathan R. Baillie, Professor Henry Adams, and Mr. Robert Harris; as ordinary members of council, Messrs. R. W. P. Birch, W. N. Colam, W. Schönheyder, W. A. Valon, C. Anderson, J. H. Cunningham, J. W. Wrestler, and J. W. Wilson, jun., the four latter gentlemen being new members of council; as honorary secretary and treasurer, Mr. Alfred Williams; and as auditor, Mr. Alfred Lass.

The Use of Concrete in Sacks for Marine Works.—At a meeting of the Royal Scottish Society of Arts, held on Monday, at Edinburgh, Mr. William Dyce Cay, C.E., gave a paper on the construction of marine works with concrete bags, and the plant used for their deposit. He noticed some previous cases of the use of sacking in the laying of concrete foundations. The use of sacking bags, however, had been first introduced by himself at the building of the Aberdeen breakwater. There the concrete bags had been dropped into position by means of a hopper barge. The barge was fitted with bottom doors. When in use, her hold was lined with jute sacking; the concrete was then filled in and the sacking sewed up. The barge was towed into position, the bottom doors were opened, and the concrete bags dropped down into position, fitting accurately over each other. The barge used at Aberdeen carried fifty tons of concrete, and barges carrying a hundred tons had since been used. The breakwater at Aberdeen had now stood twelve years, and it had been reported this year that it had required but £50 to keep it in repair since that date. Mr. Cay described also the dropping into the water of concrete bags and boxes or skips carried by cranes, in which the arrangement of bottom doors was the same. In the discussion which followed, Dr. Sang raised a question as to whether the different masses of concrete separated from each other by the canvas bags gave sufficient stability. Mr. D. M. Westland, C.E., answering, explained that, having had to take down a breakwater made of concrete bags, he had found the bags adhering very closely to one another, so that it was easier to break a bag through the middle than to separate the bags from each other. Some discussion took place as to whether concrete could be made perfectly watertight. Mr. J. Reid, C.E., said they had never succeeded in doing so. Mr. R. K. Miller, C.E., took an opposite view. He argued that it depended on the quality of the materials used.

A large block of residential flats is being erected by Messrs. J. W. Hobbs and Co., Queen's-buildings, Southwark Bridge-road, S.E., in Carlisle-place, Victoria-street, Westminster. The building is six stories in height, and has a frontage of 227ft., and is Classical in style, consisting of a central block and two end wings flanked by composition pilasters, and faced with malms and stone dressings. A large block consisting of about fifty flats, erected by the same firm on the opposite side of Carlisle-place, is now approaching completion, about thirty flats being occupied. The architect for both blocks is Mr. George Baines, 4, Great Winchester-street, E.C.

The Great Eastern Railway Company have under consideration the development of Bradwell-on-Sea, Essex, a small village on the south side of the estuary of the River Blackwater. It is 15 miles by road from Maldon, 6 miles from Southminster, the terminus of the new Dengie Hundred Railway now in course of construction, and only 5 miles by water from the proposed port of Colnemouth. The channel of the river is half a mile broad, with a high tide width of over a mile. Bradwell as a port would have an advantage over Parkeston and Harwich in being 20 miles nearer London.

The Aberdeen Harbour Trustees have adopted a report by Mr. Philip Messent, of Newcastle-on-Tyne, and will carry on the re-construction of portions of the graving dock by their own workmen, at an estimated cost of £4,400.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Birmingham Architectural Association.—A meeting was held on Tuesday evening last, the Vice-President (Mr. W. Doubleday) in the chair. A paper was read by Mr. Whitworth Wallis, F.R.G.S., on "The Temples, Forum, Theatres, and Tombs of Pompeii." The lantern views illustrating the lecture were of the most interesting description — temples, theatres, tombs, frescoes, statuary, &c., succeeded each other in an almost bewildering variety. The "City of the Dead" became, indeed, for the time a city full of life and vivacity. The draping of the statues which have been unearthed lately rivals those of the Early Greek period. A vote of thanks, proposed by Mr. W. Doubleday, and supported by Messrs. Newton and Victor Scruton (hon. sec.), was unanimously accorded Mr. Wallis for his interesting lecture.

Edinburgh Architectural Association.—At a meeting of this body, held on the 8th inst., Mr. John Wallace read a paper on "Italian Monuments." Reference was made to the Early Renaissance tombs of the 15th century, not only as being of singular interest from their intrinsic excellence and suitability for their purpose; but as throwing valuable light on the rise of Renaissance art, and the influence this department of design had on architecture proper. The Gothic tombs of the 13th and 14th centuries were next spoken of in some detail. The tombs of the Scaligeri at Verona were described as being of supreme importance, giving, as they did, dated examples of the best Gothic work during the whole time of its prevalence in Verona. The earliest examples of Renaissance tombs—those of the Quattro-cento period—were next treated, Tuscany being the home of their birth and most perfect development. The vagaries and bad influence on art of the Rococo School were then alluded to. Reference was then made to the modern Italian tombs, as exemplified in the Campo Santo at Genoa, regret being expressed that effort should be so misdirected; ignoble realism in the dexterous representation of lace and ribbons, and the trivial accessories of modern dress being aimed at, to the exclusion of the higher qualities of sculpturesque design. The value of a study of these ancient monuments was expressed with a view to improvement in this department of design in modern work.

Leeds and Yorkshire Architectural Society.—The annual dinner of this society was held on Monday evening in the Queen's Hotel, Leeds. Mr. C. R. Chorley, the president of the society, presided. "The Queen and Royal Family," given by the President, was followed by the "Clergy and Ministers of all Denominations," proposed by Mr. R. Benson Jowitt, to which the Rev. F. J. Jayne, the vicar of Leeds, responded. Colonel Wilson acknowledged "The Army, Navy, and Auxiliary Forces." The toast of "The Royal Institute of British Architects" was proposed by Mr. J. Murgatroyd. Mr. E. I'Anson, P.R.I.B.A., who responded, urged the necessity of architects joining the Institute. Mr. J. W. Connon, in proposing "The London Architectural Association and Kindred Societies," said that the Institute was rather wanting in energy and spontaneous movement. It was the figure-head of the profession. They had to look to the Architectural Association and local societies for movement and judicious agitation. Professor A. Barr proposed "The Leeds and Yorkshire Architectural Society," and Mr. G. Corson responded. "Our Guests" was proposed by Mr. W. H. Thorp, and the Rev. Canon Scott replied.

Manchester Architectural Association.—The last ordinary meeting was held at the Diocesan Buildings on the 13th inst., Mr. A. H. Davies-Colley (president) in the chair. The Rev. R. H. Snape read a paper on "Scotch Cathedrals." He prefaced his remarks by saying, as he had spent several of his earlier years as an architect, and had visited the whole of the English as well as the Scotch cathedrals, he claimed some right to speak on this subject. Our views of cathedrals must be very much modified when we come to Scotland, as they are, more correctly speaking, simply kirks, numbering in all about fourteen. Transepts, cloister courts, and crypts are non-existent except in a very few cases; towers and spires are also very few and very irregularly placed. The round arch is to be found in nearly every style, but the Perpendicular has hardly an example. The crypt of the Glasgow Cathedral is the finest in England or Scotland. The abbeys more than rival the cathedrals.

Society of Antiquaries of Scotland.—A meeting of this society was held on Monday night, Mr. Robert Herdman, R.S.A., vice-president, in the chair. The first paper was a notice of the ceiling of the painted gallery at Pinkie House by Mr. George Seton, F.S.A., Scot. After referring to the description of the painted hall as given by Billings, the author proceeded to describe the blazons and emblematical devices with their legends which remain upon the ceiling. He also referred to other examples of painted ceilings at Earlshall and Cullairney. A discussion on decorated ceilings followed, and Mr. Findlay recommended the subject as one which had not yet been treated systematically, and for which there was a large field of investigation open to those who might be induced to enter into it. In the second paper, Mr. James Macintosh Gow, F.S.A. Scot., gave notice of some cup-marked stones and other antiquities which he had investigated during a recent sojourn at St. Fillans. The third paper was entitled "Notes on the Trinitarian or Red Friars in Scotland," by Mr. Joseph Bain, F.S.A. Scot. The occasion of this paper was the recent discovery of a charter of Alexander III., confirming the foundation of Houston, a Trinitarian house, by Christiana Fraser, widow of Sir Rodger de Moubray, and Mr. Bain identified the site of this unknown monastery of Red Friars with the neighbourhood of the parishes of Athelstaneford and Prestonkirk in East Lothian.

York Architectural Association.—On Thursday, the 9th inst., in connection with this association, an address was delivered in the Church Institute, Lendal, by Mr. J. Wreghitt Connon, F.R.I.B.A., of Leeds, on "The Legal Registration of Architects." The chair was occupied by Mr. W. Hepper, president of the society. The lecturer said the desirability of bringing about the legal registration of architects was shown under the headings of how registration would effect architectural students, architects in practice, and the building public. Until the profession of architecture is placed under conditions identical with those now forming the medical and legal bodies, there is no probability of the universal education, from a technical point, of architects being attained; the power of compulsory examination being an essential precedent before students can be induced to undergo the preliminary training needful to competency in their calling. A discussion followed, which was taken part in by Mr. W. Brown and Mr. Yeomans. Mr. Hepper moved, and Mr. G. Benson, F.R.I.B.A., seconded, the following resolution:—"That this meeting of the York Architectural Association believes an Act of Registration for architects is an imperative need, and urges upon the Royal Institute of British Architects the desirability of giving the movement its countenance and support."

SCHOOLS OF ART.

Kendal.—On Saturday evening last the annual meeting for the distribution of prizes was held in the Town Hall, Kendal. The prizes were distributed by Mr. J. Cropper. The report showed that 132 students attended the school, showing an increase of 18 on the previous year, and that of 48 students on the year 1885. The work of the students done during the past year, a few specimens of which were on exhibition, showed a marked improvement on that of former years. The silver medal annually presented by the president, Earl Bective, was awarded to Frederick Wilkinson, he having been the most successful student of the year.

In the Chancery Division, on Saturday, a petition was presented by Mr. John Waddell and Co., contractors, for the appointment of a receiver and manager of the Scarborough and Whitby Railway Company. According to the petitioners' statement, Messrs. Waddell are judgment creditors for £148,000. The line was opened in 1884, and Mr. Justice Kay appointed Mr. B. L. Fernley, secretary to the company, as receiver and manager.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., and XII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—Pat. P. Co.—T. and D. P. Co.—C. L. B.—W. and J. R. H.—A. H.—G. and Co.—F. C.—A. and Co.—W. C. and Co.—H. G. S.

JAS. FASNACHT. (Better address your letter to our contemporary; we have no stomach for the task of criticising its eccentricities.)—CHAS. HUNT. (*Do* make yourself acquainted with the proposed Bill before criticising. A note to the secretary of the committee will remove most of your objections, which have been before dealt with in these columns, but which you attack *de novo* as innocently as possible.)—H. T. M. (No; they will be probably increased, and we do not see what you have to complain of. We have not decreased the lithographic plates, have we? We give you the others into the bargain.)

"BUILDING NEWS" DESIGNING CLUB.

W. B. (The size 14in. by 22in. for the sheets must be maintained. A pent roof means a projecting hood or oversailing roof to keep off the weather from those using the grindle-stone below.)—R. M. P. (There will be no living apartments in connection with the smithy.)—AN ACADEMY STUDENT. (The award of prizes for 1886-7 was published in the BUILDING NEWS for Oct. 28th last, and in the same article you will find a list of the subjects competed for, with the dates when the chosen designs were published in our pages.)

Correspondence.

ARCHITECTS', ENGINEERS', AND SURVEYORS' REGISTRATION BILL.

To the Editor of the BUILDING NEWS.

SIR,—With a view of clearing up an uncertainty which some of your readers appear to have with regard to the exact form in which the above Bill is to be presented to the House, will you allow me to state that since May last, when copies of the Draft Bill were sent to all the principal architectural, engineering, and surveying societies, and circulated generally, the Registration Act Committee has been engaged in considering the many useful suggestions made with the object of improving the Draft Bill that have since come to hand from all sides.

The Bill, therefore, which Colonel Duncan, C.B., M.P., has kindly undertaken to present early next session will embody such suggestions which appear to the committee to be improve-

ments, and calculated to benefit the public and the profession.—I am, &c.,

Edgar Farman (hon. sec.)

39, King-street, Cheapside, E.C., Dec. 13.

Sir,—Referring to the Draft Bill, I think that the following modifications might be made with advantage :—

1. That persons who have been members of any of the bodies mentioned in Schedule A, but who from removal or other cause have withdrawn their membership, should be entitled to register.

2. That provision should be made for those who have commenced practising at any time up to the passing of that Act, and not previously to 1882 only (but are not qualified under any of the heads), as it is unlikely that Parliament will pass a Bill excluding them.

3. As the Bill is at present drawn, I take it that an applicant for registration who practised prior to 1882 (not being a member of any of the bodies named in Schedule A) will, on being registered, be required to pay a fee of £5.

This is manifestly unfair, as any member of the societies will be admitted on payment of £2 only. The subscription for membership in some cases being only 5s., why should a practitioner (previously to 1882) be mulcted in the sum of £2 15s.?

4. That after the passing of the Act no person shall be qualified for admission except by examination, as the number of years' assistantship specified in Clause C is no guarantee of proficiency to practise.

5. In my opinion the Bill is weak on the question of pupilage ; and a clause should be inserted limiting the number of pupils to two for each registered practitioner, as in the legal profession.—I am, &c.,

Harrogate. F. Bagshawe.

THE DRAUGHTSMEN'S PROVIDENT SOCIETY.

Sir,—May I ask the favour of your space for the purpose of informing your readers that the committee have now finished the first stage of their labours, and made arrangements for calling a general meeting at St. James's Hall on January 9th? They have now provided for forming a fund, out of which it is proposed to lend to members out of employment sums of money up to £10, free of interest.

I would beg to urge upon draughtsmen the desirability of supporting this movement, and of communicating with the hon. sec., Mr. G. A. T. Middleton, St. James's Hall, Piccadilly, W., and attending the general meeting, so that the efforts of the committee may be crowned with success. It is desired to make the society entirely mutual and self-supporting, and the committee in framing the rules have always borne in mind that it is to be a society managed entirely by draughtsmen for draughtsmen. Thanking you in anticipation—I am, &c.,

Walter J. Kenny.

11, Southampton-street, Strand, Dec. 12.

ST. ALBAN'S ABBEY.

Sir,—I cordially share W. Field's hope that some influential effort may be made to stay the destroying hand of Lord Grimthorpe ; but I much fear his lordship will yet gain the unenviable notoriety of being the one man in England who has both the inclination, the means, and the power to exhibit his self-assumption of practical and artistic knowledge at the expense of one of our grandest national monuments.

But where is the power to be found to resist the enemy? Where are the wealthy and influential committee who were originally responsible for the work? Have the Bishops, the cathedral dignitaries, and the clergy of the diocese no interest in the church? Cannot the law for the preservation of ancient monuments be put in force?

I don't know ; but this I do know, that his lordship has enough money to ruin and to rear.

Fortunately, St. Alban's Abbey is very large, and we may hope, unless Lord Grimthorpe lives to the age of Methuselah, to have some fragments left to tell of its ancient glory, and to save the necessity of changing its name to "Lord Grimthorpe's Folly."—I am, &c.,

Arthur Baker.

14, Warwick-gardens, Kensington, W.

Sir,—Some few years back the tower of St. John's Church, Chester, fell through want of funds. It had long been known to be in a state of decay ; but there was no "riche amateur" at hand to repair it. Your correspondent seems to forget that the same thing would have happened to the south wall of the nave of St. Alban's if Lord Grimthorpe had not repaired it. The shoring supporting the wall had been up for years, and was in a perfectly rotten state.—I am, &c., Charles F. Moxon.

Sir,—Everybody who has seen St. Alban's lately will confirm the truth of every word Mr. Field says in your last issue. There seems to me something like a conspiracy to let Lord Grimthorpe do as he likes, and I do not think posterity will entirely saddle him with the responsibility. "The fact is," said one who had something to do at St. Alban's some time since, "none of us *dare* remonstrate, though we see the mischief that is being done. We are all powerless—not even excepting Mr. Blomfield or Mr. Gibbs, or we should be all kicked out together by Lord Grim." Is this true?—I am, &c.,

One Who Wonders At It.

ASSISTANT SURVEYORS R.E. DEPARTMENT EXAMINATION.

Sir,—In answer to "Assistant Surveyor's" remarks in last issue, I may state that when writing my first letter I was not in the least bit doubtful as to the meaning of "surveyor" as applied to those in the R.E.D. I may also state that I have had over fifteen months' experience of the working of the department.

The principal work done by these surveyors is the checking of quarterly and intermediate requisitions—these are for small jobs, repairs to floors, and such like, and are in the form of bills of quantities. They have also the work enumerated by "An Assistant Surveyor" to do. "Assistant Surveyor," however, has not given all the duties, and as well as I can remember from the regulations, the Commanding Royal Engineer can require the surveyor to do any work in connection with the department that is of a clerical or professional character.

Though land-surveying and levelling are not specially mentioned in the regulations, they are to be implied, or else how can a surveyor draw his plans and designs—for instance, a rifle range on steep ground—unless he does it by guesswork?

The suggestions of "Norseman" are most valuable. A surveyor ought rather to know the difference between white deal and red pine than that between a moulding of the 13th and one of the 14th.—I am, &c.,

Prospero.

P.S.—In my first letter, the words "of surveying" should come after "acquaintance."

SALISBURY CATHEDRAL,

Sir,—"Belfastiensis" may rest assured, I think, that there is no change since Price's or Wren's time, the direct-plummet experiment being frequently repeated. I was told, the last time I was there, it had been tried the same week ; and as both the vaulting and all floors above have central openings, there can never be any difficulty. The marks on the pavement are a small brass plate inscribed, "The Centre of the Tower" (*i.e.*, centre of plan), and an octagon of 4ft. diameter, said to be outlined from the capstone, the centres of the two figures being, I believe, 29·4in. apart, as Francis Price's detailed measures require, though he strangely twice gives, instead of this, "two and twenty," or "22 inches and three-eighths." Sir Christopher had plainly erred, as he shows, about the sinking of the legs, which does not account for a sixth of this decline. Indeed, the centre of the vaulting (at 88ft.) being not quite an inch W.S.W. from that of the ground plan, would not throw the top 5in. in the same direction, whereas it is $\sqrt{(27{\cdot}5^2 + 17{\cdot}5^2)} = 32{\cdot}6$in. S.S.W., according to Wren, and I see no inconsistency between this and Price's measures. The latter professedly apply to the "capstone, 387ft. from the ground" ; but the ironwork protrudes 13ft. higher, and being very visibly more inclined than anything below, may well lean the additional 3·2in. It is part of a bar, according to Price, 50ft. long, and might, I should think, be straightened by lighting a fire above the stone, almost without scaffolding. The whole finish, however (a vane, and above it the exact inversion of a pawnbroker's sign), is very unworthy the building. A vane is of little use at a height where the direction of wind often differs from the undercurrent, and one with fixtures above it cannot be hung the best way.

The present one is slightly better shaped than that represented by Price ; but a floriated metal cross, as large as on the Rhine spires, would be the only worthy finial. The iron riggings, as of a masthead, can only be meant, I suppose, to assist a climber, and would not be needed were there no vane to be oiled. All the top masonry should be held firm enough by the central iron alone. Price represents the weather-door only 3ft. high, and its sill fully three above the third band of panelling, on which band the present door immediately opens. That is the only difference now apparent from his engravings.

As the decline may be said to consist practically of merely curvature in the spire itself, I cannot but think this may some day be straightened, as factory chimneys have been, by drilling out mortar from some beds round the N., N.E., E., and perhaps N.W. and S.E. sides. The old mortar, once perforated by drills, might be attacked with a dilute acid. The whole tower was, till 1480, open as a lantern, like that of York, and the vaulting is a mistake that should be removed. E. L. G.

CAPLE'S "COMBINATION SET-SQUARE."

Sir,—I have to thank you for the notice of my "Combination Set-square," given in the Building News of last week, and should regret that a pear-wood instead of vulcanite specimen was sent you, but for the opportunity it has given me to detail a few more of its advantages over the ordinary 45° and 60°, which may be more apparent by the use of the vulcanite of smaller dimensions herewith.

Your "main" objection, as set forth last week, does not really exist, as you will see on further reference ; for if, referring to the pear-wood specimen, you take as your base line the 5½in. sides, the 30°, 45°, and 60° angles will equal respectively in length the dimensions of the right angle—viz., 9in. by 7in., by which these angles will then be formed, and you have the advantage of an extra angle on each side of the centre, equal to 165° or 15° in each case, with your square in the same position. I admit, however, that if, as you must have done, one side of the right angle is used as a base line, the 30°, 45°, and 60° angles will only measure half that which they would on an ordinary square of the same altitude ; but you obtain even in that case the use of three angles simultaneously—viz., by the 7in. side as a base line the angles of 90°, 60°, and 45°, and the 9in. side as a base line of 90°, 45°, and 30°.

If we suppose my "combination" was deficient in the respect you point out, it would still be more useful than two smaller squares, because of the altitude being greater by half—a matter of no small importance, as you are aware, to architects, engineers, and draughtsmen.

May I draw your attention to the fact that my square in any one position will give three different angles, and, in all, six can be obtained —viz. : 165°, 90°, 60°, 45°, 30°, and 15°? All professional men to whom I have personally submitted and explained it are high in their praises of its usefulness.

As your last week's notes may seriously affect its distribution among the profession, I should be obliged by a publication of these facts.—I am, &c., W. H. D. Caple.

Cardiff, Dec. 13.

THE PERSPECTOGRAPH.

Sir,—In reviewing Mr. Spiers' work on "Architectural Drawing" in your last issue, mention is made of the perspectograph, and as the agent therein referred to, I would ask your permission to make a few remarks respecting this instrument.

The perspectograph is a delicate instrument ; but its complicatedness is not really so great as with superficial acquaintance one is led to suppose. That it *can* outline perspectives mechanically is beyond a doubt. I have a machine in constant use, and shall be glad to show it to anyone who likes to see how it works.

I was, unfortunately, unable on the two occasions mentioned in your article to show the instrument to advantage, for the obvious reason that at the Inventions Exhibition it had been bent and maltreated by the public, and also had suffered from moisture and dust; and with the one sent to your office a very essential part had become lost in transmission. The manufacture of these instruments having come to an end in the mean time, I did not proceed in the matter.—I am, &c.,

C. W. ENGLISH.

69, Chancery-lane, W.C., Dec. 14.

Intercommunication.

QUESTIONS.

[9501.]—**Waterproofing Tank.**—Would be very glad to know what is the best material to point inside of tank built of white enamelled bricks, so as to make it thoroughly watertight.—B. P. G.

[9502.]—**Sapwood.**—I should feel very much obliged if some among your able readers would inform me how I can distinguish the "sapwood" or "alburnum" from the "heartwood" or "duramen," which has been discoloured by water-stain in consequence of the timber logs having lain long afloat. The question is intended to apply to Baltic yellow fir, the timber of the Pinus Sylvestris, which in this country is, I think, invariably kept afloat until required for use. When the bark is cut, should I be right if I can trace the discoloured edge clearly along the side, clearly bounded by a particular ring, in coming to the conclusion that the discoloured part was sapwood and not mere water discoloration? Is a little of the inner sapwood nearest to the heartwood allowable if it occurs on the edge only, and does not cover one side? As each year a new ring of sapwood is formed, is not the ring of sapwood nearest to the heartwood each year turned into heartwood? And if so, is there not a definite number of sapwood rings to the trunk of every tree? The carpenter who was planing the wood applied a steel scraper (the end of a joiner's square) to the planed surface of the wood nearly perpendicularly, and scraped it with considerable force, saying that if the wood was sapwood that treatment would cause it to work up woolly; but if it were mere water-stain that treatment of it would not rough the surface. Is this a good test? In this particular case the stain was traceable all along the side of the timber (about 24ft. long), distinctly bounded by the next ring, and continuing unbroken in a line from end to end. I was told that it would "dry out," as probably it would more or less, but it would, nevertheless, I apprehend, continue to be sapwood.—R.

[9503.]—**Stock Size.**—Will some reader who knows what the "stock sizes" of timbers are, give us a full list of them, so that we could compile a table of the various stock sizes of timbers for floors and roofs of various spans and use said table in our specifications and drawings? Such a reader would have the thanks of all builders and nearly all architects, who would, I know, rather specify the stock sizes if they knew them.—N.

[9504.]—**Liability for Damage.**—Some time ago I obtained a contract to pull down and rebuild some business premises, and the conditions stated that I was to be responsible for any damage that might occur to the adjoining properties during the progress of the work. After the new building is up, though not quite finished, a shrinkage occurs in one of the adjoining gables (which is only 4½in. and a party gable), the owner of the adjoining house claims damages of the owner of the new building, who, in turn, wants to make the contractor liable for the damage. The contractor says he is not liable, but says the damage is caused by the extra weight of the new building, which is four stories high, the old building being only two stories. Consequently the old gable has all the weight of the extra new gable, which was made 9in. thick above second floor. Is the contractor liable for the damage? The work was carried out to the architect's instructions. Also, is owner of new building justified in refusing to pay balance of contract to contractor, although the latter has obtained the architect's certificate certifying to the completion of the contract?—W. SCOTT, 54, Hedley-place, Newcastle-on-Tyne.

REPLIES.

[9474.]—**Ordnance Maps.**—"Def." and "und." are applied to boundaries, and are contractions for "defaced" and undefined.—R.

[9377.]—**Dimensions of English Cathedrals.**—I believe that St. Alban's Abbey or Cathedral has the longest nave in the world. It is 292ft. long. The entire external length of St. Alban's is 550ft.; Winchester boasts that it is 6ft. longer; Ely, with its western Galilee is 517ft.; Canterbury, 514ft.; Exeter, 387ft.—HARRY HEMS.

[9480.]—**Masonry and Stonecutting.**—The question at issue is not the one proposed by Mr. Harvey, but "arch-stone" versus "voussoirs." Mr. Harvey has pointed out no instance against the application of the former. In a cupola the stones are doubly archstones, and the theory of construction is based on the principle of the arch; still, it does not follow that for a special form—viz., the section of an arch rotated around a vertical line passing through its centre—a special term shall not be applied indicative of such form. Hence, the question is irrelevant to the issue.—JOHN POWELL.

[9482.]—**Products of Gas Combustion.**—I beg to thank "Science" for his kind reply. As carbonic acid is the result both of the "atmospheric" gas flame and of the ordinary "illuminating" flame, will he kindly explain the reason of the peculiar smell which arises from the former and not from the latter?—R.

[9484.]—**Chesterfield Spire.**—Mr. Peachey's practical experience relative to the above is very interesting. The spire 230ft. high, is covered with lead, and is constructed of oak. The latter material was probably more or less green when framed together, and in summer-time the heat of the sun upon the covering would naturally be very trying. I was apprenticed some twelve miles from Chesterfield's spire, and in those days always heard that his Satanic majesty was responsible for the distortion in question. Once, so the story goes, the Devil was out at night for a fly over the face of this wicked world, and chanced to rest awhile upon the summit of Chesterfield spire. It so happened that midnight mass was being celebrated at the self-same time in the church below, and the incense coming up through the belfry louvres, encircled itself in graceful clouds around the steeple. At last it reached the top, tickled the Devil's nose, and made him sneeze. With claws tightly clasping the vane, and tail twisted round and round the uppermost part of the spire, mouth wide open, and his wings spread out, he drew in his sulphurous breath and then sneezed and sneezed again. Those who prayed below heard the noise, and the townspeople who had gone to bed were woke up at what they thought to be successive peals of thunder. The next morning found the spire twisted in the fashion it stands to-day. 'Twas all the result of that dreadful sneeze. There is another old story that tells how a local smith was engaged to shoe the Devil by some magician who resided in a village near to Chesterfield. The smith, naturally nervous at his job, was clumsy, too, and ran a nail into Satan's foot, who flew howling away. Passing over Chesterfield he kicked out in agony, and so violently that he, catching the spire, twisted it and left the mark of his foot upon one of the buttresses. There is yet a third story, that in the good old days chaste maidens were not plentiful, and when at last a virtuous wench presented herself to be married at the church gate the steeple made her a profound bow, and actually twisted itself crooked by sheer gallantry. But this is told in common at other places—for instance, Ermington Church in South Devon has a tall stone spire, bent a long way out of the perpendicular, and that state of things the villagers so recently as yesterday affirmed to me came originally about on the memorial morn when a virtuous maiden became a bride. This is rather hard on the ladies, but so the story goes.—HARRY HEMS.

[9493.]—**Geology and Chemistry of Building Materials.**—Perhaps "Q. A. G." will find the information he requires in some articles (eight in number) on "The Chemistry of Building Materials" in the BUILDING NEWS for 1878; and on "Architectural Geology" (seven articles) in the BUILDING NEWS for 1879.—E. W. T.

[9494.]—**Hot Water Pipes.**—4ft. sup. of heating surface in the boiler will supply 200ft. of 4in. pipe, 250ft. of 3in. pipe, or 400ft. of 2in. pipe. If many bends are used, or the pipes are complicated to suit the requirements of the building, the friction will reduce the above 50 per cent. One foot of 4in. pipe (internal diameter) heats 222 cubic feet of air 1° per minute, when the difference between the temperature of the pipe and the air is 125°. This is, of course, subject to loss of heat by area of glass, ventilation, radiation, and other causes, which "Pack" will have to take into account.—JAMES THORNELOE.

STATUES, MEMORIALS, &c.

CHRIST CHURCH CATHEDRAL, DUBLIN.—A brass is about to be erected in this cathedral to the memory of the late Archbishop Trench. It is of latten, and is in two pieces. A standing figure of the Archbishop occupies a space 3ft. 9in. high, in correct costume, wearing the Order of St. Patrick, and holding in his right hand a Bible, the cover of which is a curious Celtic example, lent by Mr. T. W. Drew, architect, of Dublin, under a canopy, the details of which are designed in the style of the cathedral. On either side are figures of SS. Patrick and Lawrence, the one with an Irish episcopal baculum, and the other with an archbishop's crozier, both authentic. Lower down are two angels holding shields, with the arms of Dublin and Glendalough, and the arms of Kildare. The base contains the Trench arms, Capitular seals of Westminster, St. Patrick, Christ Church Cathedral, St. Bridget, and arms of Trench and Diocese of Dublin impaled. Messrs. Heaton, Butler and Bayne are the makers of the brass.

SOUTH WEALD, BRENTWOOD.—A monument of Sicilian marble, having a Latin cross 6ft. 6in. long resting horizontally on five octagonal moulded and diapered shafts, beneath which is a moulded slab richly carved with orchids, a favourite flower of the late Mr. O. E. Coope, M.P., to whose memory it has been erected, in the parish church of South Weald, near Brentwood, together with an elaborate alabaster reredos in St. Mary's, Whitechapel (noticed in a previous number), from the designs of Mr. E. C. Ayton-Lee, architect, and executed by Messrs. Earp, Son, and Hobbs, of London and Manchester.

At the last meeting of the River Tyne Commissioners, the Piers Committee announced that the engineer (Mr. P. Messent) had laid before them a report recommending the position which should be fixed for the pier heads. They recommended that there should be a width of 1,300ft. left between the pier heads, and the distance still to be built to carry the piers to the recommended terminations is 159ft. at the north pier and 137ft. at the south pier. Satisfaction was expressed that this great work is so nearly completed.

From among 44 candidates for the post of surveyor, the local board of Pudsey, near Leeds, have elected Mr. Richard Hodgson, of Grantham, and late of Idle, Bradford, to fill the vacancy.

LEGAL INTELLIGENCE.

THE LONDON AND SOUTH-WESTERN RAILWAY COMPANY.—An important arbitration took place on Thursday, the 8th inst., before Mr. Henry Clutton, at the Surveyors' Institute, in reference to the above. The Company have been widening their line of railway on the western side between Paradise-street and the Westminster Bridge-road, and it became necessary in crossing the latter road to erect a new iron bridge alongside the present one. The claimants, Messrs. Holloway Brothers, manufacturers of ready-made clothing, occupy Lambeth House, 157 and 159, Westminster Bridge-road. They claimed for injury resulting to them by the erection of the bridge and the diversion of the right of way, also for interference with light and loss of profit by reason of diminished sales. Their total claim amounted to £9,977. Various witnesses were called, and the arbitrator reserved his decision.

IS A TOBOGGANING SLIDE A "BUILDING"?—ELKINGTON V. SMEE.—(High Court of Justice, Dec. 13. Before Mr. Justice Wills and Mr. Justice Grantham.)—This was a case stated by Mr. Biron, the magistrate sitting at Lambeth Police-court, and raised the question whether a "tobogganing slide," erected in the grounds of the Crystal Palace, was a building within the effect of the Metropolitan Building Act, 1855, so as to make it necessary for notice of the erection of the structure to be given to the district surveyor under section 38 of that act. The respondent was the builder of the slide, and the contention on his side was that the slide was not a "building" within the meaning of the Metropolitan Building Act, or if it was it was exempted from the operation of that act by section 21 of the Crystal Palace Company's Act, 1881, which provides that "the main building, conservatories, and waterworks of the company, and the conveniences, and other works immediately connected therewith, shall be exempted from the operation of part 1 of the Metropolitan Building Act, 1855." But the section adds, that "this exemption shall not extend to any dwelling-house or building except as aforesaid upon any part of the property of the company." The toboggan slide was erected by a company called the Tobogganing Company under an agreement with the Crystal Palace Company. The slide and the structure connected with it were detached from the main building of the palace, and comprised besides the slide, 426ft. in length, a pavilion at one end, 63ft. long, part of which was occupied by an engine-room with brick walls and concrete foundations and roof, containing the engine used to work up the empty sleighs. The magistrate held that the structures were "buildings" within the meaning of the Metropolis Management Act, but were also within the exemption of section 21 of the Crystal Palace Act. He accordingly dismissed the summons against the respondent for not giving the notice abovementioned. The Court allowed the appeal, holding that the structure was within the Metropolis Building Act, and not within section 21 of the Crystal Palace Act. The case was accordingly remitted to the magistrate.

STAINED GLASS.

ST. MARGARET'S, WESTMINSTER.—A stained glass window in memory of Milton will shortly be placed in this church. It is the gift of Mr. G. W. Childs, of Philadelphia, who presented the drinking-fountain to Stratford-on-Avon, designed by Mr. J. A. Cossins and recently illustrated by us, and the window in honour of Herbert and Cowper to Westminster Abbey. At the request of the rector of St. Margaret's, an inscription has been written for the Milton window by the American poet, Mr. J. Greenleaf Whittier, who has sent the following lines:—

"The New World honours him whose lofty plea
For England's freedom made her own more sure,
Whose song, immortal as its theme, shall be
Their common freehold while both worlds endure."

An extensive tramway line to the Drawbridge at Bristol having been completed, was formally inspected by Major Hutchinson, on behalf of the Board of Trade, on Friday. The works have been carried out from plans by and under the supervision of Mr. Kincaid, C.E., engineer to the company.

A new building in Lodge-lane, Liverpool, for the Upper School of Liverpool College, is in course of erection. It has been built from designs by Mr. E. Harmood Banner, of that city, and accommodates 250 pupils, and is Perpendicular in style. Messrs. Brown and Backhouse are the contractors.

The Local Board of Tettenhall, near Wolverhampton, have instructed Messrs. H. J. and E. B. Marten to submit a scheme for the disposal of sewage. The anticipated outlay is £11,000.

Our Office Table.

THE City Court of Common Council proceeded yesterday (Thursday) afternoon to elect a City Architect and Surveyor in succession to the late Sir Horace Jones. The following eleven candidates had presented themselves for the appointment:—Herbert Duncan Appleton (aged 34 years), 157, Wool Exchange, Coleman-street, E.C.; Charles Barry (63), 1, Westminster Chambers, S.W.; Francis Chambers (58), 11A, College-hill, E.C.; William Henry Crossland (52), 46, Upper Bedford-place, W.C.; Goymour Cuthbert (38), 83, Queen-street, Cheapside, E.C.; Thomas Milbourn (52), 38, Bishopsgate-street Without, E.C.; Charles Nevin McIntyre North (50), 15, Borough High-street, S.E.; Alexander Marshall Peebles (47), 3, Salter's Hall-court, E.C.; John Hatchard Smith (34), 41, Finsbury-pavement, E.C.; Benjamin Tabberer (56), 13, Basinghall-street, E.C.; and Joseph Tanner (53), 109, London Wall, E.C. Two of these withdrew their applications—Messrs. Chambers and Hatchard Smith. The vote was then taken on the remaining nine names, by ballot. The first voting showed:—Peebles, 85; Barry, 45; Crossland, 31; Cuthbert, 6; Milbourn, 4; Tabberer, 4; North, 3; Appleton, 2; and Tanner, 0. A second ballot was then taken among the three highest candidates, when the voting was: Peebles, 108; Barry, 41; Crossland, 21, and the first having a clear majority of votes was declared by the Lord Mayor to be duly elected, and agreed to the prescribed conditions. Mr. Alex. M. Peebles, F.R.I.B.A., has long been in practice in the City, had held for many years a district surveyorship, and was, on the whole, the most suitable candidate. We heartily congratulate him on his appointment, which was generally anticipated by the profession.

FOLLOWING on the discussion and letter read at the last Friday's meeting of the Metropolitan Board of Works, the Works and General Purposes Committee have made a recommendation to the Board, for consideration at their meeting to-day (Friday). The notice in the *Agenda* runs in the following terms:—The committee report "for the information of the Board certain circumstances which have now for the first time come to the knowledge of the committee with respect to Mr. Hebb, the assistant architect, and recommend that Mr. Hebb be called upon to resign."

A NEW hot-water pipe joint has recently been invented and made at the Tyldesley Ironworks, owned by Mr. John Grundy, of 30, Duncan-terrace, City-road, London. It is claimed for this joint that it is impossible to blow off or become loose during expansion or contraction. This novelty will be interesting to those who understand hot-water fitting. Provisional protection has been granted to the patentee.

AN American inventor, William Dryden, of Hopkinson-avenue, Brooklyn, has just patented a form of building slab for lining the interior of rooms, which is claimed to be an advance on the usual lath-and-plaster construction. It consists of a composition of whiting, plaster, glue, straw, pulp, and alum, cast in slabs having vertical depressions on one side and corresponding spherical projections on the other side. The slabs are intended to be nailed up to the walls and underside of floor joints, as wall and ceiling surfaces, and the spherical projections are to be placed inwards next the joists, to insure a through current of air, while nails for fixing are to be driven through the corresponding depressions on the face of the slab. An opening is formed centrally in the ceiling of the room, a circular block being arranged beneath it, so as to leave an annular passage for the air and gases from the room into the ceiling space, and openings are also formed in the slabs at the skirting level for the entrance of cold air, all these openings being covered with wire gauze. By this means, it is held, a continuous air space would be provided round and above each room, while the composition of the slab would be a protection against the spread of fire.

TWO portraits of unknown persons have just been purchased for the National Gallery from the Lucas Walker bequest, and are numbered 1,230 and 1,232. The one is that of a girl by Ghirlandajo (1483—1561), and is hanging in Room No. I. Another work by this master, "The Procession to Calvary," purchased in 1883, is numbered 1,143. The other new work, that of a fair-haired man, dressed in black velvet, is the first example of Henry Aldegrever (b. 1502)—an imitator of Dürer's style and mannerisms—and is hung in Room No. XII. Some good pictures by this little-known German artist are to be seen in the galleries of Munich and Berlin.

A PRELIMINARY circular has been issued for the next convention of American master-builders, which is to be held in Cincinnati on the first Tuesday of February next. The circular is purposely issued at a very early day in order that the important subjects which are to be acted upon at the meeting may be maturely considered in the local societies before the delegates from these societies meet for final decision. The most important matter to be discussed is that of forms of contract, which the Association wishes to have made uniform all over the United States. To this end a committee was appointed last year to confer with committees from the American Institute of Architects and the Western Association of Architects, and "results of great interest to builders" are said by the circular to have been arrived at. Whether the "results" will prove as satisfactory to architects and owners as to builders, although a question of very considerable importance, is as yet undecided; but it appears that the Association proposes that all members shall decline to sign an agreement in any other form than the one to be put forward, and if this is insisted upon, the suggested model contract, no matter how carefully it may have been prepared, is certain to be looked upon with suspicion and disapproval by architects and their clients.

IN the course of an address to the students of the Islington School of Art, Barnsbury-street, on Friday night, Mr. Phil R. Morris, A.R.A., pointed out that although British art was really only about a century old, Hogarth being one of the first original English artists, during that single century our country had become filled with artists. The lack of beauty in our street architecture was due to a want of training in former generations—a want which was now being supplied. To the same cause was attributable, until very lately, the ugliness of our furniture. Even in the matter of a lady's dress, there was many a duchess of the last generation who would look with envy upon the simple toilet of a lady now. Art itself was simply the interpretation of nature adapted to the use for which the work was required. He believed art would never again be a matter of tradition. The whole civilised world was now brought into such close intercommunication that no longer would a nation's peculiarities be so strongly marked in its art as formerly; but we should be much more reflective and sensible in our art than we should be if we held an isolated position.

CHIPS.

Among the receiving orders in bankruptcy announced in Tuesday's *Gazette* appears the name of Joseph Brown, Belvedere-crescent, Lambeth, and King's-road, Wimbledon, timber merchant.

Dr. Schliemann has returned to Athens from Cythera, where he attained his main object of discovering the ancient temple of Aphrodite mentioned by Homer and Herodotus; but except some Cyclopean walls there are no vestiges of antiquity.

All Saints' Mission Church, Warrington, was opened on Tuesday. It is in a simple phase of Gothic, and seats 200 persons. Mr. J. Pierpoint, of Warrington, was the architect, and Mr. Gibson, of the same town, the builder.

At a meeting of the county justices of Kent, held on Friday, the revised and reduced plans of Mr. E. W. Stephens, of Maidstone, for the new asylum at Abbeygate Farm, East Farleigh, were finally adopted.

The York Corporation have accepted the tender of Mr. Joseph Clark, builder, &c., of York, for the restoration of the walls between Bootham Bar and Monk Bar. Four other tenders were sent in. The works will be carried out in accordance with plans prepared by the city surveyor, Mr. E. G. Mawbey, who has acted upon the valuable suggestions of Mr. G. T. Clark, of Tullygarn, Llantrissant, which have been considered and approved by the corporation.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Surveyor's Institution. Discussion on 'Allotment Legislation." 8 p.m.
Royal Institute of British Architects. "Recent Development of the City of Vienna," by F. R. Farrow. 8 p.m.

TUESDAY.—Institution of Civil Engineers. Discussion on "Electrical Tramways; paper by the late H. Goodall on, "Open Hearth Steel for Boiler Making." 8 p.m.
Glasgow Architectural Association Lecture by David Barclay.

WEDNESDAY.—Civil and Mechanical Engineers' Society. "The Roof of the National Agricultural Hall, Kensington," by A. T. Walmisley. 7 p.m.

THURSDAY.—Edinburgh Architectural Association. "Architecture and Decoration in their Social and Economic Aspects," by P. Geddes. 8 p.m.

ARCHITECTS', ENGINEERS', AND SURVEYORS' REGISTRATION BILL.

The ARCHITECTS' and ENGINEERS' REGISTRATION ACT COMMITTEE invite all who are interested in the Passing of the above Bill to CONTRIBUTE towards the NECESSARY EXPENSES incidental to the presentation of the Bill to Parliament.

If this appeal is met with a ready response by the profession, the Bill will be presented to Parliament early next session by COLONEL DUNCAN, R.A., C.B., M.P., who has kindly undertaken to pilot the Bill through the House, backed by other influential members.

Subscriptions of all amounts will be acceptable, and all sums of £1 or upwards will be publicly acknowledged, and subscribers will be supplied with a Copy of the Bill.

Subscriptions may be sent to the Honorary Secretary, EDGAR FARMAN, Hon. Sec.

J. WATSON MOYSES, B.L., ROBERT WALKER, M.S.A., A.M.I.C.E., HUGH ROUMIEU GOUGH, M.S.A., F.R.I.B.A., } Treasurers.

39, King-street, Cheapside, London, E.C.

Trade News.

WAGES MOVEMENTS.

HULL.—An extraordinary strike and lock-out of plumbers has taken place at Hull. The local branch of the Operative Plumbers' Association objected to the employment by Mr. George Frederick Wells, of Prospect-street, of a non-society man, and he was asked to dismiss this individual. Mr. Wells refused to do so, and the whole of the master plumbers of Hull met and agreed to discharge every society man in their employ unless the objection was removed. This the society refused to do, and the men were then discharged, and non-society men taken on in their place.

CHIPS.

Extensive additions and improvements to the Queen's Hospital, Birmingham, are to be made at a cost of from £5,000 to £6,000; and the committee have called in the assistance of Mr. Ewen Harper, architect, of 57, Colmore-row, Birmingham.

A new chapel is to be built for the Wesleyans at South Shore, Blackpool, and a number of architects were selected to submit designs for the same; the result being that the drawings prepared by Mr. J. H. Burton, of Ashton-under-Lyne, were adopted by the unanimous vote of the trustees.

The monument to the pastoral poet, John Cunningham, in St. John's Churchyard, Newcastle-on-Tyne, was unveiled on Monday by the Rt. Hon. Sir M. W. Ridley, M.P., after restoration, a work carried out by Messrs. Brown and Sons, of Newcastle.

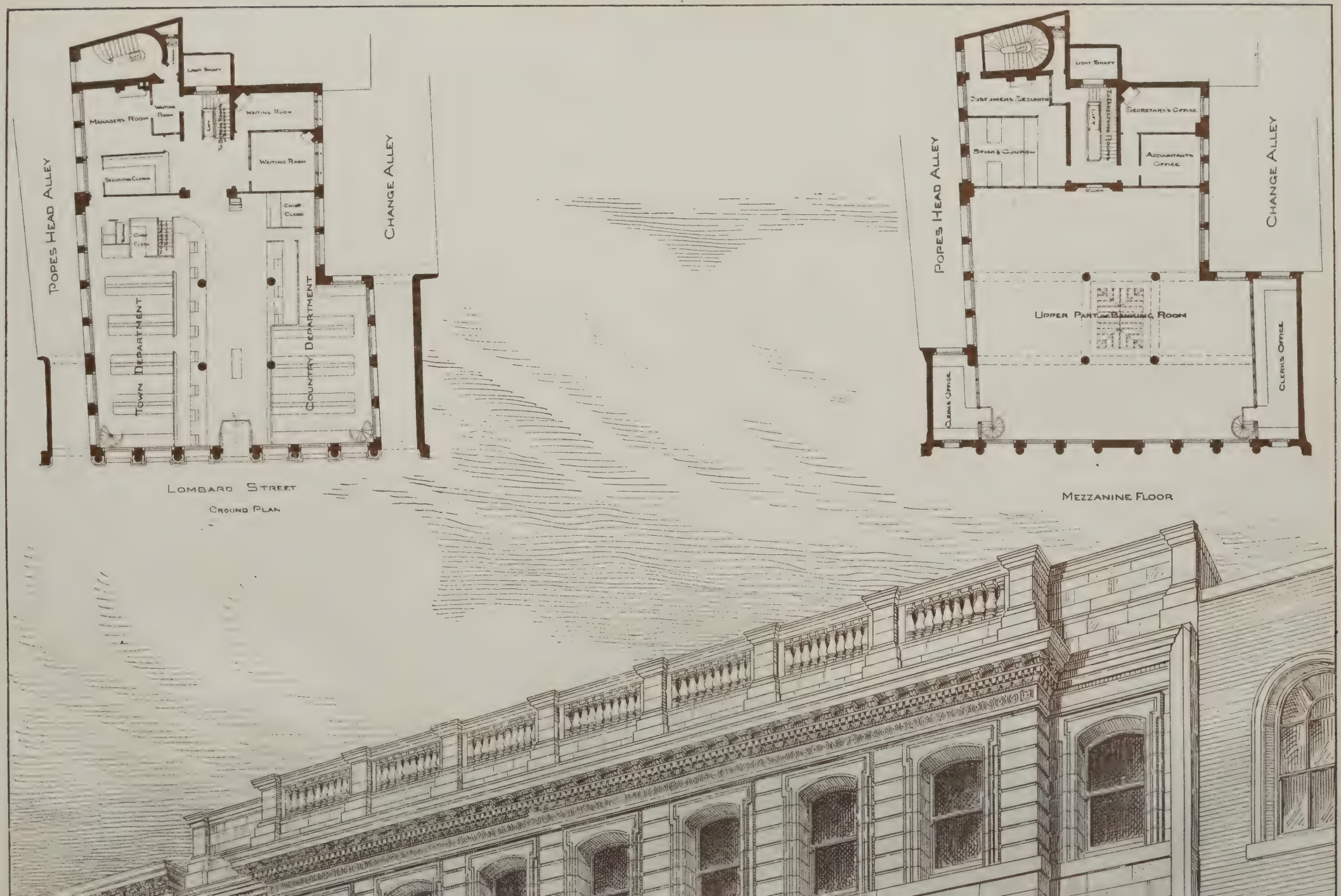
At a meeting of the Cardiff Corporation on Wednesday week, it was resolved to invite competitive plans to be sent in for laying out the 100 acres of land presented by Lord Bute to the town as a people's park and recreation ground, with an ornamental lake in the centre. The estimated cost is £30,000, but each competitor must name his own estimate. The competition is to be open to all England.

Holloway's Ointment.—This cooling Ointment perseveringly rubbed upon the skin, is the most reliable remedy for overcoming all diseases of the throat and chest. Quinsey, relaxed tonsils, sore throat, swollen glands, ordinary catarrh, and bronchitis, may be arrested as soon as discovered, and every symptom banished by Holloway's simple and effective treatment.

Cement is Tested, Mechanically and Chemically, at the NORTH OF ENGLAND TESTING LABORATORY, 2, Old Post Office-place, Liverpool. Also LUBRICATING OILS, Mechanically and Chemically.

Tobacconists' Trade.—How to Open Remuneratively from any amount, however small. Write at once for Illustrated Catalogue, post free.—LESSER FRIEDLANDER, Tobacconists' Complete Furnisher, 3, Houndsditch, London. Oldest, best, and cheapest house in the world. Established 60 years.

Depression of Trade.—Complaints about the falling off in consumption of many articles are loud and universal, but there is one exception to the prevailing dulness, viz.: GRANT'S MORELLA CHERRY BRANDY, for this popular liqueur not only maintains its position, but continues to increase in favour notwithstanding the efforts to supplant it by rubbishy imitations. Observe our branded corks and capsules. Sold by Wine Merchants, and by THOMAS GRANT and SONS, Maidstone, and 46, Gresham-street, E.C. Makers of the delicious Morella Marmalade. Sold by Grocers.


POPES HEAD ALLEY
CHANGE ALLEY
LIGHT SHAFT
MANAGERS ROOM
WAITING ROOM
WAITING ROOM
WAITING ROOM
SECURITIES CLERKS
CHIEF CLERK
TOWN DEPARTMENT
COUNTRY DEPARTMENT
LOMBARD STREET
GROUND PLAN
POPES HEAD ALLEY
CHANGE ALLEY
LIGHT SHAFT
CUSTOMERS SECURITIES
SECRETARY'S OFFICE
SPEAR & CLIFTON
ACCOUNTANTS OFFICE
UPPER PART OF BANKING ROOM
CLERKS OFFICE
CLERKS OFFICE
MEZZANINE FLOOR



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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1720.
FRIDAY, DECEMBER 23, 1887.

THE REQUIREMENTS OF PUBLIC BUILDINGS.

TO maintain an efficiency for safety and convenience of public buildings is one of the first duties of a State. The Romans had magistrates who undertook the supervision and construction of all buildings of a public character, and the office of the Ædile was regarded as a high one and a primary step to a distinguished position in the State. In France, Germany, and other countries there are departments having the control of national buildings—a kind of bureau—whose function it is to prescribe for and supervise the erection of national and other public structures. In the United States the Government of Washington has its supervising architect, and the question of a National Building Act has been under discussion for a considerable time. Our own separate municipalities have their borough surveyors, and in the metropolis there are at least two governing bodies, each having its own architectural functionary or superintending architect. Our systems of control work more or less smoothly, according as the legal machinery which set them in operation is perfect or otherwise. The chief hindrance is that the Statute law has been framed piecemeal, the enactments have been made after admitted failures and to rectify abuses, and have not been laid down upon any comprehensive plan. Thus the frequency of fires in London during the 17th century led to the framing of the Building Acts of which several were put into force, and in the following century the troubles arising out of party-wall disputes led to legislation. Again, the necessity for widening streets arose, and an Act was passed which made regulations about them, so that in course of a century several statutes were passed, all of them framed to meet some urgent state of the metropolis, and many of them conflicting and overlapping in their requirements. More extensive powers were then required; these gave rise to later Acts, till at length the confusion of so many sections and amendments became so bewildering to builders and others that a new Act was called for incorporating leading principles and the general provisions of former statutes. Such a measure was that of the Building Act of London, 1855, though far from being a complete piece of legislation. In a very few years it was found necessary to alter and amend the Act to meet new circumstances—such, for example, that buildings erected for the manufacture of machinery distant more than three miles from London, and of one story only, should be exempt from certain rules as to party-wall division. Afterwards a new Act transferred the powers over dangerous structures from the Commissioners of Police to the Metropolitan Board of Works. The provisions of the Metropolis Management Act of 1862 were subsequently called for.

Such conflicting and piecemeal legislation has been opposed to anything like a systematic administration, and a host of buildings have been erected deficient in many things, about which the Acts have said nothing. As new laws are framed these structures are found to be defective, and the owners or lessees of them are made amenable to the authorities for various modifications and improvements. One instance of this will suffice. Most of the London theatres were built before the recent rules came into force under the Metropolis Management Act, 1878, and were therefore defective in many points which recent experience has proved to be necessary to the safety of the public. The provisions contained in that Act empowered the Metropolitan Board of Works to make several alterations to existing theatres and music-halls, and, acting under those provisions, the Board have carried many alterations into effect at considerable expense to the owners and lessees. "Such structural defects as can be remedied at a moderate expenditure" were the only qualifying words in the Act. Several structural faults were left untouched. Lately it has been sought to make legislation still more severe, and not only to insist upon structural alterations being made in accordance with the suggestions of the Board, but to see that these alterations are maintained in an efficient condition. In the public interest these alterations are desirable, though they entail upon many owners a very large expense in altering buildings which were erected years ago. Although a perfect system of building regulations is a slow growth, the promoters of buildings set apart for public resort have a right to object to what they regard as a sort of vexatious interference with their rights—an inquisitorial and arbitrary dealing with them. Additional exits, and better stair approaches, and fire-resisting materials are all very necessary; but they ought to have formed part of provisions in the Act when first passed. The danger of fire only led our old legislators to prescribe rules for what they thought to be fireproof materials; they did not appear to entertain any desire to increase the number of exits, so the latter precaution has been reserved for more recent Acts to deal with. So with other details. But this slow-growing legislation has been costly, and has greatly impeded enterprise. It may be too late now to regret past omissions, yet it was easy to have forestalled the requirements of all public buildings of this class, if a comprehensive code of regulations had been laid down.

There are, for example, a few well-marked requirements for public buildings which distinguish them from the private class. Their structural strength should be greater; their walls thicker; their floors, galleries, and staircases of greater strength; the means of ingress and egress adequate to the requirements present and future of the establishment. The site is of the first importance, and in this particular a public building ought to possess facilities over private erections. Yet it is one of those conditions which have been left to good fortune and accident. No building law has ever provided that a church or a public hall should have a site open on two or more sides. Even so important a building as a block of municipal offices or a court of law has no provision for extension, or that it should stand at the angle of a square or be surrounded by roads, though the necessities of the public would have certainly dictated a site at once open, and with facilities of entrances and exits on at least two or three sides. Common sense and appropriateness have alone suggested open sites for these buildings; but a comprehensive scheme of legislation should have defined the needful requirements. For example: in the United States architects have been discussing the paramount requirements of a national building, and one author of a paper read recently has sketched out what these should be. Referring to site, it is suggested that it should be at the angle of a square, with its main façades to the south and east for proper light; that an undivided space of not less than 30ft. should be preserved upon the two inner façades as a protection against fire from adjacent property, and for circulation of air and admission of light. In London our principal public edifices have been well provided for. The Bank of England, the Royal Exchange, and the Mansion House form a trio of well-placed buildings, each surrounded by streets and having a wide space in front of them. The Houses of Parliament and New Courts of Justice have sites worthy of the palatial edifice raised upon them. The British Museum, the National Gallery, and the Post Office have sites leaving little to be desired; and the great Metropolitan basilica of St. Paul's is at least well isolated from adjacent buildings. But legally there was nothing to prevent any of these buildings being hemmed in between shops and houses—imperilling their safety, or, at least, the treasures some of them contain. After site, the entrances demand attention; yet not a word exists about their number in any building law, and even, as we have seen in regard to theatres, they have never been considered till recently. We consider it to be of the first public importance that every edifice set apart for assemblies should be provided with at least a certain number of entrances according to its size or capacity. The provision would, of course, divide public buildings into different classes or risks, the highest risk being that of a theatre or public hall, and the exits ought to be proportioned in number to them. What these ought to be would be a question of experience based on experiment. The rule as to theatres abroad is that two exits should be provided for 300 persons and three for 500. Capt. Shaw makes the sensible suggestion that the exits should at least be as numerous as the internal divisions of the auditorium, according to prices. Another authority says no allowance should be less than 3ft. for every 200 persons in determining the width of doors and stairs—a very small allowance. But it is not width of openings so much as the *number* of them that is desirable. It is far safer to provide a 3ft. or 4ft. door for every 150 persons than one doorway of double that width for 300 persons. At any rate, there might be a rule determining the least number of entrances allowable for a given number of persons and their least width. If this had been done by the framers of the Act of 1855, there would have been less call for remediable measures being taken now, and the owners of theatres would have been saved considerable expense and inconvenience. The Metropolitan Management Act exempts most of the public buildings we have named from the operation of the Act, though it is difficult to see why, unless it is thought that national buildings are generally planned and designed irrespective of minima of cost, and other considerations which usually weigh much with those who promote private enterprises. The Board has "power from time to time to make, alter, vary, and amend such regulations as they may think expedient with respect to the requirements for the protection from fire of houses or other places of public resort within the metropolis, &c." These words are far-reaching and general, and much is left to the discretion of the Board or its officers, and there is, from some recent incidents, little assurance that they will not be stretched in one case and relaxed in another. To prescribe the requirements as to the position and structure of houses or rooms of public resort, is not so easily done as when there are rules for guidance—of course, discretionary powers are important, and ought to be exercised in every particular case—but the requirements of entrance and exit, strength of floors and staircases, are things that are as equally necessary in one situation as in another. The difficulty of prescribing fairly in every case under the existing rules has no doubt been felt by the Metropolitan Board, who are now seeking to strengthen their hands. They could prescribe or give suggestions for structural alterations, but have not the power to see that the alterations were practically in operation. For example, they ask for fresh powers by their new Bill, to which we referred last week, to inspect theatres at any time, to see that the staircases are not obstructed by pay-boxes, or the gangways

blocked by chairs, and to see if all the exits can be easily opened outwards. Then as respects structural matters, there ought to be some definite rules given for the scantlings of floor timbers and girders for assembly rooms and galleries which are now left to the builders. How many gallery accidents there have been of late years! Supervision by district surveyors may be all that can be desired; but what is required are specific sizes for girders, bearers, and other things necessary to enable a floor or a gallery to bear its full complement of weight. A gallery often gets overcrowded, and the stamping of feet or a sudden rush may severely test the floor. Definite rules as to width, construction, and thickness of stone staircases, or, better, of concrete, should be enforced, though of all these matters there is really nothing to guide in the Building Act. Lighting is one of the requirements that are sadly overlooked in our public buildings. It forms no part of building law, except for purposes of sanitary efficiency. There is nothing to require every corridor to be well lighted by end windows, or that basements and offices should have at least good areas for ventilation and light. The materials and finish of walls and floors for the purpose of not only resisting fire but of preventing the passage of sound, are other details very inadequately dealt with; but we have said enough to prove that the essentials to a safe and a healthful public building have never been contemplated by the Legislature. The Building Act has been from the first chiefly remedial in its operation, of supplying defects after they have been discovered, rather than in prescribing and preventing calamities. Although in some respects more perfect, the by-laws for new buildings in urban and rural districts are also unsatisfactory. The power which every authority has to make by-laws with respect to new buildings in its locality has been somewhat misapplied by the framing of rules which seriously restrict the adoption of local materials and methods of construction.

THE LAW AS TO OWNERS OF DWELLINGS.

OWNERS and lessees of dwellings in a condition unfit for habitation or dangerous to health ought to take a lesson from the judgment recently delivered in the case of "Hyde *v.* Vestry of Marylebone," which came before Mr. Baron Pollock and Mr. Justice Hawkins. The case related to some houses near the Middlesex Hospital belonging to Captain Berners, and held by Mr. Hyde under a long lease, which expired at Michaelmas, 1886, and also having a lease of twenty-one years to commence from that date. The latter only paid a ground-rent of £5, and so was a "beneficial" owner under his lease. In July, 1886, the medical officer reported, under the Act of 1868 to provide better dwellings for artisans and labourers, against the houses, which was followed by the surveyor's report condemning the premises. A summons was issued to both owner and lessee. On the day after the first lease expired they both attended and objected to demolition. Soon after an order was made for demolition, but upon appeal to sessions it was altered into an order for structural alterations, going beyond Hyde's covenants to repair. However, Hyde gave notice to Captain Berners, and, with his consent, did the works required at an expense of about £400, and afterwards applied for and obtained from the Vestry a charging order, under the Act, charging that sum as an annuity on the premises. Captain Berners objected, and applied for writs to set aside the order, or of prohibition to restrain the Vestry from enforcing it. The Court delivered judgment against the applicant, Captain Berners, upholding the charging order charging the expense upon the premises. In his judgment, Mr. Baron Pollock remarked that the question was whether the order had been rightly made against Hyde—that is, whether he was at the time the "owner" within the meaning of the Act. He was of opinion that he was, and that the order was rightly made. At the time the notice was given that the premises were in an unfit state, he held the premises under a long lease unexpired, and also had a lease for twenty-one years to begin when the first had expired. He thought the Act intended the notice to be given to the then owner of houses in an unfit state, and the subsequent proceedings were to be upon that notice. The scheme of the Act showed the intention to enforce the liability of the party in whose hands the premises were allowed to become unfit for habitation. He thought that it was clear, therefore, that the person liable was the owner at the time the notice was given. The charging order was right, and the application was dismissed with costs. Mr. Justice Hawkins concurred in this opinion.

The decision is of importance as showing the interpretation of the Court on this part of the Act. Many an "owner" might evade the objects of this beneficial Act if it were otherwise. He could assign his interest, or, say his interest had expired, and the new owner would be rendered liable. The Act itself obviously intended to enforce the liability on the person who was owner at the time the defective condition of the premises was found. There was no presumption that on a change of ownership a new notice was to be given. The Act of 1868 has important provisions, which give power to the officer of health to examine any premises. If he finds they are in a state unfit for human habitation, he reports to the local authority, who refers the report to their surveyor, and he is authorised to inspect the premises, and report as to the cause of the evil, and the means of remedying the same by structural alterations or by demolition. On this report the local authority has power to call upon the owner to carry out the works necessary, the expense of which is to be charged on the premises as an annuity to be payable for a period of 30 years (Section 25). It was under these provisions that the lessee in the above case was ordered to execute the works necessary to put his houses in a fit state, and then to obtain a charging order on the premises. The provisions of this Act (Artisans' and Labourers' Dwellings Act) apply also to dwellings or buildings which, although not in themselves unfit for habitation, are so situated as to stop ventilation or make houses in their proximity unfit for habitation. For example, if a house is so situated that it obstructs air or light to another dwelling, the authority has power to order the pulling down of the "obstructive building." These provisions of the law have been found of essential value in towns where large blocks of houses built in courts and areas are found which obstruct any scheme for improvements. They enable a local authority to clear away all obstructive and injurious buildings, and to apply the other remedial measures of the Act. An owner, of course, has power to appeal and state his objections upon the reports of the medical officer and surveyor being sent to him, before any order for demolition is made, and there are clauses by which he can retain the site by undertaking to pull down, &c., which entitle him to receive compensation for the demolition. The above case establishes the meaning of the term "owner" in a way that might have been misinterpreted, and shows that the word in the Act is large enough to include interests in the term of an estate.

Mr. F. S. Granger, M.A., of Nottingham, has been appointed Lecturer in Classics and Philosophy to the Nottingham University College.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fourth ordinary meeting of the Institute for the present session was held on Monday evening. The PRESIDENT, Mr. E. I'Anson, announced that under the provisions of By-law 44, the following gentlemen had ceased to be Associates:—Henry Barber, of Manchester; W. J. Bowyer, of Cambridge; R. S. Ingram, of Kilmarnock; Ernest W. C. F. Schmidt, late of Eastbourne; Jas. Souttar, of Aberdeen; Edward Joseph Thomas, of London; and Charles Young, of London.

Mr. MACVICAR ANDERSON stated that three series of measured drawings had been received from competitors for the prize offered by Colonel Edis, who, it would be remembered, offered last year a prize of 20 guineas for the best set of measured drawings of any building or buildings erected in Great Britain and Ireland, in any style current between the years 1600 and 1800, to be made within a period of four weeks. The Council had selected the series of drawings from Exeter, submitted under the motto "Semper Fidelis." The sealed envelope containing the name of the successful candidate was then opened, and the drawings proved to be the work of Mr. Sidney K. Greenslade, of Ockendon-road, Islington, N. For the recently-created Travelling Studentship at Athens, of the value of £100, jointly contributed in equal proportions by the British school at Athens, and Mr. I'Anson, President of the Institute, seven candidates presented themselves—viz., James H. Cooke, Liverpool; Ambrose M. Poynter, Robert Weir Schultz, Ravenscraft Elsey Smith, James Cromer Watt, F. Ernest Williams, and Arthur Needham Wilson, all of London. The council having carefully considered the antecedents and character of the several candidates, and the quality of the work submitted, had awarded the studentship to Mr. R. E. Smith. Although the fact that this gentleman was the son of his father had, of course, not influenced the council in their decision; yet it was a source of gratification to feel that the award went to the son of so well-known and highly-respected an architect as Professor Roger Smith. On the screen were exhibited that evening drawings executed during his tour by Mr. A. Needham Wilson, the Soane Medallist for 1886; and also a selection from the drawings of the late Mr. Geo. Devey, lent by his executors.

The hon. secretary also read a letter from Sir James Fergusson, Under-Secretary for Foreign Affairs, stating that the third international exhibition will be held at Munich, from the 1st June till the 3rd October, as a celebration of the first art exhibition held in the Bavarian capital. As it is specially designed to obtain the co-operation of foreign artists with the view of enhancing its interest, Lord Salisbury has been requested to make it known to British artists.

THE RECENT DEVELOPMENT OF THE CITY OF VIENNA.

Mr. FREDERIC R. FARROW, the holder of the Godwin Bursary for 1886, read a paper on this topic. He commenced by describing th separation between the City of Vienna anditse surrounding town by a system of fortifications existing previous to 1857, and the proposals made to remove the separation, leading to the decree of the Emperor issued Christmas, 1857. This decree provided for the removal of the fortifications; the appropriation of the area partly for open spaces, partly for sites of public buildings; for the formation of a boulevard round the city, and a quay next the Danube Canal; for the sale of surplus land to form a fund from which were to be erected numerous public buildings, and for the promotion of a competition for designs of the proposed scheme. The competition was held, an official plan subsequently prepared in the Office of Works of the Ministry of the Interior, and the work commenced. The Stadt Park, the Palace Court, People's Garden, Rath-haus Garden, and the place in front of the Votive Church were laid out as open spaces. The building fund was established by the sale of surplus land at prices ranging from £150,000 to £300,000 sterling per acre, from which was defrayed the cost of erecting public buildings on the Ring. The Museum of Applied Art was erected for the purposes of a museum and technical art school during the years 1868-71, from the de-

signs of the late Freiherr von Ferstel, at a cost of £65,000. The Cur Salon in the Stadt Park is a building used as a concert-room and café, designed by J. Garben in florid Italian Renaissance. The Opera House was the first public building erected on the Ring, having been built during 1861-68 from the designs of Vander Nüll and Von Siccardsburg, at a cost of £500,000, for the accommodation of an audience of 3,000 persons. The Academy of Fine Arts faces the Schiller Platz, was designed by Baron von Hansen, and erected in 1874-76—contained galleries for casts and pictures, library and reading-room, and accommodation for students of architecture, sculpture, painting, and etching. The Art and Natural History Museum intended to form, with the Imperial Palace now in course of erection, one grand conception, from the designs of Semper and Hasenauer, were commenced in 1872 and completed in 1884. The Houses of Parliament, in Classical Greek style, designed by Baron von Hansen, consist in the main of a one-story building on a basement, and provide for a House of Peers and a House of representatives, with the necessary offices, &c. The Rath-haus was designed by Freiherr Friedrich von Schmidt, whose plans were selected in open competition. It was erected in 1872-84, in Modern German Gothic style, with an admixture of Renaissance features. It included a grand ball-room, 12,000ft. superficial area and 45ft. high, with its attendant supper-rooms, salons, &c., a council chamber and municipal offices. The University buildings contain 46 lecture-rooms for 6,000 students in the faculties of arts, laws, medicine, and theology; three large halls for festival occasions; examination-rooms, and a fine library, on the model of the Ste. Geneviève at Paris, for 32,000 volumes and 520 readers. The buildings were designed by Baron von Ferstel, were commenced in 1874, and completed in 1885. The Court Theatre, designed by Semper and Hasenauer in florid Renaissance, thus contrasting with the other buildings in the same interesting group—the Houses of Parliament in Greek, the Rath-haus in German Gothic, and the University in a severe Italian Renaissance style. On the site of the Ring Theatre, destroyed by fire December 8, 1881, the Imperial Institute had been erected, fron the designs of Baron von Schmidt. This building contains a commemorative chapel and suites of residences in "flats." These latter were especially noteworthy, as showing the latest phase of feeling in Vienna in respect to such domiciles, the rooms being for the most part entered directly from a vestibule or corridor, a distinct departure from earlier types of plan, in which the only means of access to many of the apartments was by transit of other rooms. The Bourse was designed by Baron von Hansen, and was erected in 1870-75 at a cost of about £350,000. The great hall, of basilican form, measures 195ft. by 130ft. in extreme dimensions; and there are also offices for bankers and stockbrokers, a corn exchange, &c. Among the chief hotels were the Grand Hotel, on the Kärntner-ring, with 300 visitors' rooms; Hotel Imperial, also on the Kärntner-ring, formerly the Palace of the Duke of Würtemburg, and the Hotel Austria, on the Schottenring, each with 150 rooms, and the Hotel Métropole, on the Franz Josef's Quay, with 400 visitors' rooms. The Palace of the Grand Duke William, on the Park Ring, overlooking the Stadt Park, designed by Baron von Hansen. In conclusion, the author exhibited plans of, and described some of the houses in flats, pointing out that house rents in Vienna were far higher than in London. Of these flats, the "Heinrichshof" is one of the largest in Vienna; it is situated on the Ring, and has been built from the designs of Baron von Hansen. The Globe House, erected in the Hof, in the Baroque style prevalent in old Vienna, from the designs of Ludwig Tischler, combining café and restaurant with the dwellings on the upper floors, is planned on the most modern system, with the rooms entered from vestibules or corridors. The house of Herr Neumann, in the Rudolfsplatz, with stone façade, was an exception to the stucco generally used in Vienna. The "Arkaden-Hauser," near the Rath-haus, had luxuriously-fitted blocks of residences, with cafés and restaurants on the ground floor. A group in the Stadiongasse, also near the Rathhaus, was planned on the older system of residences in "flats." The Schwarzenberg group, containing 100 dwellings in three blocks, was also planned on the older system. The private house of the brothers Böhm, in the Maria Lilferstrasse, had the ground floor arranged for shops and small residences for letting, and the third floor also arranged for letting. The Commercial Bank was a combination of business premises and residences on the upper floors. The author also briefly referred to some of the churches of Friedrich Schmidt, including the Brigittenau, the Weissgärber, the Lazzaristen and the octagonal planned and domed Gothic church in Fünfhaus.

ARCHITECTURAL DESIGN IN VIENNA.

Mr. THOMAS BLASHILL, Fellow, Superintending Architect to the Metropolitan Board of Works, also read a short paper descriptive of a recent visit, illustrating his remarks by a large collection of drawings and photographs he had obtained at Vienna, which showed most of the important new buildings. A plan prepared in the office of the architect to the municipality, showed the situation and surroundings of the city, which, as regarded latitude and altitude, only slightly differed from London. The climate, however, differed materially, and the general brilliant sunshine makes Vienna, to English eyes, first of all, bright. It could not be called a manufacturing or commercial city, but more the town residence of the emperor and wealthy classes. In some of the suburbs were important villas; but the middle classes lived mostly in flats, in which accommodation was far more expensive than a house and garden in London. The working population occupied houses of some architectural pretensions, with rather high rooms, in which, however, they were closely packed. From an elevated point, near the beautiful "Volks Garten," the chief of the new buildings could be seen: the Hof, or Court, theatre, now being completed by Baron von Hasenauer, sumptuous in design and decoration, and open on every side; Ferstel's University, and his Votive Church; the Palace of Justice; the Town Hall, by Baron von Schmidt; and the Houses of Parliament, by Baron von Hansen. On the Ringstrasse were the two Imperial Museums, and opposite to them the new Palace of the Emperor was slowly rising. Blocks of private houses filled up intervals and formed backgrounds to the view. The new Opera House, rather beyond the view, was a fine Renaissance building, possessing an auditorium very successful in respect te sight and sound. The grand Church of St. Stephen was a rare ancient example of the Gothic style; but the Votive Church and the Town Hall were almost the only instances of Gothic in that area, the group of spires in the latter forming a picturesque feature above the horizontal lines of the general mass of buildings. The sober character of the great mass of Italian designs was striking. Doorways, windows, &c., seemed old friends of thirty years' standing; and, though specimens of good Renaissance were not wanting, there was little or nothing of the very "free Classic" which, in the interval, had flourished in London. The Houses of Parliament was the only instance known to Mr. Blashill of the successful use of the Greek style in a large and complicated design. In this work it was developed into life and beauty. The building was of greyish-white marble, and the interior richly designed in coloured marbles, adorned with figure sculpture and harmonious decorations. Figure sculpture was a striking feature of the new architecture of Vienna. It was very cheaply executed, and was employed in every situation in which the human figure could be placed in the exterior of a building, and also much used in interiors. The back elevation of the University building furnished a good example of external sgraffito work. In Vienna, it seemed probable that it would long retain its freshness. Terracotta was used in enriched friezes and figure sculpture. Although much used, brick was seldom seen in the elevations of important buildings, much of the architecture being executed in cement upon a structure of brick. Stone was not the local building material; but good grey marble, reddish-white marble, and light grey limestones, were obtained for important buildings, besides the richly-coloured marbles lavishly used inside the Houses of Parliament. Portland cement had been much used; but old work executed in a local plaster wore well, and this plaster was still used. The new improvements were the results of a grand combination of tact, talent, and business capacity, and were worthy of study. He also referred to the employment of women as bricklayers' and masons' labourers.

Mr. WILLIAM WOODWARD said they had heard in that room on Friday evening that the study of the history of architecture should be abandoned to antiquarians, that examinations were unnecessary, and that building operations should be left to be conducted by builders; and he was not, therefore, surprised at the absence of the high art architects when such practical papers on the embellishment and laying-out of great capitals were read, especially as these arguments were endorsed in an eloquent commendatory speech by Professor Kerr. [Professor Kerr: I said nothing of the kind.] Such questions as the laying-out and widths of streets, the ideals of municipal control and administration, were beyond the "ken" of high-art architects; but they had had two valuable papers, following up those by the President on "Modern Rome," and by Mr. John Hebb on what had been done at Milan. It seemed that, with few exceptions, the architecture of Vienna might come under the category of the cast-iron type; but very great care seemed to have been taken by the Government to relegate the duties of supervision to those who were supposed to know what was most likely to contribute to the architectural adornment of the city. It would have been a great advantage to London if a similar Ringstrasse or boulevard to that seen at Vienna could have been carried out here. Our climate was not favourable to the employment of so much sculpture as the Viennese adopted on their buildings; but if more of the class used by the late Sir J. Pennethorne could be introduced into our buildings, it would greatly add to their effect. An example of the want of forethought and control exercised by the Metropolitan Board of Works was to be seen near Holborn Town-hall, where although the end of Gray's Inn-road, recently widened to 60ft., was shown by experience to be none too spacious, they were actually commencing a new street to the Angel at Islington only 50ft. in width.

Mr. HENRY DAWSON proposed a vote of thanks to Messrs. Farrow and Blashill for their interesting papers.

Mr. ARTHUR CATES, in seconding the motion, said Mr. Farrow's paper showed how great were the advantages to be obtained by young men who availed themselves of the opportunities for travel afforded through the liberality of Mr. George Godwin. It was no credit to the young men of the profession that this year there were no competitors for that Bursary. The papers, one by a student and the other by a mature official, highly placed, would probably benefit the Metropolis in the future. The works which were going on in Vienna and in other Continental capitals were in sharp contrast to what we saw in London, in their wisely prodigal expenditure on works for the improvement of the cities carried out with some degree of dignity. Although he could not say that the architecture of Vienna possessed the elegance of that of our leading architects, there was apparent great character, a harmony of composition, an openness and spaciousness, a liberality in design, and a generosity in execution. This spaciousness of design was very evident in the sizes of rooms and the widths of staircases of important buildings in Vienna. The keynote of this difference was that Austrian architects were subject to academical training, which, while it was productive of some faults, and hardened their style, it gave them a desire for height, and spaciousness. Our architects deserved some of the blame for the contrast to be seen in London, for they were possessed by a desire for economy of money and space, and did not insist upon aiming at grandeur of style, so that every scheme in this Metropolis was blasted by a miserable prodigality and a wasteful parsimony which was more expensive than a liberal scheme. The Metropolis might a century since have had a parallel to the Boulevards of Paris and the Ringstrasse of Vienna in the new road from Marylebone to the City; but it had been destroyed in effect by the miserable and squalid shops allowed to be built on the forecourts, and the same process was injuring all the wide thoroughfares in every quarter of London.

Professor Kerr said the fault lay on our mode of government. London could never, under Parliamentary and local self-government, achieve such great results as could cities under imperial rule. Still, in individual buildings in the City we could show exceedingly creditable examples of the work of the architect. At the same time architects should not cease to point out that outlay on the decoration of a city paid in a commercial sense; that it was a beneficial expenditure for the nation at large and a profitable investment.

After a few remarks from the President, who referred to the Thames Embankment as a work of ornamentation carried out by the much-abused Metropolitan Board of Works, the vote of thanks was carried by acclamation, and briefly acknowledged by Messrs. Farrow and Blashill.

ARCHITECTURAL ASSOCIATION.

THE fourth ordinary meeting of the forty-first session of the Association was held on Friday evening, the President, Mr. John Slater, B.A., in the chair. The following new members were elected:—H. H. Dunn, G. P. D. Saul, S. A. Stanger, J. G. Henderson, D. F. Pitt, P. R. Smith, P. Hayton, jun., E. A. Masey, F. C. Eden, A. F. Faulkner, F. Bouch, H. W. Bannan, E. Osborne, H. J. Hicks, E. L. Lutyens, G. P. Wagstaff, and W. E. Wears.

The President announced that a special business meeting would be held on January 20, for the purpose of discussing the question of the affiliation of provincial societies, and the proposed alterations in Rule 22 relating to the constitution of the committee.

THE PROPOSAL TO MAKE ARCHITECTURE A CLOSE PROFESSION.

A paper was read by Mr. T. G. Jackson, M.A., F.S.A., on this subject, which appears *in extenso* onthe next page. At its close,

Mr. G. A. T. Middleton said, that as a member of the Committee which was promoting the Architects' and Engineers' Registration Bill, he wished to thank Mr. Jackson for his criticisms of the draft, as it was only by acting on the suggestions conveyed in such honest and outspoken criticisms that a committee could so modify the provisions of such a measure as to render it workable. He regretted that he could not agree with many of the arguments used by the lecturer. He was surprised to hear Mr. Jackson say there were no points on which architectural knowledge could be tested by examination. Anyone who had gone through the Institute examination, as the speaker had done, must be aware that it was a good one; it did not, and could not, include tests of artistic powers, but it would exclude men who did not understand constructional matters. This R.I.B.A. examination was the one specified as a test of fitness for the registration of English architects in the Bill to which he had referred, which proposed to give the control of examinations in Ireland to a similar body, the Institute of Architects in Ireland. Scotland at present possessed no corresponding professional body claiming to represent its architects. Mr. Jackson had asserted that the public were sufficiently protected by the present statutory regulations. This might be the case in the Metropolis, where the district surveyors were a highly qualified body of men; but it was not so in provincial towns, and especially in rural districts. The Bill would correct this, and would insure that in a few years none but competent and well-qualified men acted as architects and surveyors, which was more than could be said to be the case at the present time. Engineers and surveyors, as well as architects, were included in the one scheme of registration, for no Bill which failed to do so would have a chance of passing; but it was distinctly provided that the examinations should be separate. The Bill recognised, in fact, three distinct and well-defined branches of the profession. The lecturer had stated that the object of candidates entering for a test examination was not the acquirement of knowledge, but of a diploma; but, he would ask, did this apply also to medical and legal students, who equally had as the goal before them the passing of an examination entitling them to a diploma to practise, but who were generally admitted to obtain in the preparation for those examinations a considerable knowledge of their respective professions? The objections raised by Mr. Jackson applied fairly enough to competitive ones, such as those held for admission to the Civil Service, but not to those held under the auspices of the Institute. It was desirable that every person practising in the profession should have to pass some test of general fitness, and should also have served articles of some form of pupilage. Whether the terms of pupilage set forth in the Draft Bill were the best that could be devised was as yet uncertain, but if they failed to meet with the approval of the majority of the profession they would be modified. He agreed with the lecturer that no man's position would be raised or lowered by registration, and he thought no one proposing to enter the profession would be such a cad as to imagine that his social position could be affected by enrolment in a list. It was evident that all men at present in practice who chose to register must be included in the lists, but as time went on the incompetent men would gradually drop out, and the profession would reap the benefit of registration. He differed from the lecturer again in his suggestion that the general public were not interested in the matter. He knew that most medical officers of health felt strongly in the matter, and that their view were shared by many medical men and members of the professions.

Mr. Bernard J. Dicksee said, as one of those disqualified under the Registration Bill—namely, men who had commenced practice since 1882, and who had not been articled—he objected to its provisions. An open door of salvation had, however, he found, been left for him, as members of that Association were to be recognised; though what better qualifications he possessed the day after his election than he held the previous day he had yet to learn. One of the Scottish societies mentioned in the Bill, membership of which would qualify for registration, admitted to its ranks, he had been informed by a competent authority, house painters, glaziers, and decorators.

Mr. William Woodward thought that the practical question for consideration was whether the Architects' Registration Bill would or would not benefit the profession. Those promoting that Bill believed that the obloquy which had been cast upon them had arisen, not so much from architects of good standing, as from those who had unwarrantably assumed that name and were unworthy to be recognised as members of the profession. Others had feared that the Bill, if passed, would quash the R.I.B.A. with its compulsory examination for Associates. It would, he thought, have been better if a less distinguished architect than Mr. Jackson had taken the question up, for from Mr. Jackson's high position in the profession he could look with unconcern on the difficulties which the average young practitioner felt from the unfair competition to which he was exposed. He wondered Mr. Jackson had not strengthened his position on this question by telling them the names of members of the legal and medical professions who were outsiders, and yet more distinguished than those within the ranks; but he had not attempted to do so. Apart from this question of registration, he had been much surprised by some of Mr. Jackson's observations as to the qualifications of architects. He had informed them that the construction of vaults and walls was mere builders' work, and that the history of styles and art, which had been thought to be most essential items of knowledge to professional men, were only interesting to antiquarians. If Mr. Jackson was correct, and construction and style were outside his province, they had nothing left to the architect but the designing of the mere façade of his building. Was the contriving of this art surface, the simple casing of a building, that which Mr. Jackson would have them regard as alone entitling a man to assume the name of architect? The lecturer, moreover, had said that the true friend of the architect was not the engineer or the surveyor, but the painter and sculptor, but the latter gentlemen were not introduced to the architect except in the very largest buildings. The decorator might be allowed to be the friend of the architect, but the speaker could not see how the painter could be recognised as such. Mr. Jackson's assumption would confine the profession to buildings of the first class in magnitude and importance, and would relegate all other work, such as sanitary matters, engineering, even decoration, to various experts.

Mr. H. Roumieu Gough said he had been delighted to find from Mr. Jackson's paper how very weak the arguments were which could be adduced against Registration. When the speaker first took up the question he met with much ridicule, misrepresentation, and even insolence; but in the opening addresses of the present session, the president of every professional society, including the Institute and all the provincial bodies, had alluded to the proposal. To allege that the profession did not call for closing the entrance by examination was absurd; to allege that the public were not interested in the movement was more difficult to disprove; but whenever he had written to the public Press on the question, the number of letters and inquiries he received from outsiders showed the interest that was being aroused. The chief point of controversy seemed to turn on the inclusion of engineers in the Bill; but it was only within the past century that the profession had been separated, and it would be practically impossible to obtain statutory powers to prevent engineers from practising as architects, and *vice versâ*. He held that every professional man calling himself an architect ought to understand all about materials, to be able to calculate stresses and strains, and have some knowledge of engineering matters. He knew that those who regarded architecture as a fine art, pure and simple, would not agree with him; but if they looked at the etymology of the term "architect," they would recognise that at least its original meaning was the "chief builder." They had been told that an architect's knowledge could not be tested by examination, and that registration was, therefore, impracticable, and would not benefit the profession. But let them ask any medical or legal practitioner if they were willing to tear up their charters, or if their examinations were valueless as tests; the ideas would be scouted as monstrously absurd. If they granted, for the sake of argument, that knowledge in art could not be tested by examination, yet the knowledge of construction and materials could be so tested, and its possession would not render a man less artistic or accomplished. An artist as such was useless as an architect unless he were also qualified to construct. Mr. Jackson had also said in the early part of his paper that the Registration Bill was being promoted by men who would not regard the Institute as the great central body. That was a mistake, for the promoters of the Bill had expressly named the Institute as the examining body for Great Britain.

Professor Kerr thought the time had come when the meeting ought to be called on not to misinterpret Mr. Jackson's views. There were some to whom his phraseology might be obscure, but many would remember the time when such words were in everybody's mouths, and were used by distinguished men who had now passed away. When Mr. Jackson spoke of architecture being an art somewhat distinct from engineering and construction, why should he be ridiculed and misrepresented? Why was the suggestion made that the lecturer thought the construction of an edifice was the work of a builder, and that its beautification that of another man? Such criticism was utterly unworthy of an answer. What Mr. Jackson contended for was that England could afford and ought to maintain an architectural profession more or less suggestive of fine art, and that pure art could not be taught. The late William Burges nailed that thesis to the wall, although he could not express it logically, but he trusted that those who could argue the matter out would do so. At the present time the architectural profession was undergoing a marked change in this country. There was, for instance, a great change apparent within the Institute of British Architects. Not many years ago the number of its members was fewer, and although not more select than at present, its pre-eminent men were, in a certain sense, more distinguished in the eyes of public society. The Institute was then a learned society, but that state of things had passed away; that was to say, the public interests in this country, and the professional interest inside and outside the Institute, did not necessitate it to confine itself exclusively to art and learning. The Institute

ran a risk, therefore, of losing touch with art altogether. The Council of the Institute had recently adopted a measure quite in accordance with the spirit of the age—that of admission by examination, as far as it could be applied to architecture and for what it was worth. It was not an academical examination, but an ordinary practical test—not intended for the purpose of keeping out so much as of letting in names—although they practically, he must admit, amounted to the same thing. Then came Mr. Gough with his Registration Bill, which was a perfectly honest movement for the extension of the principle of exclusion or inclusion—whichever way people chose to regard it. For his own part, he did not believe there was a chance of the Bill being read a first time, still less of its passing; but he would give its promoters a fair opportunity. The position of the Architectural Association was different: its object was primarily education, and was a pure, practical, commonsense, adaptable one to suit the purpose of the times, day by day, and he hoped its members would adhere to the principle of mutual instruction. Mr. Jackson had, he thought, said in a scholarly way that they must not let architecture, as an art, die out. The question was whether the time had not arisen for the formation of the nucleus of a new body of artist-architects elected by artist-architects, not, however, in connection with the Royal Academy, for that was hopeless, but in the profession itself.

Mr. Arthur Cates had listened with great interest to Mr. Jackson's admirable paper, although its author had made therein an onslaught upon what was very dear to him—the Institute examination. Nothing could be more fatal to their prospects than would be an examination conducted on the principle of that of the Civil Survice, and which, instead of inducing students to study, led them to cram to satisfy examiners. The Institute examination, although not as yet a triumphant success, had been acknowledged to have been of great practical benefit to those who prepared for and passed it. This examination met with much opposition at first, but the views of architects had advanced of late years, and at the last conference all seemed to be in favour of the principle. The aim of its promoters was that the architectural pupil should from the first be encouraged to study for his profession, and that his progress and accuracy should be tested by questions. Mr. Jackson had taken a very high standard of an architect's power, which he was entitled to do by his own attainments, but which few others could reach. It was the misfortune of the architectural student that his preliminary education, even at public schools, was miserably imperfect and inadequate, and he and others therefore hoped that the Institute would establish, in addition to the present compulsory examination, preliminary and intermediate ones. It would be desirable in many ways that provincial societies should be affiliated to the Association, binding young architects in one league throughout the country, and leading up to the Institute examinations.

Mr. Cole A. Adams proposed a vote of thanks to Mr. Jackson, remarking that he should have preferred to have heard him lecture on another subject, for he ventured to think the one chosen was hardly the one to bring before a body of students banded together for mutual instruction, but savoured too much of high politics. He was surprised to hear Mr. Jackson, in this year of grace, attempt to throw cold water on an architectural examination, for although all agreed that it was impossible to test acquirements in art, still art represented but one side only of the profession. Any test of constructural knowledge was of great importance to the architect, and one which was paralleled by the examinations existing in all other learned professions. He did not believe that preparations for examinations would unfavourably affect a man's artistic capabilities. It would be an insult to suppose that the distinguished gentlemen Mr. Jackson had mentioned would have failed to pass the Institute examination. He hoped that after what had fallen from all speakers that evening, Mr. Jackson would modify his views. The cry for the abolition of examinations might be expected from some young students, but not from gentlemen of Mr. Jackson's standing in the profession.

Mr. Edgar Farman did not concur with the last speaker in deprecating the subject chosen by Mr. Jackson. The question of closing the profession vitally concerned students, and no better or more important topic could have been selected.

The President remarked that, in his opinion, Mr. Jackson had done students a very great service in bringing the question forward. He agreed with him thus far, that an examination should be regarded as a means, and not as the end, of preparation and study. The late Mr. Street was at one time strongly opposed to the voluntary examination; but before his death his views changed, and in later years he held that it was a very good thing for students. It was not requisite for gentlemen like Mr. Jackson; but many students received no professional instruction at all, and the only way in which the use a student made of his opportunities could be tested was by an examination. The fact that under the compulsory examination ten times as many candidates presented themselves as under the voluntary system showed that it had not been a failure, although he should like to see the numbers largely increased. We had, as Mr. Jackson remarked, district surveyors to look after the safety of our buildings in the Metropolis; but how could it be ascertained if they were qualified to discharge their duties if they were not tested by examination, and ought not this system to be extended all over the kingdom? As to Registration, he concurred with Professor Kerr that he did not see any likelihood of the Bill passing, but this was a question of high politics into which he would not go.

The vote of thanks having been passed by acclamation,

Mr. Jackson replied. He observed that registration and high architectural politics were not the subjects he should have liked to talk upon that evening, for that Association was not quite the right body in which to discuss those matters. At the same time, it was important for the younger men of the profession to consider whether they would make architecture a close profession, or whether they would retain their liberty; and it was desirable that they should be prepared for the question when it came practically before them. Many points in the paper had been criticised; but one had not been touched on, and that was that any scheme of registration would bind architecture into a close profession, and any Act could only have the effect of preventing builders and others from calling themselves "architects," and they would, in fact, do the same work as now, but only refrain from entitling themselves architects. The Registration Bill would have the effect of making three classes—artist-architects, registered architects, and mere builders. Each class would go their separate way; the mere builders would not suffer, but he believed the better men would. It had been misinterpreted by some, but he placed the utmost value on sound and good construction. The progress of architecture would depend on the increased knowledge of construction, and as time went on he believed new ideas would arise in the minds of architects, and thus a new style or styles would be evolved. It had been urged that, although metropolitan district surveyors were well qualified, provincial surveyors were not so well informed; but the reason for this was that the better class of men would not take such places because it would not be worth their while, and he did not see how any scheme of examination or registration would improve the remuneration of those officials. One fatal objection to the proposals was that there could be set no fixed standard of examination. His remark that the true friends of the architect were the painter and sculptor had been criticised, but he meant to show that the kind of study to which the architect should devote himself was the fine arts, and not the mere work of the engineer or surveyor. The architect's training ought to be artistic, and in sympathy with the allied arts.

A committee of the City Court of Common Council has recommended that the salary of Mr. Andrew Murray, principal assistant in the architects department be raised from £600 to £800 per annum; and that of Mr. T. Baker, officer for surveying the City Lands and Bridge House Estates, from £500 to £550.

THE PROPOSAL TO MAKE ARCHITECTURE A CLOSE PROFESSION BY IMPOSING THE TEST OF EXAMINATION AND REGISTRATION.*

IT is obvious that so sweeping a revolution as that by which what is now a free and liberal art, to the pleasures and honours of which all may aspire who can obtain employment, would be converted into a close profession like law, physic, and divinity, to which admission could only be obtained by apprenticeship, payment of fees, examination, and diploma, could not be effected without influencing for good or for evil the progress of architecture in the kingdom. It is, therefore, a matter which ought to be thoroughly considered in all its bearings, and from all points of view, both by those who follow architecture as a profession, and by all others outside our ranks who value the progress of art among us. Nothing could be more disastrous than that such a radical measure should be hurried through Parliament and become law without any real certainty that it is desired by the public, or even by the whole body of architects; without any clear prospect that it would help to improve the architecture of the day, or even that it would not, on the contrary, fatally injure it; without due consideration for the case of those on whom the new restrictions would press with undeserved hardship; and, above all, without proper intelligence of the undoubted blessings of liberty from State or bureaucratic control which we should sacrifice. This thorough and impartial consideration the proposition has never yet received. The advocates of the measure have had their say, and have probably said all that is to be said on their side of the question. Those who object to it have been generally silent; the success of the scheme seemed to them unlikely, and the attempt to carry it out not dangerous; and they have consequently turned away with a feeling of security from the discussion of a question which, while it remained a mere question, was uninteresting to them. The time has, however, arrived when their views ought to be known, and the arguments against the proposed change ought to be listened to with equal attention to that which those of their opponents have received. It is for this reason, therefore, that I have chosen as my subject to-night "The Proposal to Make Architecture a Close Profession by Imposing the Test of Examination and Registration." It seemed to me also that the discussion which I wish to provoke would, with special propriety, be begun by one, like myself, who is not a member of the Institute or any other architectural society, and who may therefore be regarded as in a special way able to look at the matter impartially. The history of the scheme and its growth from a mere speculative idea into the concrete form of a Bill, which it was sought to bring into Parliament last session, is given briefly in the *Journal of Proceedings* of the Royal Institute of British Architects for November last. From that account it appears that the Council of that Society for 1859-60 reported that "the establishment of a system of compulsory examination, extended to all architects, whether members or not of this Institute, was considered desirable." The first step taken towards this end was the establishment of voluntary examinations of candidates for admission to the Institute, which, after some twenty years, became compulsory. The further extension of this examination is now seriously contemplated, and Mr. Connon, the author of a paper in the Journal I have just cited, says that "should compulsory registration become an accomplished fact, the registering and examining authority should alike be vested in the Institute." Meanwhile, however, in the absence of any sort of coercion, it would appear from the same account that these examinations have not been attended by a great measure of success. From 1861-81, while the examinations were voluntary, the average number of candidates who passed annually was less than three; while, since 1882, when the examination for admission to the Society became compulsory, the number has risen only to twenty or thirty, although, according to one statement, no less than four hundred students, on an average,

* A Paper by Mr. T. Graham Jackson, M.A., read at the Architectural Association meeting, at 9, Conduit-street, on Friday, December 16, 1887.

enter the profession yearly. It is clear, therefore, that we are very far from the state of things contemplated by Mr. Connon under which the Institute would hold the keys of admission to the profession. As a step towards the attainment of that object, it is now proposed that all the local architectural societies in the kingdom should accept the Institute as a common head, to which they should be affiliated, so that the parent society should stand to architects in the same relation as the Incorporated Law Society to solicitors and attorneys. But in spite of the analogy, this dignified position will not, it seems, be willingly accorded to the Institute by all those who promote compulsory registration, and it is from the dissentients that the first tangible scheme for closing the architectural profession has seen the light in the form of a Parliamentary Bill. Whether if registration were carried the Institute would have the management of it or not is unnecessary to discuss here. I should myself agree with Mr. Connon that it would be the natural and most convenient plan; but this is only a matter of detail, and I wish to-night to confine myself to principles. Setting aside this point, the Bill, of which I dare say most of those in the room have seen an abstract, may be taken to give correctly in the main the nature and scope of the restrictions which it is desired to place on the pursuit of our craft. I propose to examine them in detail. The Bill calls itself "The Architects and Engineers Act," but it includes surveyors also within its jurisdiction, and its object is to combine architects, civil engineers, and surveyors — surely a strangely heterogeneous assembly—into a close profession of which the members are to be registered after a qualifying examination, and, of course, payment of certain fees. After a certain date it is proposed that any unregistered person calling himself an architect shall be fined £20 for the first and £50 for each subsequent offence; that no public body shall give him any appointment; that his certificate shall have no legal value, and that he is to have no *locus standi* in a court of law for recovery of his professional charges. The only way to registration is to be in the first place by apprenticeship to a registered architect for a term in general of five years, and afterwards by examination. The term of apprenticeship is reduced to two years in the case of assistants of five years' standing and students who have passed the examination of the Institute or others like it; while assistants of eight years' standing are excused the examination, though one reads with surprise that even they are expected to serve an apprenticeship of two years beyond that time. Such is the outline of the Bill, which may be summed up in three words: registration, to which the avenue is by apprenticeship and examination. Looking more closely at the details of the Bill one cannot but be struck by the unequal measure meted out to apprenticed pupils and assistants. The articled pupil may present himself for examination after five years' pupilage, but the salaried assistant, after serving five years, must undergo two more as a pupil before he can do so. Now it is likely that before he became an assistant he had been some years learning his business in an inferior capacity, so that probably he would have undergone a probation of nine or ten years before, in the opinion of the framers of the Bill, he was qualified to offer himself for examination. But during these five years the assistant is at least as likely as not to have made better use of his time than the pupil, and it is simply unjust that the man who can afford to pay a premium should be floated into the profession at the end of the time, while, from want of a golden key, his poorer companion has to go to school again for two years more. This is a hard case enough, but what must we say to that of the assistant who is to be subjected to two years' apprenticeship after eight years of service as a draughtsman, which probably implies twelve years or more of training for a profession to which the man with a premium in his hand may obtain admission after five years or less? If the final qualification is to be by examination, what need is there for the further qualification of apprenticeship? If an assistant or any one else can pass the examination, that ought to be enough. But this evidently is not the intention of the Bill, which proposes to adopt the restrictions of the old trade guilds and modern trade unions. Like them, it makes apprenticeship the only door of entrance, and as no architect in his senses would take pupils without a premium, their services being of little or no use even at the end of their term, the result would be that there would be fewer architects to share the same amount of work, and that poor men, however well qualified, would be left on the outside of the door, while a golden shower of premiums would fall on those who are on the right side of it. As the same fortunate persons are to have the sole right to hold public appointments, it is easy to see who would be the gainers and who the losers by the new state of things. Although the Bill professes to be drawn in the public interest, it is not our fault if it awakens that incurable suspicion with which we regard those who propose that certain privileges and advantages should be conferred on them because it will be for the public good that they should enjoy them. The preamble of the Bill, however, boldly takes its stand on the ground of public interest. It runs thus:—"Whereas it is expedient that persons requiring professional aid in architecture, civil engineering, or surveying, should be enabled to distinguish qualified from unqualified practitioners, be it therefore enacted," &c. This beginning would naturally lead one to suppose that the Bill emanated from the public, anxious to protect itself from incompetent practitioners. Nothing, however, can be further from the fact. The scheme for closing the profession, and the Bill, which is the first outcome of it, are the offspring of architects; they come from within the profession itself and not from without, and this alone is enough to justify the outside public in regarding it with suspicion. The general body of mankind is, in fact, wholly in the dark about us; they neither know nor care whether we are organised into a close profession or not. I have even heard it said that nineteen men out of twenty, in a mixed company, if questioned on the subject, would be obliged to confess that they had never even heard of the Institute, a statement so nearly, if I may say so, bordering on profanity, that I should hesitate to repeat it had I not heard it from the lips of a member of the Council of that respected body. Nothing can be more complete than the indifference of the outside world to these plans for revolutionising our condition, except the ignorance of them. There has not been the least sign that any one outside our own ranks is otherwise than satisfied with things as they are, unless it be Lord Grimthorpe, who wrote to the *Times* approving the idea of examination, but saying at the same time that there was nobody among us fit to be examiner. To his support, such as it is, the promoters of the Bill are, so far as I am concerned, heartily welcome; but with this solitary exception, I know of no instance in which the public have given any sign that they require the kind of protection the Bill offers them; nor do I believe that if they had it they would attach the least importance to it. Had it been otherwise, surely the tentative and imperfect tests of qualification, which have been afforded by the examinations of the Institute, would have attracted some attention. But who can recall an instance in which membership or non-membership of that or any other architectural society told to an architect's advantage or disadvantage? What employer ever troubled himself to inquire how many and what capital letters the architect whom he thought of employing could write after his name? On the contrary, it is notorious that an architect may reach the highest grade among his brethren, and, in the estimation of the outside world, without being a member of any architectural society, in proof of which we need look no further than the list of architectural members of the Royal Academy. Obviously, the public are wise enough to trust rather to their own eyes than to those of other people; they are content to judge architects as they do painters and sculptors by their works, and they find in them a better guarantee for good workmanship than would be afforded by any diploma or registered certificate of competency. As to the protection against bad work which it is pretended the Bill would give, the public have already taken the matter into their own hands without any aid from us, by erecting an elaborate machinery of local boards, sanitary authorities, and district surveyors. If this machinery is properly worked, unwholesome and unsubstantial building ought to be impossible, and if bad work does manage to pass through such a sieve it would probably pass through any other that could be devised. If the surveyor does his business it is impossible for drains and soil pipes to convey sewer gas into houses, or for the construction, so far as the plans go, to be insecure, and any subsequent failure must be the result of bad workmanship or wilful negligence on the part of the architect or builder in carrying out the work. Against negligence, of course, no diploma is any protection. Whatever certificates of competency an architect may have it will not be enough that he should know how things ought to be done; the public will not rest satisfied with that, but will insist on seeing that he does it. No one can seriously believe that they will dismiss their local surveyors and shut up their Building Acts and By-laws as unnecessary when the world is supplied with a duly certified and registered body of architects. The regenerate architect, if ever he comes into being, will have to pass local boards and their surveyors just as we unregenerates have to do, and he will be very sanguine if he supposes his diploma will be of any assistance to him or will be regarded by the outside world as affording any security which would enable them to dispense with that of the Local Government Act. So far as public security goes, the proposed measure would add nothing to it; the present machinery is sufficient if properly administered, and, if necessary, its efficiency can be increased and its powers enlarged. Society may safely be left to take care of itself in this respect, and it is certainly no business of ours to undertake to defend it against ourselves. In support of the scheme for closing our profession a great point is made of the analogy of other professions which are already closed. In the paper by Mr. Connon, to which I have already referred, we read: "The demand is no new thing. It has already been granted by the State to the clergy of the Established Church, to military and naval officers, to members of the Civil Service, to physicians, surgeons, and apothecaries, to solicitors and barristers, to chemists and druggists, to dentists and veterinary surgeons, to metropolitan surveyors, to colliery managers, to certified teachers, to ships' captains and mates, and to steamship engineers." But the analogy sought to be drawn between these professions and our own craft is fallacious. Many of them have inherited their privileges and monopolies either from trade guilds and mysteries of the Middle Ages or from ecclesiastical usurpation, and cannot be said ever to have received them directly from the State. Others, again, like doctors and chemists, have to deal with matters of instant life and death, and it is clear that we have a right to feel sure that the man who serves us knows the difference between Epsom salts and oxalic acid. With a still larger number of cases, such as those of officers in the Army and Navy or the Civil Service, District Surveyors, and certificated teachers, we have absolutely no analogy at all, for all these persons are public servants paid by the State, and the public which pays has, therefore, a right to be assured that they are worth their wages before it engages them. In our case there is nothing parallel to this, for the State certainly does not engage to find a practice for those of us who prove, by examination, that we are competent to undertake it. Neither is our case analogous to that of the Church. The established clergy enjoy emoluments and immunities at the public expense, and some of their acts have a certain legal value. It is evidently only in virtue of these endowments and official duties that they are under State control, for in the case of other denominations which enjoy no such privileges there is no State control whatever, and anyone who pleases is at liberty to undertake the office of minister without incurring any pains and penalties. So also in the case of certificated teachers, the Government interferes only where there is a question of receiving a grant of public money. Schools that receive no Government aid may employ uncertificated teachers if they please. The analogy attempted to be drawn between these cases and our own is entirely fallacious, but even if there were anything in it it would not be worth much as an argument unless we are prepared to invite the State to play a paternal part and close every profession that is now

open for fear an innocent public should be imposed upon by incompetent professional men. But it is time to point out that the Bill offers no sort of protection against the worst kind of building that goes on in our midst. It only aims at preventing people who do not know how to build calling themselves architects, a matter which need not trouble us very much, and it leaves the "jerry-builder" unharmed so long as he does not offend our respectability by ranking himself as one of us. There are, of course, bad architects in the world, but there are few of them who do not know how to build houses that will stand, and be wholesome to live in. It is not, so far as I have observed, in their buildings that the evils occur which are generally complained of. I remember a case where, after a family had lived a few days in a new house, all the drains were mysteriously choked up, and where, on examination, it was found that the leaden soil-pipe was carried into the ground and the end turned up and closed without any pipe-drain from it at all; but this house was one of a dozen or so built by a speculative builder without an architect. I remember another case in the present year where a house fell down, which proved to have been designed, not by an architect, but by a plumber. And let it be observed that with cases like these no Registration Bill would interfere. Let the builder call himself a builder, and the plumber a plumber, and they would incur no penalty. If they avoided the sounding title of architect they might go on designing and building these filthy and insecure habitations as long as the district surveyor let them. To make the Registration Bill efficacious it would be necessary to insist on the employment of a registered architect on every building that is put up. This would be protection indeed with a vengeance, but though it is difficult to regard it seriously, I observe in the same journal to which I have more than once alluded that one gentleman actually suggests that local authorities should be required to condemn plans prepared by any other than a properly-qualified architect. Here at last we seem to have the *reductio ad absurdum* of the whole scheme. It begins by shutting the door against all but those who can afford to pay the premium of apprenticeship, and having thus limited the number of architects to a fortunate few, it proceeds to sweep into their net all the building operations of the kingdom. Surely the wildest imagination can go no further, and may well rest satisfied with the glorious prospect of such a good time to come. Before leaving this branch of the subject it is necessary to notice one strange argument. I must, I fear, call it a selfish argument in favour of making architecture a close profession. It is supposed that in some mysterious way the social status, as it is called, of the profession would be thereby raised—an idea which embodies a sort of complaint that architects are not thought of as highly as they deserve. Now, even if it were true, I must object that this is an unworthy argument, which we ought to be the last persons to employ. But I believe the complaint to be wholly unfounded; there seldom was a time when the calling of an architect stood higher in public estimation—certainly there never was a time when so many young men of higher culture and superior position flocked into it. Among people of educated taste it seems to me that architects and their works receive quite as much attention and commendation as they deserve; and I am far more afraid that our profession will become fashionable than that it will be despised. But however this may be, it is certain that it will gain no additional respectability from the Registration Bill, nor will those who now think themselves too low on the social ladder find themselves raised by a single step if that Bill becomes law. Setting aside, however, this Parliament-made gentility, which may be left to dazzle those who fancy it, and the more solid advantages of loaves and fishes, which the Bill is to confer on the new profession—setting aside, in fact, architects themselves altogether—let us turn to the far more important question of what the revolution will do for architecture. The object which its promoters have in view is thus stated by Mr. Connon. He says, "That the largest proportion of the profession are as well educated and as highly trained as they would be under an Act of Registration is probably true. What is sought is the exclusion of those who sink far below the standard which should be the lowest level of fitness." It is intended, therefore, that the unworthy should be shut out by the test of examination; but nothing is said of the exclusion of those who, for want of means, are unable to undergo the compulsory apprenticeship which the Bill requires, whether they are able to pass the test of examination or not. This condition would have the effect of narrowing the field to those who can afford to pay for entering it, and there would certainly be no gain to architecture in this. Everyone must know of cases of men who have risen from assistants into architects and done excellent work, though they have never gone through a regular pupilage, and who would have been lost to the profession had the proposed Bill been in force. But we are told, further, "that the profession of architecture would benefit greatly by the universal education of its followers which would follow from legal registration." And this brings me to what is, perhaps, the most misleading of fallacies, and one which seems to underlie all that has been written and said on the side of registration—namely, the confusion of examination with education. Now, there are several ways of employing examination. Students may be examined by their teachers with a view of seeing whether they have properly understood what they have been told, and of correcting any misapprehensions they may have fallen into. That kind of examination is itself a means of education, and is both useful and necessary to the student, who might otherwise be a long while in discovering his mistakes. It is obvious, however, that the examination for admission to a profession is not of this kind. There is another kind of examination like that at our old Universities, which are both teaching and examining bodies, where the teachers are also the examiners, and do in a manner review in the University schools the result of the University curriculum. This kind of examination is less educational than the other, and many University teachers of the present day advocate the abolition of University examinations as the best thing that could happen for University education. Clearly, however, the examinations at Oxford and Cambridge have little in common with what we are considering. The third type of examination is that for admission to the public services by examiners who have had nothing to do with the education of the candidates, but simply admit or reject them according to their success in answering a certain number of questions. This kind of examination has been adopted in dealing with public appointments, less for the sake of guaranteeing the efficiency of the public servants than for satisfying the people that Government patronage is fairly and impartially distributed. Such examinations are perhaps necessary, but, if so, they are necessary evils; it is obvious they are of no educational value to the student like the first kind, nor do they enable him to gauge his own knowledge like the second kind; they do not follow at the end of a long course of study directed by the same body which conducts the examination, and which therefore knows how to bring out and sift the knowledge of the candidates; they must therefore be general and superficial, taxing the memory rather than the intellect, and they often degenerate into something like a game of skill between the examiner and his victim, in which luck and accident play not the least part. It is to this last class of examinations that ours would inevitably belong, and I can see nothing more likely to divert the studies of architectural students into unprofitable channels, or to put before them a wrong object for their efforts. To work with the object of passing a board of examiners is a very different thing from working to acquire knowledge. The object is not education, but a diploma; and the man will read, not to clear up his own ignorance and fill up the gaps in his knowledge, but to prepare himself with such scraps of information as may come in usefully and help him to fill up his examination paper. Cram, with all its hateful parody of real teaching, would become the order of the day. We should have superficial textbooks by the dozen to save the student the trouble of thinking and searching for himself, and to give him just that kind of smattering which would pass muster with the examiners, without planting in his mind any germ that might afterwards grow up into accurate and scientific knowledge. Independence of thought and freedom of research are impossible under such a system, and without these nothing original can ever be produced. The question with the student would be, not "What do I most want to know?" but "What will pay best in the examination?" That this is the result of the system of examination for the public service is too notorious to be questioned; cramming has become a lucrative profession, and has created a special literature of its own, which all sound scholars would wish to put on the fire back. It is only too certain that the same effect would attend the establishment of a qualifying examination for our own calling; it is the merest fallacy to suppose that it would be an educational measure, and its actual result would be that real architectural education, so far from being promoted, would be positively obstructed. But a greater difficulty than ever presents itself when we come to the subjects which intending architects are to take up. A formidable list is given in a collection of papers on education read at the Conference of Architects last summer, for a copy of which I am indebted, I believe, to Mr. Cates. It ranges from mathematics in its highest branches to the history of architecture in all ages and countries, freehand, linear, and perspective drawing, experimental mechanics, heat, optics, acoustics, electricity with laboratory practice in all; then follow chemistry, also with laboratory practice, and languages, either French or German, or both. All this we are told is comprised in the first year's course of an architect's training in America, and we can only wonder at the astounding powers of digestion which an American architect enjoys if he can get any nourishment out of such a surfeit of good things. But the most surprising thing, after all, is that in all this magnificent programme for an architect's studies architecture itself is forgotten. The student may bring up for examination a pitiful smattering of the great sciences I have enumerated, which is all he can hope to acquire in so short a time, and which he will do well to forget as soon as he can for fear it should lead him into danger, and he may show that he knows something of the various styles of architecture of other ages and of all countries, which is, after all, a matter rather of antiquarianism than of art. He can also be examined in the elements of construction; he can be asked how he would lay his drains, how he would warm and ventilate his rooms, how he would roof over an irregular space, how he would construct a vault or a spire or a dome, or any other part of a building. But all this is not architecture; this is but the builder's art. Architecture begins after all that; it assumes that the building is well planned and constructed—*tout cela va sans dire*—and then it steps in and makes it artistic and beautiful. But this is an intangible operation that cannot be brought to the test of examinations; as well might you try to examine painters or sculptors in their arts, and if there is no actual standard by which to try them, neither is there any by which you could try an architectural design or pronounce its author qualified or unqualified to practise. You can examine a candidate in building construction, and if he shows ignorance you can, without fear of contradiction, pronounce him unfit to be an architect on that score; but what examiner would dare to pluck a candidate on the ground that his design was artistically bad? One may easily imagine the outcry that would be made, the prejudices that would be offended, and the battle the examiner would have to fight with men of rival schools. He would be told at once that he had exceeded his powers, and had no right to prevent a man from earning his bread in the profession because his work did not happen to suit an examiner's taste. And the objection would be a very fair one, for architecture can no more be brought to the bar and tried by a fixed code than the other arts, and no board of examiners would ever dare to attempt it. This being so, it follows that any man who passed in building construction and knew how to lay his drains would, under the proposed scheme of registration, be ushered into the world as an architect; and, not only so, but he would receive, as it were, the Government stamp or hall-mark to certify to the world that he was, in every sense of the word, a genuine architect, although he might be more incapable

than his own office-boy of producing an architectural design that was decently tolerable to an artist's eye. If this is what is meant by raising the status of the profession, we may, in all conscience, pray heartily to be left where we are. It is, no doubt, the impossibility of applying the test of examination to the artistic side of our work that has driven the advocates of higher examination for architects to attach an exaggerated importance to the scientific side. After reading the astounding list of sciences that we are invited to learn, one is reminded, with Mr. Aitchison, of the knight in "Wonderland," who was equipped with a mousetrap lest he should sleep at a place overrun with mice, and a beehive lest he should meet a swarm of bees in his travels. We architects have no occasion to enter the laboratory of the chemist or the physicist; the little knowledge we might pick up there would be worse than useless, and in any real difficulty we should be forced, after all, to rely on the advice of the chemist or physicist himself. We need know no more about optics than the simple laws of perspective. In questions of heat and electricity we must be guided by the advice of specialists, and it is enough for us to know to whom to go, and such general facts about those matters as lie within the reach of every layman. Of mathematics, a very little indeed will be found practically sufficient, and I fail to see in what an architect would be the better for knowing much of botany or even geology. In all these things we must, like other people, be content to accept the result of other men's studies and to believe those who have made these sciences their life's work. Life is not long enough for all this. No architect ever did or ever will make himself master of such a mass of scientific matter, and if we merely dabble in it we shall only be wasting our time, or, at the best, acquiring that little knowledge which is proverbially dangerous. The main point which I want to make clear to-night is that the examination test to which it is proposed architects should be submitted cannot be applied to the artistic, but only to the constructional qualifications of the candidates; that is to say, not all to their skill in architecture, but only to their knowledge of building. Consequently, as it admits men to our profession on mechanical grounds alone, it lowers architecture to the level of a mechanical art, and the change, if it ever came to pass, could not fail to be detrimental to the pursuit of architecture as a fine art. It would open still wider the breach which unfortunately divides it from the sister arts of painting and sculpture, and in so doing would condemn it to a lifeless monotony and hopeless unprogressiveness. It is, believe me, in the extending of an architect's skill into the decorative arts, in the closer union of himself with other artists, in the cultivation of the power to ornament his own handiwork, and so of introducing consistency and harmony into what otherwise is a mere jangle of jarring notes struck by unsympathetic hands, that the hope of architecture among us lies. The true brethren of the architect are the painter and the sculptor, not the surveyor and the engineer, and those are no true friends of our art who would try to persuade us otherwise. Let it not, however, be supposed that I undervalue any plan for protecting the public against bad building. Against bad architecture nothing can protect them except their own good taste, but against bad building it is possible to erect safeguards. This, however, I repeat, has already been done by a legal machinery independent of us, which renders any safeguard of our own devising superfluous. If it be thought that the present system of supervision by local boards is inefficient, that is a matter for the public to see to; it may easily be made more stringent, and its area of jurisdiction may be widened so as to cover the country as well as the towns. So far from wishing to supersede the present system, I would see it improved; in particular I should like to see the office of local surveyor in small country towns undertaken by persons of higher qualifications, and in London and the larger towns I would have the number of district surveyors increased till they were able to exercise such supervision over buildings in progress, that bad construction could not escape detection. Let it not be supposed either that I undervalue the importance of improvement in architectural education; only let it not consist in superficial dabbling in a host of scientific subjects, none of which we shall have time to master, and about which in the end we must take the opinion of experts, but in such matters as really belong to our craft; not in chemical analysis of our building stones, but in practical masonry; not in botanical classification of our timber, but in actual carpentry and joinery; not in the theories of optical science, but in the study of light and shade and perspective effects. A month spent on a building in progress, under the eye of a friendly clerk of works, will be of more use to a student than a year spent in the laboratory of the chemist or the experimental philosopher. It is a piece of training that I always recommend to my own pupils after they have seen something of office work, and I am sure there are few better. Lastly, let me not be supposed to undervalue the constructional part of an architect's work because I say that this part is not architecture, but building. Architecture follows building, and therefore building must precede architecture, and is included within it. There can be no good architecture without good building, and I firmly believe that no man has been, or ever will be, a good architect without being first a good builder. The great masters of old are at least as remarkable for skilful construction as for beautiful design; and it will be admitted that the same is true of the most eminent architects of our own day, who have certainly shown themselves as attentive to strength and convenience as to purely artistic quality in their work. Sir Charles Barry, Mr. Street, and M. Viollet-le-Duc certainly cannot be accused of want of constructive knowledge; no engineer could have more skilfully saved the great central towers of St. Alban's and St. David's from ruin and set them on new and substantial legs again than Sir Gilbert Scott; and I wonder how many of those who boast of their practical knowledge in comparison with those whom they call the "artist architects" would venture to give a lesson in building construction to Mr. Pearson, Mr. Butterfield, Mr. Waterhouse, Mr. Norman Shaw, or Mr. Bodley. There is no more fatal error than to suppose that the two sides of our profession are antagonistic, and nothing can be more injurious to architectural study than to consider the one and ignore the other, as any scheme of examination that can be devised is bound to do. Before we set to work on any revolutionary plans and upset our present constitution, let us consider how architecture in England compares with that of other countries where it enjoys State protection and control, and where something like State education is provided for its students. I quote from a paper read at the late Conference by Mr. Phené Spiers, whose knowledge of the training of architects both in England and France entitles him to speak with authority. He says:—"There is no national school of architecture here; there is no traditional teaching of 200 years as in France; so far as architectural design is concerned I am inclined to think this is a positive advantage, and that in consequence English architecture is at present in a much more healthy state than that either of France or Germany. In ecclesiastical architecture it has always been so, and of late the progress made in domestic and town architecture has been such as to outstrip entirely our foreign contemporaries." One may without vanity accept this picture as a true one. Travel where one may on the Continent one cannot but be struck by a certain tameness and hardness, and a cast-iron monotony that characterises even the best work one sees. Perhaps our worst English work is worse than anything we see abroad; but our best is incomparably better. It bears signs of life and progress and of wholesome originality that are wanting elsewhere; and foreign architects themselves now look on English architecture and architects with a respect unknown before. The cause of this may be found in our freedom from the shackles of State control on the one hand, and the enervating influence of State protection on the other. Liberty and free trade are necessary to the growth of art, and any measure for controlling or regulating the pursuit of architecture stifles that element which belongs to art, and brings into prominence that which is purely mechanical. In Italy and Austria the architect is a man who has failed to qualify himself as an engineer. It is the engineer who restores ancient buildings and builds new ones, while the architect figures as little better than a clerk of works. Can anything more expressly illustrate the tendency of legislative interference to eliminate that element which constitutes the difference between a mechanical and a fine art? Such would be inevitably our fate if architecture were made a close profession. Hitherto we have been free; in our freedom lies our hope of the future; our true wisdom lies in guarding it jealously against State interference and bureaucratic control. If engineers and surveyors choose to put the chain round their necks it is no affair of ours; but let us, at all events, beware how we sacrifice that proud independence under which we have won for our country a foremost place in the ranks of art with the promise of still greater achievement in the future.

SCHOOLS FROM AN ARCHITECT'S POINT OF VIEW.

At the annual meeting of the Worcestershire Association of Church School Managers and Teachers, held at the Guildhall, Worcester, on Saturday, a paper on the above subject was read by Mr. Ernest Day, M.S.A., the Sheriff of Worcester. Mr. Day pointed out that a good plan for boys and girls' schools might be carried out by providing a lofty central hall or schoolroom, communicating with classrooms for boys on the ground floor, and over these rooms classrooms for girls communicating with a gallery running round the central hall, the girls of course having separate approaches, but so arranged that they might have access to the central hall to mass the whole school as occasion might require. This plan was on the lines of Sir Titus Salt's schools at Saltaire; but he thought it questionable if the Education Department would sanction such a scheme. His remarks on school planning would have regard more particularly to elementary schools, and he would endeavour to furnish a few particulars which appeared to him essential points to keep in view. The site should be selected in as central a position as possible in the district where school accommodation was needed. It should, if practicable, be of ample size to afford good playgrounds and to secure plenty of light and a good circulation of air round the buildings for the purposes of ventilation. Good-sized, properly-paved playgrounds were very desirable in order that children might enjoy reasonable recreation which added much to their physical strength and greatly augmented their mental faculties. The general arrangement of each school must depend upon the number and classes of children; if a mixed school of say, 622 children, he should apportion as follows: allow for boys 171, girls 171, infants 280, and generally a portion of about one-third class accommodation for boys and girls in each case, although where funds allowed he preferred providing a general room and classroom to accommodate respectively all the children in the boys and girls' schools. The floor area should not be less than 10ft. per child, except for infants, which would suffice at 8ft., and the cubical air space for each boy and girl should be 200ft., and each infant 130, although the Department would sanction a much lower standard. The partitions or doors between classrooms and the main room should be of half glass, and so placed as to allow the master or mistress to secure supervision of the entire school. The design of school buildings must of necessity vary according to outlay and local materials; but speaking generally the aim should be to impart some distinct architectural features. As to fittings, stools with inclined seats should be provided for the teachers. They would give a slight rest to the back, and in case a teacher was standing for any length of time would afford considerable relief. With regard to the heating of schools, open fireplaces were in all cases an advantage, as they looked cheerful and served as good exhaust ventilators. It might be found, however, that to warm a school exclusively with open fires was insufficient during very cold weather, or involved too much fuel, time, dirt, and attention; and in such a case he should recommend a hot-water apparatus, the pipes being so arranged as to distribute the heat as equally as possible, and care



being taken to secure a sufficient supply of fresh air. If possible, even with a hot-water apparatus, one fireplace should be used in the large rooms. Proceeding to deal with the question of ventilation, the speaker said a large portion of the upper part of each window should be made to open, and there should be vertical air pipes, or shafts fitted with flaps or valves for the admission of fresh air. On the apices of roofs—he strongly recommended for all schools open roofs, ceiled to the underside of the rafters—extract ventilators should be placed. In the discussion which followed, the Rev. W. R. Carr expressed disapproval of Mr. Day's views as to the advantage of open grates, nor did he think that stools should be provided for teachers; but the Diocesan Inspector, the Rev. C. T. Hunt, on the other hand, approved of the provision of stools for teachers, and, like Mr. Day, he also admired open fires. If the general lines of Mr. Day's paper had been acted upon by builders of schools forty or fifty years ago it would have been much better for everybody. One of the great drawbacks to church schools was the wretched design and arrangement of some of them, and it was marvellous what good work was done in spite of such miserable surroundings and conditions. Mr. Edgington considered that a teacher could not carry out work properly from them; and while open grates had advantages in getting rid of bad air, but they did not warm a school sufficiently. Mr. Houghton did not think open fires answered except in narrow rooms. As to stools for teachers, there were times when their use might be permitted. The Sheriff, in replying, said he thought his suggestion as to stools had been misconceived. He did not mean tall stools on which teachers would sit, but something inclined at a considerable angle which they could rest against without sitting down. His opinion as to the desirability of providing such means of rest was strongly confirmed by medical men. As to the allowance of air space per child, in the London board schools 130 cubical feet was the minimum, but that was insufficient. He considered 200 cubical feet for boys and girls was something like a reasonable allowance; and he had even allowed in schools for 230 cubical feet.

ST. CATHERINE'S, BROMLEY, KENT.

THIS house was erected for Mr. J. E. Walker, in the Holwood-road, Bromley, Kent, on an elevated gravel site, commanding picturesque views of the surrounding country, the materials used being stock bricks, relieved by red-brick plinths, quoins, arches, &c., and moulded red-brick sills and tablets to the windows, and moulded red-brick string at the first-floor level, above which height the brick walls are rendered externally with cement and shingle, roughcast, with fine moulded cement sills, &c., and cove at underside of eaves. The roofs are covered with dark brown tiles, with bright red ridge tiles; all the external woodwork being painted dark oak, excepting the window sashes, which are cream white. The works were carried out by Mr. Crossley, of Bromley, Kent, from the designs, and under the superintendence, of Mr. H. Percy Monckton, A.R.I.B.A., architect, of 32, Walbrook, London, E.C.

ROOF COVERINGS.

IN a recent paper on "Construction of Buildings," the author, an American architect, alludes to the value of porous terracotta sheathing set in lime mortar, and bolted to T-irons, the whole surface covered with pure asphaltum, with roofing prepared paper rolled on while the asphaltum is still hot. The paper then adheres closely, and prevents the passage of moisture or rain. The valleys, hip rolls, gutters, and flashings are proposed to be formed in copper; the whole is then slated, bolted with countersunk heads, and with nuts and washers. Such a roof is found to retain the heat during the cold weather. Few of our roofs are so constructed. Very often the felt sheathing and boarding are omitted, and the only covering is the cold-conducting slates imperfectly laid. The result is disastrous to comfort in a house. The artificial means of heating employed are unavailing in maintaining a comfortable degree of temperature, for the heat is wasted on cold surfaces, which speedily conduct it away. Unfortunately, expense is the chief consideration in building at the present day, and this is the reason why houses are so seldom provided with felt or paper sheathing. In churches, schools, and the better class of residences, the roofs are boarded and felted, adding much to the degree of warmth maintainable, and, we may add, materially saving the fuel required to keep up a desirable temperature. As the warm expired air ascends, it is quickly chilled by a cold roof, and falls to be rebreathed by those in the church or school, thus making ventilation more difficult. Those who contract for warming these buildings appear to lose sight of the roof in their calculations. In determining the loss of heat they adopt certain coefficients for the loss by walls, window surfaces, floors, &c., but omit the heat abstracted by the roof, which is very considerable. We have still to educate the builder in the choice of materials. In this country, exposed to all variations of temperature, the covering of roofs with felt or asphalted material like paper ought to be considered as necessary a precaution as slating it. Our old thatched and tiled houses were far more retentive of warmth than any of the modern slate-covered villas erected round London. The provision of a layer of felt or prepared paper like the "Willesden" below the slating would insure a certain amount of retentiveness and warmth in the rooms of a house that would quickly compensate for the trifling extra cost entailed. In an ordinary roof the cost would not be more than from £4 to £5 to lay the asphalte roofing felt, if we reckon the felt to be 2d. per foot super. It will be probably a long time before the comfort of a house will be thought of sufficient importance to make a building by-law of roof construction; but the architect is certainly justified in adopting everything that can insure the health and comfort of his employer by the employment of reasonable and inexpensive materials.

Mr. John Lowry, the head of the extensive firm of builders and contractors known as John and Wm. Lowry, of Corporation-street, Newcastle, died on the 14th inst., aged 63 years. The funeral took place on Saturday, and was attended by Messrs. W. H. Dunn, G. C. Adamson, G. Connell, and other architects, and very many representatives of the building trades.

CONTENTS.

The Requirements of Public Buildings 923
The Law as to Owners of Dwellings 924
Royal Institute of British Architects 924
Architectural Association 926
Proposal to Make Architecture a Close Profession by Imposing the Test of Examination and Registration 927
Schools from an Architect's Point of View 930
St. Catherine's, Bromley, Kent... 931
Roof Coverings 931
Our Lithographic Illustrations 932
An Ingle Nook 932
Schools of Art... 932
The Relations of Architect, Surveyor, and Builder ... 953
Stratford Co-operative and Industrial Society: Canning Town Branch 954
Student Work at the Institute 954
A Good Wood-Block Flooring 954
Amalgamation of the Bath-Stone Quarrymen 954
Metropolitan Board of Works 955
The Chair of Queen Hatasu... 955
Wayside Notes 955
Building Intelligence 956
Competitions 957
Architectural and Archæological Societies 958
Correspondence 958
Intercommunication 959
Legal Intelligence... 959
Statues, Memorials, &c. 960
Our Office Table 960
Trade News 960
Tenders 961

ILLUSTRATIONS.

THE BISHOP'S THRONE, TRURO CATHEDRAL.—A CATHEDRAL CHURCH.—NEW BANK IN LOMBARD-STREET.—GORDON DWELLINGS, CAMBERWELL. — THE WEST TOWERS, LIEBFRAUEN KIRCHE, HALBERSTADT.—AN INGLE NOOK.

OUR LITHOGRAPHIC ILLUSTRATIONS.

TRURO CATHEDRAL—THE BISHOP'S THRONE.

This is made in Burmese teak, and is a fine structure, with central seat for the bishop, and chaplains' seats on either side. The book-front of the bishop's seat has sculptured figures, representing the Archbishop of Canterbury, the Bishop of London, and the Bishop of Truro. These figures, which are sculptured out of the solid, are in canopied and crocketed niches under the bishop's book-board; the fronts to the chaplains' seats are traceried, canopied, and crocketed. The divisional ends between the book-front of the bishop and the chaplains terminate with poppy heads, with sculptured figures, representing the four great doctors of the Western Church—St. Gregory the Great, St. Jerome, St. Ambrose, and St. Augustine. Below the poppy heads, on the same ends, are sculptured a winged beast and a pelican, symbols of might and love. The two ends of the fronts to chaplains' book-fronts are traceried, and terminate with sculptured poppy heads of animals entwined in each other in combat. The three seats are misereres, divided as stalls, with carved canopies over; that to the bishop's seat is supported on clustered columns. The back of the seat is traceried and sculptured, the central panel having the archbishop's mitre and a shield under the arms of the archbishopric of Canterbury, impaled with those of the present archbishop, Dr. Benson. The panel on the eastern side contains the mitre and arms of the Bishopric of London, impaled with those of Dr. Temple, the present Bishop of London and late Bishop of Exeter, out of which see that of Truro was formed; and the panel on the western side contains the mitre and arms of the Bishopric of Truro, impaled with those of Dr. Wilkinson, the present Bishop of Truro. The ends to the chaplains' seats which run up and support the richly-groined canopies have on their fronts sculptured representations of the Archangels St. Raphael and St. Michael—St. Raphael in armour on the eastern side with a flaming sword in his hand, and St. Michael on the western side in armour, striking a dragon at his feet with a sword. The seats are surmounted by elaborate groined canopies of varied design, and terminating over the bishop's seat with a crocketed spire, round which cluster a forest of pinnacles with flying buttresses. The whole work is sculptured out of the solid wood, and was designed by Mr. J. L. Pearson, R.A., and executed in its entirety by Messrs. Luscombe and Son, of Exeter.

NATIONAL GOLD MEDAL DESIGN FOR A CATHEDRAL.

We published a plan of this cathedral church with a longitudinal section of the design in the Building News for Oct. 21st last, giving at the same time some particulars of the matter. To-day we print the eastern façade of the building showing the choir and chapter-house. The central and western spires also figure in the composition. Mr. Fred. Whitwell, of York, is the author of the design, for which a National Gold Medal was awarded to him by the Science and Art Department.

NEW BANK, LOMBARD-STREET, E.C.

We give an illustration this week of the new banking premises of Messrs. Lloyds, Barnetts, and Bosanquet (Limited), Lombard-street, E.C., which have been erected from designs of Mr. J. A. Chatwood, F.R.I.B.A. An account of this building was given in our issue for April 22 of this year. The lower portion of the façade is of Cornish granite; the upper portion of Portland stone. On the ground floor is a large banking room lighted on three sides; the back portion of the bank is divided by a glazed partition of mahogany into rooms for the managers, waiting rooms, &c. In the basement, which is faced with white glazed bricks, are the usual strong rooms, rooms for the clerks, lavatories, &c. There are offices on the mezzanine floor, looking into banking-room; the board room, &c., are on the one-pair floor looking into Lombard-street. Messrs. Colls and Son, of Moorgate-street, are the contractors.

GORDON DWELLINGS, POUND-ROW, CAMBERWELL.

This block of buildings, situate in Pound-row, Church-street, Camberwell, has been erected by Messrs. Colls and Sons for themselves on ground forming a portion of the Church-street improvement scheme, and purchased from the Metropolitan Board of Works. Built as a commercial speculation, and intended to supply the maximum accommodation at the minimum rent, not much license could be given to the architect, Mr. Ellis Marsland, M.S.A., in the way of architectural effect, although an attempt has been made to relieve somewhat the barrack-like appearance this kind of building is apt to assume. The chief features in the design are the adequate air space with which the building is surrounded, the abundance of light supplied to each room, and the safe exit in case of fire, provided by means of the staircases being detached from the several blocks, and communicating therewith by fireproof galleries and corridors. Each suite of rooms is complete in itself, consisting of living room with kitchener, two or three bedrooms, sink, pantry, w.c., and coal cellar, with adequate laundry accommodation on the roof. The several floors are formed of wood joists filled in with concrete, composed of coke breeze and Portland cement, making practically a fireproof floor. The roofs are formed of the same material, and covered with asphalte, forming an excellent drying ground, and also a space for recreation. The whole buildings are divided into four blocks, containing 125 rooms, and are five stories in height. The sanitary arrangements are in accordance with modern sanitary science, and the water supply is contained in a large tank containing 5,000 gallons, placed on the top of the detached staircase, forming a tower. The top stone (on which are sculptured the arms of the late General Gordon and the present chairman of the Metropolitan Board of Works) was laid by Lord Magheramorne, K.C.B., with all due ceremony, on June 28th, 1885.

WEST TOWERS, LIEBFRAUEN KIRCHE, HALBERSTADT.

Halberstadt, a town of some 30,000 inhabitants, lies within easy distance of Brunswick, on the slope of the Hartz Mountains, and is a most fruitful field for the architectural student in search of the picturesque. It is remarkably rich in half-timber buildings, which display a wonderful variety of outline with detail of a very elaborate character. The Rath-haus is mainly of 15th-century Gothic, with Renaissance additions. The principal ecclesiastical building is the Cathedral of St. Stephen, originally Romanesque, though the greater part has been rebuilt in Decorated Gothic; whilst across the Domplatz is the Romanesque Liebfrauen Kirche, with the very fine towers of the form so generally adopted by the early German architects, shown in the sketch. The church consists of nave with aisles, transepts, and circular-ended chancel; and in addition to the western towers has octagonal towers in the angle of aisles and transepts.

H. H. McC.

AN INGLE NOOK.

This is a room specially fitted up by Messrs. Hindley and Sons at their show-rooms in Oxford-street. The greater part of the furniture, including the panelled wainscot, was enamelled in cream colour. The chair shown was a copy of a Chippendale; the angle cabinet is a pretty example of its type. It will be noticed by many of our readers that the ingle nook was shown at the last Architectural Association *Conversazione* at the Westminster Town Hall.

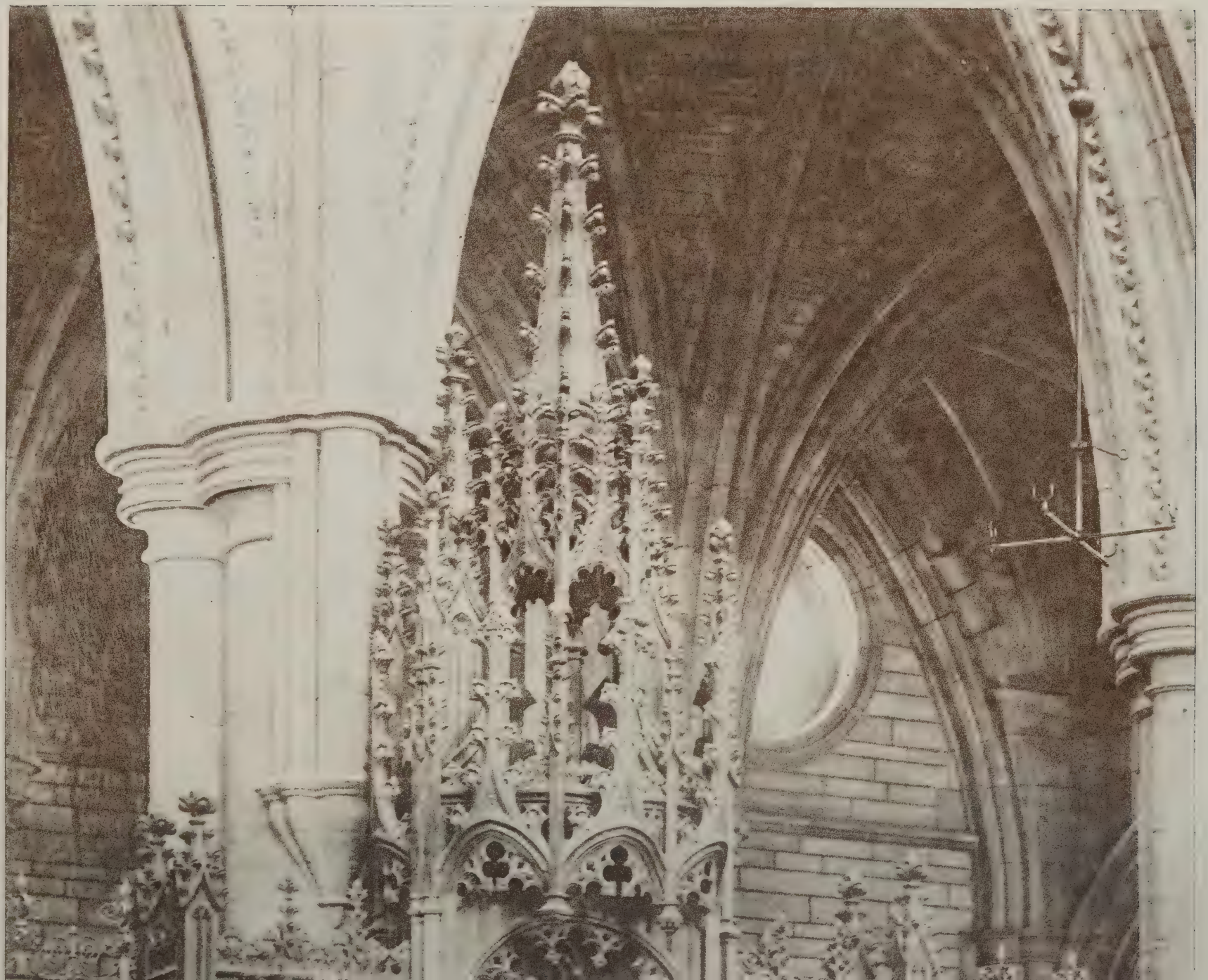
SCHOOLS OF ART.

Leeds.—The annual meeting of the Leeds Schools of Art and Science was held in the Albert Hall on Friday evening. Professor Silvanus P. Thompson (Principal of the City and Guilds of London Institute's Technical College) presided. Mr. A. Stephenson (head master of the Art School) reported that during the past year there were 595 students in attendance. There had been some excellent work done, but the engagement of a special teacher for modelling had not been followed by any adequate result. In the painting classes, though there were one or two failures in minor points, the general standard of the work was not inferior to that of former years. Mr. J. Wertheimer (head master of the School of Science) reported that the results of the work for the session 1886-7 were quite equal to those of preceding years, and there had been several successes in the honour stages, and a large increase in the number of students. By the increased accommodation which would be gained when the new buildings were completed, they hoped to greatly extend and improve their work.

The Female School of Art.—The Countess of Rosebery on Wednesday distributed the prizes to the students of the Royal Female School of Art, in the Freemasons' Hall, Great Queen-street. The annual report stated that the Queen had inspected the drawings sent to her by the students with much satisfaction, and expressed the wish to purchase water-colour drawings by Catherine Howard and Emily Lucy Varley. During the twelve months 171 students received instruction in the various branches of art taught in the School; and on the 9th of April last 2,010 works were forwarded to South Kensington for examination and competition for rewards. Nine national awards were accorded to this school. The chief prize winners were as follows:—Scholarships.—The Gilchrist Educational Trust Scholarship, £50, Ida Marion Kirkpatrick; the Brightwen Scholarship of £10 to Ruth Harman; the Duchess of Westminster's Scholarship of £20 to Edith Harwood; the Clothworkers' Scholarship of £30 to Edith Mary Flack; the Queen's Scholarship of £60 to Edith D'Oyly Rowe; Queen's Gold Medal, for a group of still life painted in water colour, cluster of bananas, grapes, pomegranates, &c., to Catherine Howard, 205, Amherst-road, Hackney. National Queen's Prizes.—Helen Bramwell Norris, Helen Phillips, Florence Annie Shindler, Mary Augusta Spackman, Charlotte Maria Alston. National Bronze Medals.—Ellen Leigh Badcock and Emily Lucy Varley. National Silver Medal.—Catherine Mary Kitson. The Rev. Prebendary Whittington stated that out of the fifteen Gilchrist Scholarships that had been awarded, thirteen had been gained by the students of the Royal Female School of Art.

Internal alterations have just been completed at All Saints' Church, Southampton. The old pulpit, reading-desk, part of the north gallery, and the seats across the eastern portion of the church were removed, and the space thus cleared is now occupied by a chancel, with the organ rebuilt on the north side, and vestries on the south side. The chancel is separated from the nave by an alabaster screen with panels of inlaid marbles, surmounted on either side of the central opening by two seven-branch gas standards, and on the north side by an alabaster pulpit with marble pillars. The chancel has been furnished with oak credence table and stalls. The works have been carried out from the designs of Mr. Mardon Mowbray, of Oxford.

In a competition for heating and ventilating the town hall at Congleton, the plans of Messrs. Sugden and Sons, of Leek, have been awarded the first premium by the corporation.





"PHOTO-TINT," by James Akerman, 6, Queen Square, London, W.C.

BISHOPS · THRONE · TRURO · CATHEDRAL · J·L·PEARSON·R·A·ARCHT

MADE BY MESSRS LUSCOMBE·EXETER

Gordon Dwellings.
Pound Row. Camberwell.
For
Messrs. Colls & Sons.

Ellis Marsland M.S.A. Archt



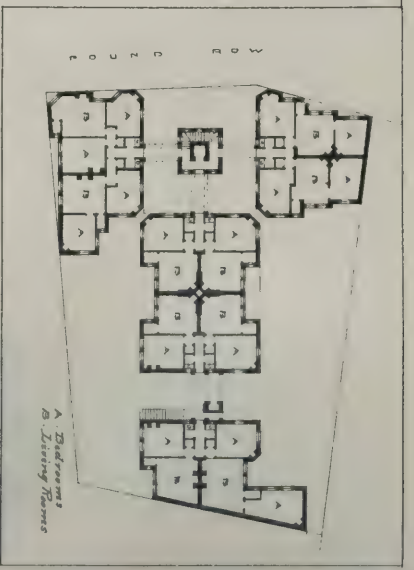


Photo Lithographed & Printed by James Ackerman, 6, Queen Square, W.C.

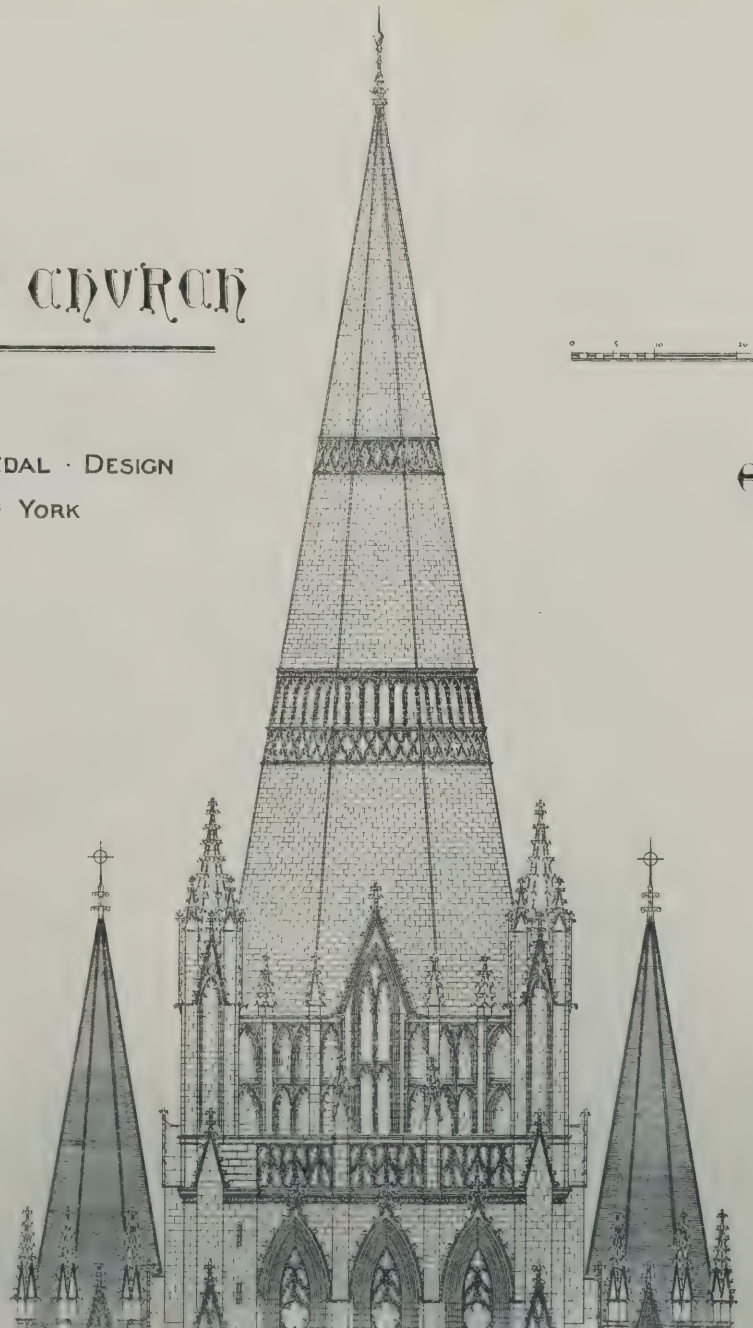
A CATHEDRAL CHURCH

NATIONAL · GOLD · MEDAL · DESIGN

BY · FRED · WHITWELL · YORK

Scale of Feet

EAST ELEVATION



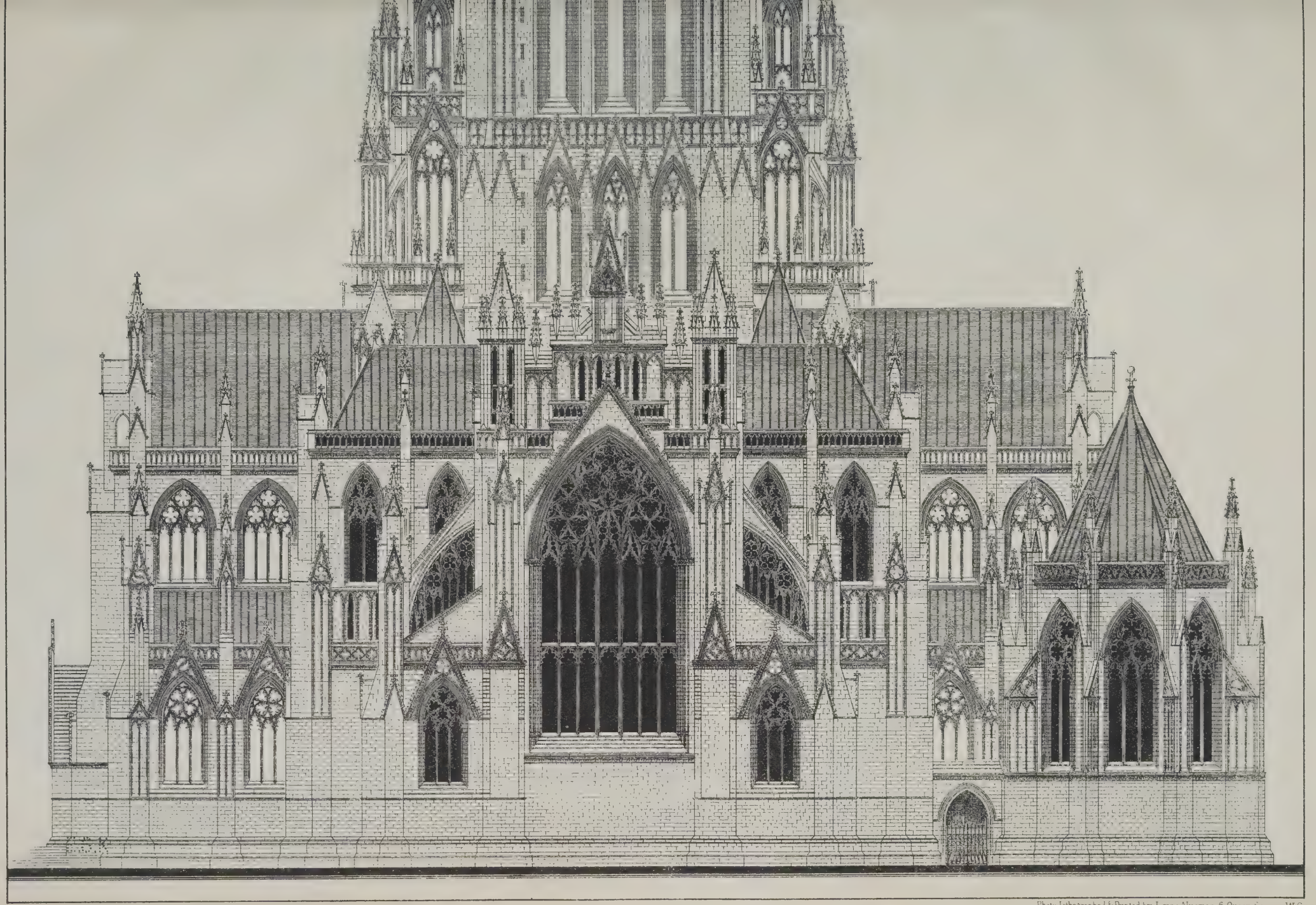
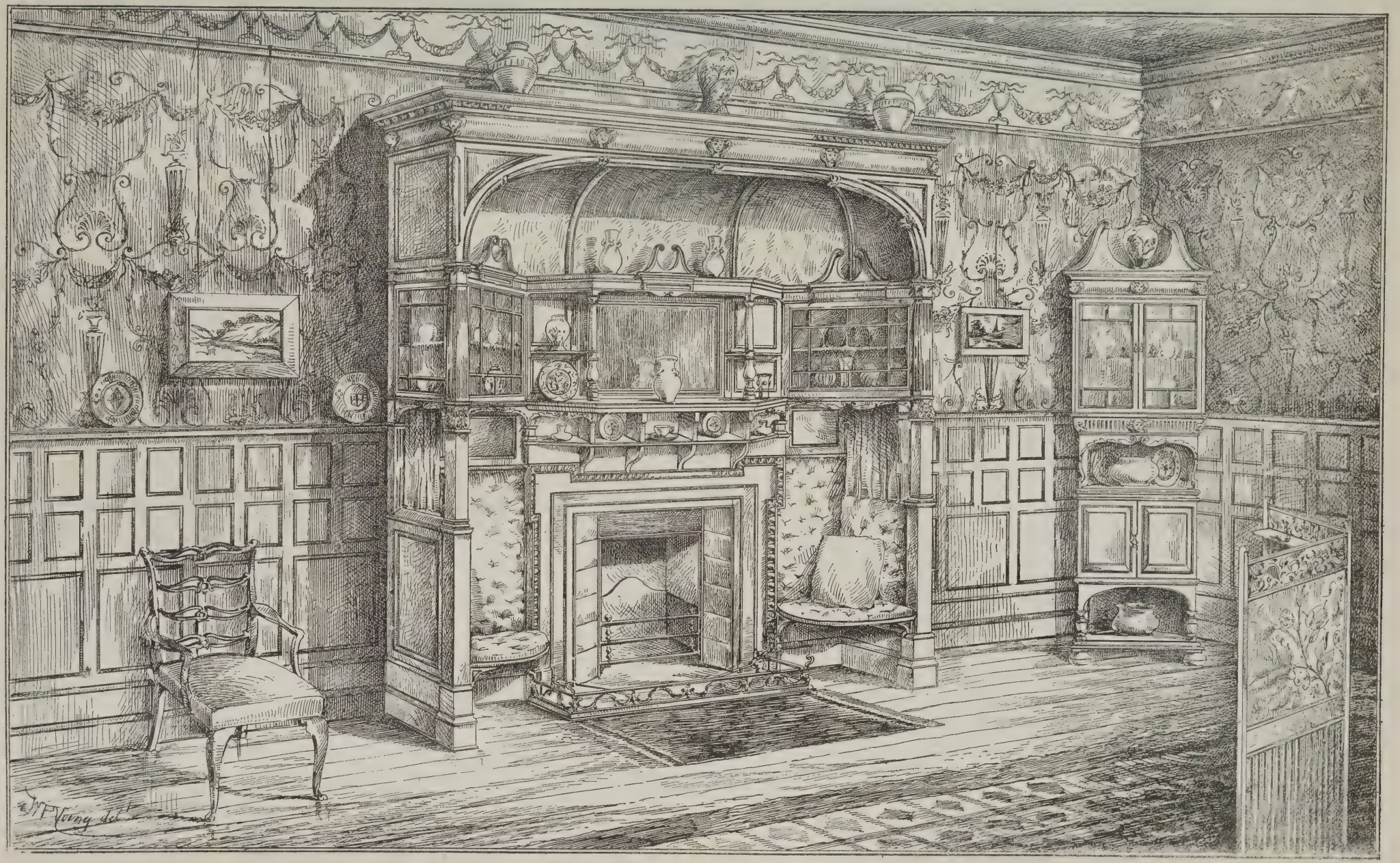


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AN INGLE NOOK.

THE RELATIONS OF ARCHITECT, SURVEYOR, AND BUILDER.*

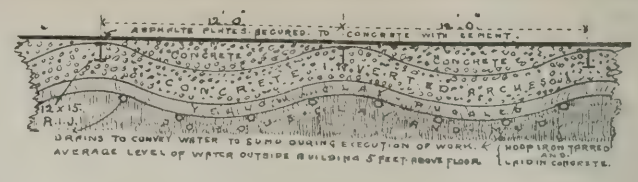
(*Continued from p.* 893.)

CLAUSE 16 of the Institute form of contract defines the course to be taken in case of bankruptcy or unjustifiable suspension of progress. In the event of the contractor's bankruptcy, it is generally advisable to let the trustees finish the building. Similarly, when a contractor is in pecuniary difficulty, it will often be far better to help him by judicious advances for wages, or guarantees for materials, or both, than to seize. I need not remind you that this course requires careful management, and you must, moreover, guard against the removal from the premises of materials bought with the building owner's money. If you take possession of the building and get a contractor to complete it, you will find it impossible to obtain a tender for anything like the amount of the balance of the contract sum. But the safest plan in any doubtful case is to insert a condition stipulating for securities something like this – The contractor to send in with his tender the names of two responsible sureties, who are willing to be jointly and severally bound with him in the sum of (so much) for the due completion of the contract, and the bond to be executed at the time of the signing of contract. Clause 19 provides what may be done in case of default of payment by building owner, or the delay from any proceedings taken by other parties, as adjoining owners (for instance), and the payment for the work already done. If the work be stopped, the contractor must furnish you with a detailed statement of his claim, with items priced, to show how he makes up his estimate of loss. As the building will probably be finished at some time or other, it will be found advantageous to have the prepared work delivered at the building; if finished work, the price will be the contract price, minus the cost of fixing. The claims for use of scaffolding under these circumstances are usually exorbitant. These may be tested in various ways: by approximately valuing the scaffolding, and comparing this amount with the amount demanded; by reducing the amount of demand to a percentage, and comparing it with amount of contract. When scaffolding has been described in a bill of quantities, the claim may be regulated by a proportion of the price in bill. Clause 20 is an arbitration clause. The expediency of admitting or opposing an arbitration clause has been argued from various points of view. Some architects will on no account submit to it; they instead adopt something like the following: "If any disputes or differences should arise between the employer and contractor as to the quality of materials or the manner of executing, or as to any charge, account, or other matter connected with the contract, such disputes or differences are to be settled by the architect, whose decision shall be binding and final on both parties." It will be maintained by some that the architect is the natural arbitrator between employer and contractor; but I doubt whether such unlimited irresponsible power is a healthy condition for any man. It is pretty certain that you can get no builder of standing to agree to such a clause. Supposing you have adopted an arbitration clause, and that there are questions at issue, care should be exercised that only the kind of questions provided for by the conditions be submitted (the Institute conditions except from its operations Clauses 9—10), and progress will be accelerated by settling at first what points shall be dealt with. As a building arbitration usually turns upon measurements and prices, it seems reasonable that a quantity surveyor should be selected for arbitrator, as he, from the nature of his work, is much more frequently engaged upon such questions than an architect. If the scientific training of the average architect were what it should be, I should say the architect would be the best. If the points in dispute are purely or mainly legal, a lawyer is the proper person. But I need not remind you, gentlemen, that it is nearly always expedient to pay rather than refer. A referee is one of the most expensive luxuries with which I am acquainted, except a lawsuit. Moreover, the disposition of the arbitrator to favour the contractor is notorious. If avoidance is, however, impossible, go direct to your arbitrator, not bringing an action first, which greatly increases your expenses, and then I can only repeat the advice of Polonius, "Being in, bear't that the opposed may beware of thee." If the selected arbitrator prove obnoxious, it should not be too readily assumed that he cannot be removed. This can be done in various ways. It is a common error to conclude that when you have instructed your solicitor in a case of dispute, you are to take no further heed until the matter is ready for hearing. My experience has been that you should watch the whole progress of the case as it proceeds. You will generally find that you can make valuable suggestions, and your attention is often sufficient to turn a desperate case into a good one. It is a reasonable arrangement to let all your general clauses—I mean such as apply alike to all trades—follow the conditions. There are generally stipulations that contractors shall supply all sheds for housing materials, temporary screens, pumping, &c., that may be necessary. It will be found at completion, perhaps, that these things, or some of them, have not been used, and the architect concludes that some of the amounts shall be deducted. He is met by the objection that these items are speculative, and at contractor's risk; that, although they happen to have cost nothing, yet they might have cost much more than the sum included, and he would have been bound to do then without extra charge. He would also claim that some of the similar items had cost more, and would ask for the difference, which seems reasonable enough. If you reconsider one item you reopen the remainder. The rule to commence all clauses which are at contractor's risk with the word *allow*, and all sums specifically provisional with the word *provide*, puts these matters generally on a satisfactory footing. The clause providing for the accommodation of clerk of works comes reasonably here. Perhaps I may be allowed to express my opinion of the introduction of a clerk of works without any intimation of it in quantities or specification. This is sometimes done, and I do not think it is just to the builders. The intention that the works shall be done under the supervision of a clerk of works should always be stated before obtaining tenders. Here also most conveniently follow clauses such as permission to dig sand and gravel in the ground, and it will be expedient to test its quality before you introduce such a clause. Permission to use it is implied by the permission to dig. This is also the place to state the materials of which you require samples (the best way to insure satisfactory quality), such as brick, tiles, terracotta, slates, locks, &c. One finds many specifications weak as to attendances. Each trade to attend on all others, and to do all jobbing required, is always interpreted as excluding gas-fitter, bell hanger, hot-water engineer (not domestic hot-water supply), ventilating engineer, lift engineer. All these attendances should be specially described or a sum provided for each. But in the case of work done by specialists, a little inquiry beforehand will afford you sufficient information to describe the work and so avoid a provision. Such provisions are the chief sources of unexpected expense. It is advantageous to have all the provisional sums together after the general clauses instead of distributing them though the trades; one sees then at a glance all the provisional sums together. Instead of providing rods of brickwork, cubic feet of timber, &c., I think it preferable to provide a sum of money. Only in rare cases is it safe to provide less than 5 per cent. on the estimated cost to cover extras; but if you do provide material, you will find it convenient to place it in this position for the reasons I before mentioned. It will save you time and trouble if you describe the articles, for which a sum is provided in the trade to which they belong. Taking tile paving for instance. In the Plasterer a clause might appear: "Pave with Minton's 6in. by 6in. tiles, p.c. 10s. per yard, laid and pointed in cement, the hall and ground floor" and corridor as far as swing door, "a sum provided for this paving; see provisions." In the provisions, provide for 100 yards of tile paving p.c. 10s. per yard at the works, and allow for packing, carriage, and laying in Portland cement. The treatment of provisional items in this manner saves much referring to notes. In the case of a separate contractor for ironwork, this will prove to be specially valuable. A tabulated list in the section of specification Founder and Smith, stating size of section, length, span, weight per foot, and what it supports for every joists and girder in the building, stating that a sum is provided. In your provisional list you can then put it thus:—"Provide for 70 tons of rolled joists £560, and allow for unloading, fitting in hoisting, fixing, and attendance on smiths." One may add, while on this subject of provisions, that the best way to obtain good ironmongery is to make a list of it, and get an estimate from a high-class maker of builders' ironmongery, especially the locks. It is in such cases convenient to put the provisional sum in the list of provisions, describing each article of ironmongery with the joinery in the usual way, and stating by a clause in the preamble of joiner that a sum is provided for all ironmongery except cups and screws, but that contractor is to fix it. Another important consideration as to provisional sums is the settlement, by the specification, of the questions of packing, carriage, profit, and fixing. As to packing and carriage in a clause at the head of the list of sums, say: "On all things for which a sum is provided allow for packing and carriage." As to profit, say: "All p.c.'s to mean prices at the works, minus trade discount, but not discount for cash." It is also expedient to say something like this in substance: If contractor desires a profit on any of the following provisional sums, he is to add it to the sum in each case, and such of these amounts as are not used will be deducted with such profits from the amount of contract. The enormous proportion which some trade discounts bear to the net price, may be defended in cases where articles are of small value and very minute fluctuations occur; but many of them are unjustifiable experiments for deceiving the inexperienced or unwary. In the better specifications that I have seen, there are a few general principles which I think commendable. One is the practice of commencing general descriptions with the exceptions, and following with the rule. Another is specifying completely and separately, things complete in themselves, like outbuildings, fences, conservatories, &c., instead of mixing up their items with the general work. Observe, too, you may shorten your specification considerably by commencing each trade with a nnmber of general clauses, such as, "All iron butts to be wrought, all door and window-frames to be grooved where required to receive finishings." When there are quantities for a building, it is most convenient for the architect to furnish his surveyor with rough notes of the special requirements, the surveyor producing the complete documents from these and the quantities. I am afraid I have been trenching upon the subject of the paper on "Specifications" that Mr. Searle has kindly promised; but I am quite sure he will furnish you with a great store of further information on the subject, for there is plenty more to be said; but I refratn for this reason from going further into the subject. The contract will be most satisfactory if you select a number of builders of equal position, and consequently similar capacity for doing good work, and it should be remembered that there are some builders who never saw, and have no conception of good, work, while there are others who would find it difficult to produce bad. To the majority of you, gentlemen, I need not enlarge upon the fact that the difference between good and bad work, if represented in the form of a percentage, would be very small indeed; it is more a matter of tradition and habit of particular firms. One has heard at various times sentimental arguments against the present system of tendering. All contracts (say they) should be fair between employer and contractor; their proper object should be to insure the employer fair value for his money, and the builder proper payment for his work; and this, they maintain, the modern mode of contracting does not do. No doubt the best work is to be obtained by selecting a builder of high reputation and paying him his own price; but your desire for good work would not always be justified even under that arrangement. All things considered, I think the present system offers the fewest evils. The principle of competition runs

* By JOHN LEANING, M.S.A. A paper read before the Society of Architects at St. James's Hall, Piccadilly, Dec. 13, 1887.

through all businesses, and is truly described as the life of trade, and I do not see any cogent reason for the application of different principles to the building business. But the keenness of competition imposes stronger obligations than ever upon architects and surveyors to avoid straining contracts beyond their legitimate limits, and to exercise special care that improper risks or liabilities are not imposed upon the builder. The form of contract is the next consideration. The solicitor's contract is generally diffuse; his usage is to embody the greater part of the conditions. This is not necessary; nothing is required beyond the following:—A description of the position of the building, the names of the contracting parties, an undertaking on the part of the contractor to erect the building for a certain sum, to the architect's satisfaction, according to drawings and specification and conditions (and quantities, if they are to form a part of the contract). An undertaking on the part of the employer to pay the aforesaid sum for the building on its erection and subject to the conditions. The drawings and specification are identified by notes referred to in contract, contract drawings, and specification being all signed by ths parties. In fact, one may take it as a rule that the shorter the contract document is, the better, so long as it clearly embodies the intention of the parties to it. It is best to have a form of tender; the offer is then properly defined, and if a schedule of prices for labour forms a part of it, the advantage is considerable. While on the subject of tenders I may allude to the acceptance of the lowest. When a number of builders are invited to tender, I think the lowest should invariably be accepted. When the tender is an open one, the case is considerably different, and I think a builder may be selected with less regard to his standing in the list. To the erection of a building under a schedule there are various objections. It generally involves a larger cost than a contract for a total sum, and the uncertainty as to time of completion is another important objection. So much has been said and written about quantities that I need not trouble you with more than a few words. If you want good work, I think you must have quantities. The cases in which they do not effect an ultimate saving are rare, and I think, in justice to the builder, they should form one of the bases of the contract—indeed, in the majority of cases, they are so practically, if not legally; and so far as my experience goes, without any of the dreadful consequences which imaginative persons have conjured up. It certainly does seem anomalous for an architect, with the building owner's concurrence, to order the preparation of quantities which they practically repudiate as soon as the contract is signed. I might go on to speak of the settlement of accounts; but I have already, I think, exceeded the reasonable length of a paper of this kind. A very good paper on "Settlements" was read by Mr. Riddett a few years ago before the Architectural Association, which I daresay many of you heard. I commend it to those who have not as a very sensible statement of the subject. After all, the architectural diploma is one of the main reasons of our association in this society. Looking at the position of the profession generally, one cannot but feel naturally indignant at the anomalous position of the architect, that men of scientific attainments and high artistic ability should be classed with the large crop of mere pretenders, and I must confess my astonishment at the unworthy motives which have been imputed to us. I trust we are all actuated by a desire to leave the profession better than we found it, and I do not fear that such motives will lead us to a substantial reward. The truly noble profession of architecture occupies at present an abnormal position from which I have confidence that it will shortly emerge. The conspicuous improvement of late years in the character of our architecture must impress us with good hope of its future, and we have good reason to congratulate ourselves that we have a share in those splendid traditions of art which the architects of this time are so worthily handing down to posterity.

The Metropolitan Board of Works have sanctioned the application of the vestry of Hammersmith for a loan of £29,000 towards the purchase of Ravenscourt Park.



STRATFORD CO-OPERATIVE AND INDUSTRIAL SOCIETY, LIMITED: CANNING TOWN BRANCH.

THIS building comprises the first portion of a block recently erected in Rathbone-street, Canning Town, Essex. The elevation is designed to give as much light as possible; the mullions are of cast iron; the two lower cornices and trusses are of Portland stone, and in the upper cornice and arches Brown's moulded and ornamental white bricks are used, the shop-front is executed in walnut. A very important feature in this building is the basement floor (of which we give a section). The site once formed the sloping bank of a stream, now some 18ft. below the present surface; the ground excavated for foundations and basement was of a soft, muddy clay, through which the water freely ran with considerable force, the neighbourhood being very close to the river Thames, and the street-level about 8ft. below Trinity high-water mark. The difficulty has been successfully overcome by the introduction of 12-in. rolled iron joists, pinned in side walls, and bolted to centre stanchions, to form skewbacks for inverted concrete arches; 5-in. rolled iron joists were also placed about 4ft. apart on the bottom flange of 12in. joists. Asphalte plates were cast on site with coarse gritted backs, and were bedded on concrete with neat Portland cement, and afterwards finished with a rubbed surface of asphalte, laid in the usual way; similar plates were also fixed vertically to walls. The upward pressure on this floor is between six and seven hundred pounds per square foot. Mr. James Morter, of Stratford, was the contractor, and the whole of the work was designed and carried out under the personal supervision of the architect, Mr. Henry Poston, of 39, Lombard-street, E.C., and Forest Gate.

STUDENT WORK AT THE INSTITUTE.

DURING the week an exhibition has been on view at Conduit-street comprising a series of sketches and studies chiefly by students competing for prizes. A feature, however, of the collection specially to be noted consisted of several beautiful drawings by the late Mr. George Devey, whose houses and clever restorations of old domestic buildings made for him a name as well as a fortune. The sketches to which we refer are, without exception, slightly finished in water-colour, though a few are more correctly described as pencil studies partially washed in tint to show local colour and materials. In all of them there is a marked knowledge of detail and a breadth of treatment which clearly indicate an artistic power and thoroughness, even though some of the drawings are scarcely more than impressions of the subjects shown, and perhaps knocked off in a few minutes. Still, all that is essential to the study in hand is there, and so each sketch, without pretence at finish, is satisfactorily sufficient. Among these drawings we may note a view of a Courtyard from the Place des Arts, Rouen, with its conical roofs of small slates and half-timbered gables. Another sketch somewhat similar to the last is from the Maison de M. D'Ornery, Boscherville. Some gables from Beauvais, hung close by, are drawn, as it were, in analysis, to show the construction, as well as patterns, of the timber framings. An almost English bit of Domestic work figures from Harfleur, and several of the other frames contain sketches of genuine West of England houses, both stone-built and in half-timber. Mr. A. Needham Wilson, the Soane Medallist for last year, exhibits his drawings made in Provence during his prescribed tour. They are very numerous, and are the best possible evidence of his industry, though, as a rule, his sketches fail in effectiveness, so that in a show of this kind much hard, conscientious labour is liable to be overlooked by the visitor. Nismes and St. Gilles alone afford almost endless material for careful study, and Mr. Wilson's sketch-book was evidently well occupied here as at Arles, Gard, and Tarascon Castle. The ancient cloisters from Vaison, Vaucluse, forming part of the Cathedral there, are shown, and the W. portals of St. Agricol, Avignon, as well as the Chateau des Issacts aux Angles Gard. Roman remains and mosaic enrichments, sculptures, and wood carvings likewise are included in the series. Col. R. W. Edis's prize of twenty guineas attracted three students only, and of their drawings little need be said. "Quod potui perfeci" is the motto of one set which furnishes some elaborated measured sheets from Hampton Court Palace, giving the best part of this historic building, with others of equal character from Trinity College and Magdalen College, Cambridge. "Semper Fidelis" sends a goodly number of sketches, chiefly from Exeter, showing the timbered houses in North-street, and measured drawings of the old Guildhall, and to this set, which is by Mr. Sidney K. Greenslade, the prize has been awarded. In the arbitration room downstairs the competitors for the special Travelling Studentship of £100, offered by the Committee of the British School at Athens and the President of the Institute, displayed their drawings. Most of these are old friends, the best of them having already done duty on former occasions, and some of these have previously been awarded medals and prizes. None appear to indicate any special knowledge of Athenian architecture; but some difficulty has probably been experienced in awarding the prize with such a close competition. West Walton Church, Norfolk, by Mr. A. N. Wilson, is one of the best sets, and, like another of Aberdeen Cathedral, by a Scotch competitor, has been exhibited in these galleries before. The fortunate competitor who has won the studentship is Mr. R. Elsey Smith.

A GOOD WOOD-BLOCK FLOORING.

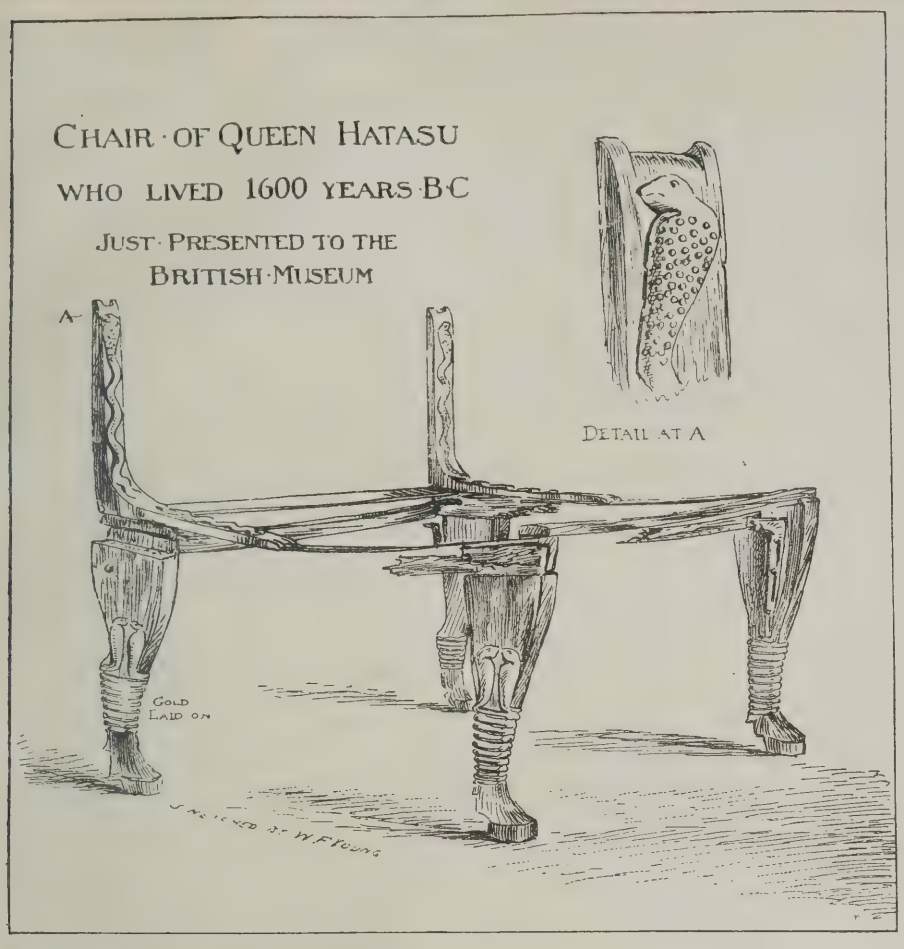
AT the invitation of the Executive Committee of the Manchester Jubilee Exhibition, Mr. Roger L. Lowe laid his patent wood-block flooring at the principal entrance, covering about 1,800 superficial square feet with pitchpine blocks. The traffic on this floor has been enormous, it being estimated that in and out over 7,000,000 people have passed over it. After careful examination, the flooring is little the worse, not one single block being loose or damaged in any way. Where the stream of people passed through the doorways, and the traffic was of necessity narrowed to a few feet wide, the wear has been the greatest, but even here it is very slight indeed. Knowing that the main buildings were to be sold, Mr. Lowe wrote to the executive committee respecting his flooring, and received the following reply:—

"I am instructed to inform you that the whole of the Exhibition Buildings are to be sold by auction next week, and will immediately thereafter be pulled down.

"The committee will, therefore, feel obliged by your taking up and removing your flooring during the course of the present week. I may add that the flooring has stood the enormous traffic at the entrance to the entire satisfaction of the committee.—I am, yours faithfully, A. A. Gillies, sec.

AMALGAMATION OF THE BATH-STONE QUARRYMEN.

THE great Bath-stone quarrymen of the West of England have amalgamated their several Bath-stone businesses into one, and that after this date they will be carried on as one concern under the style of "The Bath Stone Firms, Limited." They are not taking this step for the purpose of disposing of the whole or any portion of their interest. On the contrary, the entire capital of the united business will be provided solely by themselves. The numerous buildings—Ecclesiastical and Domestic—which were erected in Bath stone many years ago, and which are to-day in excellent condition, prove



that when the stone is chosen with judgment, and used with reasonable care, it is thoroughly reliable, and that there is no other building material that is at once so trustworthy, so effective, and so economical. That Bath stone is as good to-day as it ever was, is an undeniable fact, which is evidenced by many buildings that have been erected in this stone in recent years. The interest of the amalgamated firms will be not to recommend any particular description of Bath stone; but, possessing all the varieties, to insure that the preferences of architects for certain kinds are carefully observed. There is no intention of raising the price of the stone, and the conduct of the business will remain in their own hands, the details of management being carried out by the most experienced and practical men in the trade, who are also large proprietors. The firms concerned are Messrs. Pictor and Sons; Randell, Saunders, and Co. (Limited), Isaac Sumsion, Corsham Bath Stone Co. (Limited), R. J. Marsh and Co. (Limited), S. R. Noble, and Stone Brothers (Limited).

METROPOLITAN BOARD OF WORKS.

THE Works Committee reported to the Metropolitan Board on Friday that they had investigated the charges against Mr. Hebb, their assistant architect, of demanding boxes and stalls from the managers of theatres, and they recommended that he should be called upon to resign. A letter was read from Mr. Hebb, submitting that the course proposed went far beyond what the justice of the case required, as it would blast his reputation and bring upon him professional repudiation. After a heated discussion, Mr. Hebb was called before the Board, and asked that he might have time to prepare his defence and call witnesses, as he should then be able to emphatically disprove the charges brought against him. It was agreed to accede to this, and to adjourn the matter until the second week after the Christmas holidays.—With reference to the decease of Mr. E. Woodthorpe, late district surveyor for the District of the Northern Division of the City of London, and the District of Limehouse, Wapping, the Precinct of St. Katherine, and the Hamlet of Ratcliff, it was decided that a district surveyor be appointed for each of the two districts; that advertisements be issued inviting candidates for the appointments, and that the Board do proceed to the elections on Friday, the 13th January, 1888.

THE CHAIR OF QUEEN HATASU.

WE illustrate to-day what is probably the most venerable piece of furniture in the world—viz., a "Royal Egyptian throne, of the above-named queen, Hatasu, a lady who lived and reigned in the Nile Valley some 1,600 years before Christ and 29 years before Moses." The throne, or rather the remains of it—as what is left is in a dilapidated condition, and has to be secured with brass bands—is made of what appears to be lignum-vitæ, is of a dark colour, like the cocus-wood, and is inlaid over all the carved portions with gold plates. The two sacred serpents, shown on the two uprights at the back, however, are not treated so, but, as our detail illustrates, with little silver rings sunk all over them—probably a conventional rendering of snake-skin. This interesting throne-chair is in the upper gallery of the Egyptian Court, and has just been presented to the British Museum by a gentleman in Cheshire.

Receiving orders are announced to have been issued in the cases of the following builders:—Blamey and George, Stukeley-park, Fulham; John Dart, Morice Town, Plymouth; Thomas Grey, Penarth; and William Gilbert Wyatt, High-street, South Norwood.

The first stone of the Queen Victoria Jubilee Board Schools, Dewsbury, was laid on Friday. The site is situated between Wellington-road and Westgate. The architect is Mr. John Lane Fox, of Dewsbury; and the contractors are Messrs. E. Chadwick and Sons, of Staincliffe, who are erecting the town hall in Dewsbury Market-place for the Corporation.

A full-length painting of ex-Lord Provost M'Onie was unveiled on the 15th inst., in the Corporation Galleries, Sauchiehall-street, Glasgow, by Lord Provost Sir James King, and a replica was presented to Mrs. M'Onie. Mr. Geo. Reid, R.S.A., is the artist.

WAYSIDE NOTES.

I DO not know what may be the ultimate result of the inquiry at the Metropolitan Board of Works into the charges brought by Mr. Augustus Harris and Mr. Hare against Mr. Hebb; but surely some notice of the matter is to be taken elsewhere. Mr. Hebb is a Fellow of the Institute, and although that body has been remarkably shy in the past in moving where the interests and honour of its members have been concerned, it surely cannot let this matter drop? If Mr. Hebb is the victim of scandal, he ought to be able to claim the fullest assistance of the Institute in establishing his reputation. If the charges brought against Mr. Hebb should turn out to be true, I imagine it will be the duty of the Institute to take steps of a very different nature—if architects who do not cadge for theatre orders are still to remain Mr. Hebb's fellow members. But I still cling to the belief that the charges cannot be true, and that the Royal Institute of British Architects will do its duty, and by an independent investigation establish Mr. Hebb's innocence.

There was evidently a very strong party spirit among the assembled members and visitors at the last meeting of the Architectural Association, which, although it did not rise to such a pitch as that on the memorable occasion when Mr. Cole A. Adams brought in his motion to raise the annual subscription, was yet running very high, as one could tell by the nature of the applause of the Registrationists and that of the gentlemen who may be said to have occupied the Opposition benches.

It was with intense interest that I listened to Mr. T. Graham Jackson's opening remarks on "The Proposal to make Architecture a Close Profession by Imposing the Test of Examination and Registration." One naturally felt curious to know the exact views, on the topic of the hour, of an able architect who has held aloof alike from Institute, Association, and Society. Those, however, who, like myself, were a little uncertain as to the position the lecturer would assume with regard to Registration were not long kept in suspense; for Mr. Jackson had not proceeded very far with his discourse before it became painfully evident that he had determined to make out the best case possible for the "Opposition," and to exhibit to his audience the darkest side of the Registration scheme. But, unfortunately for his cause, he rather overstated his case, and, metaphorically, trod upon the toes of his friends in the matter of examinations generally, and that of the Institute in particular, intimating that such tests were of little or no use in determining the capability of a student to design a work of architecture.

This was rather an unfortunate point in Mr. Jackson's paper. It weakened the Anti-Registration party, as it split it into two divisions—one composed of those who would oppose the Bill "tooth and nail," and the other of persons who would believe in the efficacy of examinations; and it caused Mr. Arthur Cates to pose as the champion of the Institute exam., which he ably defended, and, moreover, gave the assembly an outline of a scheme he has for some time been engaged upon, for dividing the examination into three sections—preliminary, intermediate, and final—a measure that must be of inestimable advantage to the profession. I should say that Mr. Cates' defence of the Institute exam. negatived the antagonistic arguments; and as regards Mr. Jackson's other objections to the Bill, I feel bound to say I could not see a single one that could not have been answered by an eloquent, enthusiastic Registrationist. Unfortunately, the oratory was all on the other side. I trust Mr. Jackson will forgive my saying that many things he put forward as objections were, in reality, most unpractical; or, at any rate, of such description as would be little regarded by a workaday world. It does not appear to me that his paper in any way injured the cause of the "Architects', Engineers', and Surveyors' Registration Bill."

Mr. Jackson, someone said, had done wrong in bringing the question of Registration before the members of the A.A.; but, as the next speaker pointed out, if the question affects

anyone, it surely affects them! Being mostly composed of young men who have their way to make in the world, it is of great moment to them to decide whether they will be better able to struggle into practice as registered architects—with a hall-mark that the public will recognise—or in the same way as their predecessors—competing with brazen-faced incompetence. Let the younger members of the Association look to this. One speaker on Friday last said he had hoped to hear the opinions of students that evening. It *would* have been interesting, but they did not get a chance.

In the matter of the Indianapolis Competition. As Mr. Editor observed last week, the time for sending in drawings for the Soldiers' and Sailors' Monument at the above American city is now drawing near But we have some marvellous draughtsmen in our midst, so it is possible there will be many an exhibit prepared in this country, even by those who only awoke to the existence of the competition with the appearance of the advertisement in last week's issue. Who cannot "spin a yarn" about hair-breadth escapes in competition work? Often have I heard young competitors relate with pride how they have prepared a set of competition drawings in no time, or something less! They belong to the "wholesale" class with a vengeance! More haste less speed, my young friends—especially in competition work. Once upon a time we ourselves essayed to beat the record in the matter of quick drawing. Alas! we got no job, and no premium; *but* a contemporary, in reviewing the competitors' exhibits, observed that "of some of the drawings it would be unkind to speak."

There was a communication about the Indianapolis competition in the *American Architect* of the 12th ult. It was headed, "Bulletin No. 3," and appears to be a circular issued by the Commission, that is not to be found in the particulars that I obtained last week for curiosity's sake. There are only two "bulletins" contained therein. The one that appears in the *American Architect* is dated "Indianapolis, Nov. 1." It replies to a few questions by architects who proposed competing; but the replies are not of much moment, excepting, perhaps, the one which states that the ten architects who have been especially invited to compete will have no advantage whatever over uninvited competitors. As far as I can judge from a hasty glance at the particulars issued, the architects of America receive more respect from competition inaugurators than do we in "merrie olde England."

I see that the inhabitants of Walworth met last Tuesday to support a movement in favour of adopting the Free Libraries Act. The motion of the chairman that the assembled persons should pledge themselves to support the proposal was carried with only two dissentients. This is better than the result of the meeting at Scarborough, where the Yorkshire folk refused, point blank, to adopt the Act. The Queen of Northern watering-places has, it is said, disappointed us in the matter of her club competition; and now the town proves a black sheep (from an architect's point of view) in the question of free libraries. Nevertheless, their cause gathers strength as time goes on. Doncaster has offered liberal premiums for designs for a library; and, according to Mr. "Chips," the one at Denton is now well in hand. Last week, I happened to pass the Tate library in the South Lambeth-road, but the walls of this building were then barely above the level of the ground.

Don't forget to inquire into the most desirable form for arranging the internal economy of free libraries. *Verb. sap.*

This week's "B. N." will, doubtless, be perused more at leisure than is ordinarily possible to the busy architect. Christmas holidays allow one breathing-time towards the close of this eventful year of Jubilee. How many an architect must feel thankful for the J——e! There must be a great number of practition ers who, had not our gracious Sovereign Queen Victoria accomplished the fiftieth year of her reign, would have been complaining of bad business, whereas now they have been "up to their eyes" in work in connection with Jubilee clock-towers, halls, institutions both public and private, and what not. Perhaps, if they have not erected any new buildings, they have partially pulled down old ones, and may feel proud (?) that they have desecrated many a venerable, weather-beaten village church and many an old, ivy-mantled tower, and that they have dislodged some tons of old stonework and obliterated an acre or so of mouldering carvings. Hurrah for the Jubilee! By how much are we poorer now in the matter of old work than before the commencement of Anno Domini 1887? Pardon me, O reader, it is only, as you say, pure jealousy—no restoration job having come in the way of him who now heartily wishes you "A Merry Christmas and a Happy (and Prosperous) New Year"—the ancient

Goth.

CHIPS.

An agitation has been going on for some time past among the quarrymen of Easdale, Argyleshire, on the Marquis of Breadalbane's estate, the causes being dissatisfaction with the manager of the Slate Company who lease the quarries, and with the present low rate of wages.

The death of Mr. Charles Langton, of Langton Hall, has been commemorated by the erection of a "Latten" brass, worked by Mr. Gawthorp, of Long acre, London, and placed on the south wall of the chancel of Langton Church, below the Langton escutcheon.

At Evesham on Thursday, the 15th inst., the clock tower erected by the burgesses to commemorate the Jubilee was inaugurated. The turret is situated on the end of the Town Hall facing High-street, and is of oak, resting upon a square tiled base. It consists of three tiers, the lowest containing a four-dial clock, with gasfittings for illumination at night, and the next a bell weighing 4cwt. for striking the hours. The cost of the turret was £450. A vane, a wind gauge, barometer, and thermometer, the three latter being inclosed with massive plate-glass in bronze frames in the middle pier looking towards High-street, have been presented at an expense of about £100. The clock itself, which cost about £150, was inserted by the Corporation.

Tapeley Park, near Bideford, the Devonshire seat of Mr. W. L. Christie, is being restored by Mr. Ewan Christian. The old house has been re-roofed, and part of the outer walls pulled down and rebuilt. The outer parapet has been removed, and the roof carried over walls, with good eaves. The fronts of the house have been cased with red facing brick, and the west front rebuilt with a new bay to drawing-room. The work has been intrusted to Mr. Wm. Dart, of Crediton.

On Wednesday week a private chapel in Benwell Tower, the Bishop of Newcastle's house, was dedicated. The chapel is of stone in the Tudor style. An open screen with folding gates separates the chapel from the ante-chapel. The reredos of carved wood is the gift of the ladies of the diocese. Amongst other special gifts is a pastoral staff of oak.

The prizes and certificates gained by the successful students at the colleges connected with the City and Guilds of London Institute for the Advancement of Technical Education were distributed on Friday night by Sir John Lubbock, M.P., at the Carpenters' Hall, London Wall. Sir Frederick Bramwell presided. The reports on the Central Institution at South Kensington, the Finsbury College, and the South London School, read by the hon. secretary, Mr. W. P. Sawyer, were of a highly satisfactory character. Sir John Lubbock, in his address, remarked that the Guilds Institute was not only vigorous, but continued to grow by leaps and bounds. The number of candidates in 1883 was 3,635; in 1884, 3,968; in 1885, 4,764; in 1886, 6,508, with 8,600 students, while this year the number of students was 10,284, and there were 460 classes.

A cross, subscribed for by students past and present of the Scholæ Cancellarii, Lincoln, has been dedicated at Lincoln Minster. The cross is of copper gilt, with crystals, and it stands 5ft. high. It was designed by Messrs. Bodley and Garner, and cost £95.

A new Free Presbyterian church is about to be built in Fasnefern-road, Fort William, N.B. Mr. Sydney Mitchell, of Edinburgh, is the architect.

The interior of the nave and aisles of the parish church of Holy Cross, Crediton, is now undergoing restoration from designs of Messrs. Hayward and Son, architects, Exeter. The high pews have been taken out, and will be replaced by open oaken benches, with richly carved, traceried ends. The floors will be of solid oak blocks, with tiled aisles. The pulpit is to be executed in Mansfield stone. The contractor is Mr. Wm. Dart, of Crediton.

Building Intelligence.

Bedford.—The new Provident Dispensary, built on the site of an older one on St. Peter's Green, was opened by the Marquis of Tavistock on Tuesday week. Messrs. Usher and Anthony, of Bedford, are the architects, and the style is that of the 16th century. The principal front is faced with Lum's Hill stone from Derbyshire, rocked faced, in random courses, with dressings to all doors and windows in Sumsion's Monk's Park Bath stone, and stringcourses, cornices, and copings with Ketton stone. The roof is covered with Broseley tiles, and the ridge with Cooper's crested ridge tiles. The waiting-room is 35ft. by 29ft. and 15ft. in height, lighted by a large mullioned window and smaller lights filled in with stained glass. The floor is of solid wood blocks, laid by the inventors, Messrs. M. C. Duffy and Co., London. This hall is heated by one of Messrs. Musgrave's slow-combustion ventilating stoves; the stove is backed by a Hopton Wood stone chimneypiece with embossed tiles. On the south side of this hall are the consulting-room and the dispenser's-room. The general contract was taken by Mr. J. P. White, of Hassett-street.

Bradford.—The School Board have adopted plans by Mr. C. H. Hargreaves, of Bank-street, Bradford, for their new offices to be erected on the site of the present Salem Chapel in Manor-row (the new chapel which is being built at Manningham to replace this building, from plans by Mr. J. Ledingham, was illustrated by us last week). The building will be three stories in height, with a basement extending over three-fourths of the area. The Manor-row façade, however, will, in the central portion, present the appearance of being only two stories high, the extra height being given to the board-room. In style the building will be of the English Renaissance, with detail of an Elizabethan character. The basement will be rusticated with large square-headed windows. The principal entrance, which will project slightly from the main front, will be flanked with columns of the Roman Doric order. This entrance leads to a vestibule 11ft. in width, beyond which is a corridor 9ft. wide, passing round three sides of the building, and giving access to the various offices. Adjoining the attendance-officers' rooms will be a waiting-room. There will be two committee-rooms, a waiting-room, rooms for school superintendents and assistants, and a second waiting-room for visitors, all the outdoor officers being accommodated on the ground floor. A wide staircase leads to the first floor, on which will be board-room, general office, committee-room, waiting-room, and strong-room. The board-room will be 60ft. by 30ft.; the general clerks' office will measure 40ft. by 22ft. On the top floor are five junior teachers' class-rooms. The cost of the building is estimated to be £18,500; but if the whole of the floors are made fireproof, an additional cost of £1,200 will be incurred.

Carlisle.—The foundation stone of the new public markets, now being built at a cost of £30,000, was laid by the Mayor on Tuesday. The external walls are of red stone from the quarries at Annan, Newbiggin, and Wetheral. The glazed bricks for lining inside are supplied by Messrs. Craig, Kilmarnock; the concrete flooring by Mr. Onerod, Carlisle; the fireproof flooring by Messrs. Lindsay, London; the iron roofing by Messrs. Robertson, of Workington; the builders' work by Messrs. H. and R. H. Hodgson, of Workington; and carpenter and joiners' work by Messrs. W. H. Davidson, Carlisle. The architects are Messrs. Causton and Graham, 9, Spring-gardens, Charing-cross, London; Messrs. Hodgson, of Workington, are the general contractors; and Mr. H. Creswell Charlton is the clerk of works. The style of work is rock-faced ashlar up to plinth; quoins, cornices, and window jambs tooled; and the general walling is random-snecked rubble. The style is Composite. There are six principal entrances, and an arcade entrance from the principal street. A Jubilee tower, 160ft. high, has been built at the north-west corner.

Darenth.—At the meeting on Saturday of the Metropolitan Asylums Board, the Small-pox Hospitals Committee reported with reference to proposed provision for convalescing smallpox patients. The committee had caused

plans to be prepared for a "brick hut" hospital for 600 convalescing smallpox patients, with administrative buildings capable of serving 1,000 patients, to be built on a plateau site at Gore Farm, Darenth, and now submitted these plans for adoption by the managers. The estimate of cost, including the expense of buildings, drainage, &c., gave the total sum as £58,900. The present plans, although providing for the same number of patients as others previously considered, were estimated to cost but little more than half the amount then contemplated. A comparison between the cost of brick and wood structures showed that the saving effected by the substitution of wood for brick in the walls was more than counterbalanced by the space wasted in roofs, and by the cost of the necessary covered ways connecting day and night accommodation, and by the extra cost of duplicating both roofs and foundations. After a discussion the plans submitted were adopted and transmitted to the Local Government Board for approval, and as soon as this approval has been received tenders for erection will be invited by advertisement.

Greenwich.—On the 8th inst. the West Greenwich Ragged School and Working Lads' Institute in Bridge-street was opened. The building consists of a reading and refreshment room, 23ft. by 21ft.; a kitchen, with kitchener and tea-boiler; a gymnasium, 32ft. by 21ft.; an infants' room, 24ft. by 21ft., with gallery, all on the ground floor. A fireproof staircase leads up from hall to a teachers' room, on mezzanine floor, and to the first floor, containing a schoolroom, 56ft. by 21ft. 6in., with a platform at one end, and an open-timbered boarded ceiling, a retiring room, and two large classrooms. The second floor consists of two large rooms, which may be used as dormitories for boys, and the caretaker's apartments. The school is heated by low-pressure hot-water pipes. The total cost, inclusive of lighting, heating, &c., is about £2,000. The architect is Mr. George Baines, 4, Great Winchester-street, E.C., and the contractor Mr. H. L. Holloway, of Deptford.

Leeds.—Premises are about to be built next, and in harmony with, the Mechanics' Institution for the School of Science, and in connection with the Boys' Modern School. The elevations will be carried out in brick, the main fronts being relieved with stringcourses and mouldings of dressed stone. In the rear will stand a tower, containing a combination of flues in connection with the heating and ventilating of the whole of the premises. The contract for the buildings, which, with the fittings, will cost between £5,000 and £6,000, has been let to Messrs. Wood and Son, Churwell; and the work will be carried out under the superintendence of the architect, Mr. C. S. Nelson, Park-row, Leeds, whose designs were selected in a public competition. The accommodation will consist of a chemical lecture theatre for 200 students, a physical lecture room for fifty, a laboratory for seventy, and a number of class-rooms to accommodate 300 students. Master's rooms, store-rooms, and preparation rooms will also be provided. The basement will at present be used as a covered playground, but will be converted into workshops should necessity arise, and the rooms set at liberty in the old building will be available for joiners' shops and other mechanical trades. The old and new school buildings will be connected by a covered bridge.

Liverpool Master Builders' Association.—The annual dinner of this Association was held on Wednesday week at the Adelphi Hotel. Mr. Charles W. Green (president) occupied the chair, and he was supported by the Mayor of Bootle (Alderman J. Howard), Messrs. E. Kirby, H. B. Bare, F. W. Hornblower, W. W. Thomas, Thomas Cook, T. C. Thorburn, E. Hughes, J. H. Kenion, S. H. Holme, Thomas Shelmerdine, jun., J. E. Beauland (Bradford), R. Dennett (Nottingham), J. H. Marsden (Bolton), F. W. Briscoe (Bolton), W. Huntington (Lancaster), C. B. Holmes (Wigan), A. H. Holme, H. A. Matear, George Holme, G. B. Watts, N. R. Stirling, T. Wainwright, J. Wainwright, J. Wannop, G. G. Holme, W. Tomkinson, C. Tomkinson, J. Pendleton, W. Knox, secretary, and the presidents and vice-presidents of the Builders' Association of St. Helens, Wigan, Warrington, Bolton, Southport, &c. Mr. Thomas Cook proposed "The National Association of Master Builders," which was acknowledged by Mr. J. C. White. Mr. J. H. Kenion gave the toast of "The Liverpool Master Builders' Association." The toast was acknowledged by Mr. N. R. Stirling, who said that the objects for which the association was established some 21 years ago had been thoroughly carried out. Mr. S. H. Holme (first president of the Association) proposed the toast of "Architects, Surveyors, and Civil Engineers," which was responded to by Mr. E. Kirby. The toast of "The Iron Trades and Kindred Associations" was given by Mr. E. Hughes, and acknowledged by Mr. Pendleton.

COMPETITIONS.

Edinburgh.—The committee charged with the erection of a memorial to the late Sir George Harrison decided some time ago that the form it should take should be an ornamental gateway or archway over the approach to Blackford Hill, which the late member for South Edinburgh, when Lord Provost, was instrumental in securing as a recreation-ground for the city. Out of a number of competitive designs that by Mr. Sydney Mitchell, of Edinburgh, has just been accepted, and estimates will be taken for the erection of the memorial. One of the features of the gateway will be a bronze medallion, on which will be sculptured in high relief a colossal bust portrait of Sir George Harrison. This part of the work has been intrusted to Mr. Charles M'Bride, sculptor, whose marble bust of Sir George now adorns the Council Chambers.

East Grinstead Jubilee Memorial Committee.—The secretary writes us:—"Notwithstanding your somewhat severe criticism of our proposal, we have received twelve sets of plans—many of them of great merit—in response to the offer of £5 5s." Anyone curious to see the productions of the dozen architects eager to earn five guineas could have done so this week. The fortunate winner is to be selected by ballot of the subscribers!

Gloucester Baths Competition.—The corporation called in Mr. T. Roger Smith, F.R.I.B.A., to advise upon the sixty plans received in the above competition, and, under his advice, have awarded the first premium of £50 to Mr. J. Fletcher Trew, M.S.A., architect, Gloucester, for the set of plans under motto "£5,680," and the second premium of £25 to T. Mr. T. Cook, architect, Victoria-street, Manchester, for the set of plans under motto "£6,000." It is proposed to exhibit all the plans in the Corn Exchange, Gloucester, on Tuesday and Wednesday, the 3rd and 4th of next month. Mr. Fletcher Trew's selected plan, which we shall illustrate in an early issue, provides for first and second-class swimming-baths, with Turkish baths arranged between them, the front portion of site being reserved for private baths, entrances, offices, and superintendent's residence, and also for future extensions. Separate entrances are provided for each sex, and by locking the door leading from male department to Turkish and swimming-baths they are rendered accessible for females on special days without interfering with the usual entrance for males. The dimensions are—first-class swimming bath, 88ft. by 28ft., with the possibility of lengthening to 136ft., and a depth varying from 6ft. to 3ft. Second class, 64ft. by 28ft., and a depth ranging from 6ft. to 2ft. 6in. The first-class private baths for both sexes are arranged on the first floor, and the second class private baths on ground floor. They are of uniform size, 9ft. 6in. by 6ft. 6in. Each section of baths is provided with lavatory, w.c.'s, urinals, and a shower bath. The materials proposed for use are brick, with terracotta and freestone dressings, and, for ceilings, concrete. The construction will be fireproof, finished in tiles and cement.

Northampton.—The competition for the extension of the town hall and municipal buildings at Northampton, built from the designs of the late Mr. E. W. Godwin, F.S.A., has just been decided. The invitation to compete was issued by the town council to all architects practising in Northampton, and to those born and brought up in the town but practising elsewhere. Mr. Charles Barry, F.S.A., F.R.I.B.A., was asked to report and advise on the ten designs sent in under motto, and placed the first three in the following order:—1st, "Civis," by Mr. Edmund Law, F.R.I.B.A., Abington-street, Northampton; 2nd, "Victorus," by Mr. H. Holding, A.R.I.B.A., Market-square, Northampton; 3rd, "St. Crispin," by Mr. A. W. Jeffery, of Hastings. This report has been adopted by the town council. Allusion was made to the fact that, notwithstanding a clause of the conditions stated that "canvassing or solicitation of any member of the council, directly or indirectly, is most strictly prohibited; and any competitor who shall allow his name, or motto, or mark to be divulged, so as to identify the designs, will be excluded from the competition," photographs had been issued of the designs placed second, and one of these had been sent by Mr. Holding to a councillor. A letter was read from Mr. Holding stating that he had forgotten the gentleman in question was a member of the council, and that he had sent it to him as a friend. After a discussion as to whether "Victorus" had not disqualified himself, it was decided by a majority of the council to allow his plan to be included, and eventually Messrs. Law and Holding were appointed joint architects, on the understanding that Mr. Godwin's present front should be continued in the extension. Mr. Barry's fee of fifty guineas and expenses were also voted him.

Perth Station Hotel.—At a meeting of the committee at Perth on Saturday, it was agreed to accept the design sent in by Mr. A. Heiton, Perth, subject to certain conditions. The hotel, which will be built on the Caledonian-road, will have a connection with the station under cover. The cost is estimated at £12,000.

CHIPS.

William Mittens, cabinet manufacturer, of Hoxton-square, was charged at the Worship-street Police-court on Friday with an offence under the bankruptcy laws, by improperly making away with a quantity of timber, veneer, &c., which he had obtained on credit from Mr. John Cameron, a timber dealer. He was committed for trial at the Central Criminal Court.

A new organ in St. Bede's Church, Sunderland-road, Gateshead, was opened on Tuesday in the presence of the Bishop of Durham. It has been built by Messrs. Harrison, of Durham, at a cost of £360.

A feuing plan has been prepared by Messrs. Kinnear and Peddie, architects, Edinburgh, of an area of 15 acres at Craiglockhart which was acquired a number of years ago from the City Parochial Board. The ground is situated between the Craiglockhart Hydropathic and the Union Canal. It is intended to lay out the ground for villas, in lots of from a quarter acre to an acre and upwards, and also to erect, adjoining the canal, a continuous line of smaller houses, with front gardens and back grounds.

A new church is about to be built at Nantymoel, near Bridgend, from plans by Mr. E. M. Bruce-Vaughan, of Cardiff.

Last week the Philharmonic Music Hall, Cardiff, was reopened, after having undergone complete alteration and renovation. About seven weeks ago the building was closed, and the work, which was then begun, was kept going practically day and night until the opening. Every particle of the inside was swept away, and a new proscenium, boxes, balcony, and promenade erected. The alterations were carried out by Mr. J. E. Jackson, builder, Cardiff, from plans and under the superintendence of Messrs. James and Morgan, architects, Queen-street, Cardiff. The decorations were executed by Messrs. Geo. Jackson and Sons, and the linerusta work by Messrs. Fredk. Walton and Co. Entire new scenery has been set by Mr. H. Churchward—all of London.

The brother officers of the late Lieut. R. A. Theodore Dury, of the 2nd Battalion South Wales Borderers, have just placed a mural brass cross to his memory in the nave of Rochester Cathedral.

A new bridge which spans the river Tweed at Norham, and which has cost about £10,000, was opened on the 15th inst. It consists of four arches of stone, and is after the Norman style. The outside arches on the Scottish and English sides of the river respectively have a span of 85ft., with a rise of 18ft.; while the centre arches have each a span of 90ft., with a 20ft. rise. The height of the bridge from summer water level to the crown of the highest arch is 38ft. It is 400ft. long and 16ft. broad. The engineers were Mr. Codrington, C.E., and Mr. Brereton, C.E.; and the contractors, Messrs. Meekan and Deans.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Edinburgh Association of Science and Arts.—At the second meeting of this Association for the season, held on Dec. 19th, a paper on "The Foot Trapping of Soil Pipes" was read by Mr. W. P. Buchan, Glasgow. Mr. Buchan said that, more fully expressed, his subject was, "Is it better and safer for the inmates of a house that, when it can be done, the soil pipes should be trapped off outside from the drain, or that the soil pipes should be used to ventilate the drain?" Having referred to the old-fashioned trap with the eye in the centre, he said many hundreds of these traps had been taken out of late in Glasgow and all over the kingdom, and others substituted. In 1875 and 1877 he brought out traps which, in addition to the benefit of the cascade, allowed the house side of the trap to be fully seen. These had been used not only in this country, but in America. Various attempts had been made to improve on his trap, but he did not think the alterations were improvements. In the case of tenement houses, so many of which had a soil-pipe coming up the middle of the building, it was difficult to do otherwise than allow the soil pipe to ventilate the drain. In the case of villas and mansions inhabited by the owners it was, however, different. He asserted that the sectional system was the safest and best. All the branch pipes coming into the main drain should be trapped off from the main drain, so that no foul air could get up any of the soil or rain pipes. Some people, however, said that it was wrong to prevent the foul air of the drain going up the soil pipes; they said the more ventilation they could give the drain, the better. The engineer, however, should not so much look after the drain as after the people. A drain might be sufficiently ventilated by one pipe, and no more needed two or more blow-off pipes than a fire required several chimneys. Without traps, disease germs might be carried from one soil pipe to another, and thus to the people in the rooms. Sanitary appliances should be fitted up in such a way that as little harm as possible would result should anything go wrong. The reverse had been the case for many years. The discussion which followed was principally favourable to Mr. Buchan's views.

Sheffield Society of Architects and Surveyors.—The second meeting of the present session was held at the School of Art on Tuesday week, when an address was given by Mr. J. W. Connon, F.R.I.B.A., of Leeds, on "The Legal Registration of Architects." Mr. T. J. Flockton, president, occupied the chair. Mr. Connon advocated the legal registration of architects on the basis of the existing registration of the legal and medical professions. He showed its advantage (1) to the student, (2) to the architect in practice, and (3) to the public. He urged the desirability of union amongst architects in pressing this question forward for the consideration of Parliament. A discussion ensued, in which Messrs. C. Hadfield, C. J. Innocent, E. Holmes, W. C. Fenton, E. M. Gibbs, and W. F. Hemsoll took part. Eventually, on the motion of Mr. Innocent, seconded by Mr. Hadfield, a hearty vote of thanks was accorded to Mr. Connon for his address.

The tenders for the construction of the new Pier at St. Leonard's has been signed, and the work of building commenced. The tender of the successful contractors is £15,139; and a further sum of £4,500 will be set apart for the erection of a pavilion, kiosque, and wind shelters.

The bronze statue of the Duke of Buccleuch by Mr. Boehm, R.A., London, was set up on its pedestal in West Parliament-square, Edinburgh, on Friday, and will be unveiled shortly.

Extensive alterations are being carried on at the Friars carpet works, Bridgnorth, including winding-room, starching-room, drying stoves, engine-room, and boilers. The work is being carried out by Mr. W. Bate, builder, of Bridgnorth; and Mr. J. T. Meredith, of Kidderminster, being the architect. The cost of the alterations will exceed £3,000.

The Church of St. George, Oldham-road, Manchester, erected ten years ago, has just been completed by the erection of a belfry stage and stone spire, at an expense of about £2,000. The completion of the work was marked on Friday by a dedication sermon by Bishop Cramer Roberts.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the Building News, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., and XII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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RECEIVED.—F. G. U.—W. B. S. and Son.—W. T.—R. L. L.—Rev. F. G.—A. and Co.—E. H. W.—T. B. and Co.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Arry," "Pecksniff," "Herani," "W. H. L." in circle.

ANXIOUS ONE. (The selected designs and review will appear next week.)—GEORGE STREET. (Black Indian ink is better than Prout's brown, as the lines are finer.)

Correspondence.

EXAMINATIONS IN ARCHITECTURAL ÆSTHETICS.

To the Editor of the Building News.

Sir,—Mr. T. Graham Jackson, in the interesting paper that he read before the Architectural Association last Friday evening, asserted that it was not possible to ascertain the depth of an architect's knowledge of, or the extent of his power to produce, the beautiful in architecture, by any test imposed by examination.

With respect to *style*, doubtless Mr. Jackson's view is correct, and most persons will hold a similar opinion. But can this be said with regard to *principles?* Are there not certain laws of architectural design which, though they be ever so neglected, are yet at the basis of all true material beauty, and will so remain to the end of time?

It will be found that it is upon matters of style that we disagree; not upon those of principle. There are questions in design upon which all agree: they are those of principle. There are points upon which all differ: they are those of style. Style is the outcome of inborn taste, association, use, and circumstance. Principle is the firm-set rock to which we may safely anchor, and bid defiance to the storms of fashion.

You, Sir, in your columns, have often urged the necessity for a deeper study of first principles of design; and you have pointed out the vanity of all attempts to produce noble and living works of architecture by mere study of style and the acquirement of an extensive knowledge of forms and features. May I add that there would seem to be a solution—partial, at any rate—of the difficulty of Mr. Jackson, in the institution of a system of examination that would ignore questions of style, and deal solely with those questions of first principles which, as you have said, underlie all styles of design?

Surely these principles are neither so abstract and recondite, nor so indeterminable and indefinable that they could not be grasped by the least intelligent of students. And surely *they* would form the proper subject-manner for questions at examinations, of which a student could give as certain proofs of having mastered as a schoolboy could of having learnt his *Pons Asinorum*. It would appear to me that in the institution of an examination on first principles of architectural æsthetics, we should find a solution of the problem of art-examinations, since no one will essay to question the soundness of those principles and unalterable laws that constitute the *science of the art* of architectural design.—I am, &c.,

R. Owen Allsop.

THE DRAUGHTSMEN'S PROVIDENT SOCIETY.

Sir,—Will you allow me to point out to architectural draughtsmen and draughtsmen of kindred professions that the above society has now been formed and is already in full working order? And perhaps you will permit me at the same time to briefly sketch out some of the society's aims and objects.

Its objects, then, are the payment of a weekly monetary allowance during illness or disablement, the lending of small sums to members who are in distress, and the payment of a sum on the death of a member.

The qualifications necessary for entrance to the society are that the candidate for admission must state in what profession he is a draughtsman, and furnish a medical certificate of good health to be submitted to the committee for acceptance. There is, it goes without saying, a reasonable limit as to age.

Every member will be at liberty to contribute for payment during illness of not less than one guinea per week, according to the secretary's tables. He will also be able to join the Loan Fund provided he is a member of one of the other two funds before mentioned at the small quarterly payment of one shilling, which will enable him to borrow a substantial sum of money to tide him over difficulties when out of employment. These loans will be made free of interest.

The foregoing are some of the advantages which can be secured by belonging to this society, and it cannot be denied that the want of such an institution has long been apparent, the only wonder being that one was not started before, draughtsmen, up to the founding of this society being about the only class of toilers who had no provident institution of their own. Those who are desirous of joining should do so at once by applying to Mr. Middleton, at St. James's Hall, the first hundred members complying with the stated requirements being admitted free of entrance fee, which will not be the case with those who come later in the day.

A public meeting, I may add, will be held at St. James's Hall on January 9th, 1888, at 7.30 p.m., to consider the rules drawn up by the committee, and to this meeting all draughtsmen who wish to join or to learn more about the society are invited.—I am, &c.,

H. Greenway.

Cavendish-road, Brondesbury, Dec. 20.

SAFE STAIRCASES.

Sir,—I notice in your issue this week you comment on my idea of a staircase.

I do not advocate a "straight-away staircase" except with constant landings and strong handrails on either side of the staircase.

What I did say was that the ellipse was out of the question as a form for a safe staircase for public use; but that it was a question whether the square or straight staircase was really the best. But both these forms were undoubtedly better than the ellipse.—I am, &c.,

Walter Emden.

105 and 106, Strand, London, W.C., Dec. 19.

PERSPECTIVE.

Sir,—Some gentlemen whose sphere is teaching, and whose teaching spheres seemingly require to be taught what a sphere is, as they try to demonstrate, and would have us believe, that a sphere may, and should be, sometimes something else. They remind me of the perverted heraldic painter who would not believe that the beast shown him at the Zoological Gardens was a lion. So these spherical sophists befogged with rule would e'en correct nature when she fails to conform to the scholastic theory; and the mischief of it is, they are miserably misleading others.

Nature before art, say I; truth before theorem. A sphere I declare to be always a sphere, and never to be represented but as a circle. If the rules of perspective show otherwise, then *the rules are wrong*. It needs to be borne in mind that the so-called science of perspective is at best imperfect, and some rules that are taught, known as horizontal perspective, are radically wrong—utter rubbish. In order to approach nature it is necessary that of the lines bounding view do not make an angle of more than 30° to 40°; but even then there will be a modicum of error, as the field of view or plane of picture should really not be, as we make it, a straight line. Each pencil of light should be intersected at a right angle; thus, the pencils impinge upon the retina of the eye. The picture plane ought to be a curve struck from standing point of spectator. However, within the angle named the deviation is not great, but with extended angle comes glaring misrepresentation. This is more particularly seen in horizontal perspective, by which at sides of picture objects are utterly distorted; spheres would thus, no doubt, be out of shape, for all is wrong. But don't let us pretend and teach that this is perspective. We must not lose sight of common sense—the best of sense!

I am surprised that an art teacher should justify the "fudging" of perspectives. Falsehood is as bad in an architectural drawing as in speech. It would show want of rectitude, and, if suspected, utterly destroy the value of the work.—I am, &c., M.

THE AGE OF ELM JOINERY.

Sir,—As my men were engaged the other day restoring the entrance door of Exeter Guildhall, they discovered the date 1593, which had previously been hidden by successive coats of paint.

This, of itself, would not be a remarkable discovery; but, upon closer examination, I found what to all intents and purposes seemed a solid oaken door, was nothing less than an *elm* one—the oak carving being pinned carefully on each face of the door. Undoubtedly, the elm is of the same date, and therefore has endured for nearly 300 years.

We are so constantly told that elm will only last a great age under water, that I venture to ask if any of your readers know of any elm joinery that has lasted over 200 years?

If so, the question arises: Under what conditions must the wood be seasoned to attain lasting properties like unto the old Guildhall door?—I am, &c.,

Crediton, Dec. 18. W. Dart.

"COMBINATION SET-SQUARE."

Sir,—The above has been in use in my office more than ten years.—I am, &c.,

C. J. Innocent.

17, George-street, Sheffield, 19th Dec.

The foundation-stone of the New Grammar School, at Cheltenham, was laid on the 14th inst., with Masonic honours, by the Right Hon. Sir M. Hicks-Beach, M.P. The new buildings will accommodate 300 boys, and the contract amount is £6,250. Messrs. Knight and Chatters are the architect.

Adjudications in bankruptcy have been made in the cases of James Whitaker, Cromwell-gardens, West Kensington, builder; Henry Cochran, Burton-on-Trent, late of Stapenhill, Derbyshire, builder; and William Wright, Ipswich, builder.

M. Edmond About's monument in Père Lachaise Cemetery was unveiled on Tuesday. The sculptor is M. Crank, who has represented About seated in an armchair, dressed in the loose coat which he usually wore indoors.

Intercommunication.

QUESTIONS.

[9506.]—**Hydraulics.**—I shall be glad if some experienced reader will let me know what weight a piece of oak, 2ft. 6in. × 18in. × 4in., will support when placed upon still water 8ft. deep, and to what extent would the weight immerse the block? It would be interesting also to know how the result is arrived at.—Buoyant.

[9507.]—**Vaulting.**—Professor Willis, in his "Essay on the Vaults of the Middle Ages," has this passage (page 25): "The apparent mutual independence of the ribs is increased in the best specimens (of vaulting) by the manner in which they start from the abacus, some being more prominent than others. This is easily managed by placing the feet of the curves at different distances from the centre of the abacus" Will any of our readers kindly tell me if this method of starting the ribs is a purely æsthetic one, or whether it is governed by constructional considerations? It would seem that the plan which the group of mouldings form upon the abacus is arranged entirely to suit the taste—for example, the fillets of the several ribs might all be placed at the same distance from its edge, always provided that the ribs free themselves from each other at the same level, as their curves are set out quite independently of each other, according to their height and the distance they have to travel to reach the ridge. If, however, some ribs are placed upon the abacus more prominently than others for constructional reasons, is there any rule by which their arrangement is determined? I suppose the diagonal ribs, being the longest, would be placed further back than the rest, and so on. Professor Willis says nothing more about this in his Essay, but supposes all vaults to have been set out according to a sectional plan taken at about half their vertical height. Any explanation of the above will greatly oblige.—A. C. W.

[9508.]—**Colour.**—I have observed that upon looking through a piece of deep coloured ruby flashed glass on the blossom of the common scarlet geranium, the latter, instead of appearing to increase in redness, becomes pale, nearly white, and scarcely to be distinguished in colour from a piece of white paper. What is the explanation of this? I have been reading the works of Church and of Benson on "Colour," but these do not solve the matter for me. They say that light transmitted through red glass has the green and blue rays cut off, and that the glass is permeable to the red rays only. If this were so, the redness of the geranium flower should be increased in intensity instead of being nearly blotted out. I have tried the same experiment with other reds—*e.g.*, Japanese lacquered trays, red book-covers; but in these cases the reds are intensified. I may mention that the glass is of the common description used by builders in the narrow margins and corners of staircase window sashes, and that what I meant by flashed glass is that the body of the glass slightly over 1-16in. thick, being colourless, the ruby colour is flashed over on one side only in a very thin film.—W.

[9509.]—**Plugging Wall.**—Will some reader of the "B. N." kindly tell me how to securely plug a wall so that bracket lamps can be safely fastened to them? Several times they have been firmly wedged and the brackets screwed to the wedges, but in time the latter work loose and get shaky and dangerous. — Woodrose.

[9510.]—**Letting Land.**—Will some reader inform me what are the usual charges for letting land on building lease for 99 years? I was the appointed agent and surveyor, but made no arrangement as to any charges. I have prepared most of the plans for the houses built upon it.—R.

[9511.]—**Etching.**—I am anxious to learn etching, and shall be glad if anyone will give me any hints on the matter, either as to books on the subject or as to where the necessary instruments, &c., can be obtained.—Needle.

[9512.]—**Tables of Depreciation, &c.**—I shall be glad if anyone can tell me where I can find any tables on depreciation, sinking fund for leasehold property, and how same is worked out.—Ground Rent.

[9513.]—**Damp-Courses and Concrete over Site.**—I imagine damp-courses are only necessary in damp situations. The Model By-laws generally in force make no distinction, but indiscriminately insist on laying same in all buildings. I should like to know whether this by-law is universally insisted upon, or whether it can be safely ignored where it is not necessary? Is it advisable to comply with the by-law demanding 6in. of concrete over site of building where subsoil is dry, hard, and compact? How could a damp-course be best manufactured on the site from mineral tar?—Confusion.

[9514.]—**Certificated Inspector of Nuisances.**—I am desirous of becoming a certificated inspector of nuisances. With the Public Health Act, 1875, what other books would be best to acquire and study? When is the next examination, how often, and where are they held? An answer from "A Member of San. Institute," or any person who has passed recently, would oblige.—Enlightened.

REPLIES.

[9471.]—**Music Hall.**—I am sorry for the mistake, but it was not mine. I wrote "Vol. 36" in Arabic figures, but a printer's error, by leaving out an X. in translating this into Roman numerals was the cause of the disaster "E. W. H. P." complains of.—A. C. W.

[9486.]—**Earl Strongbow.**—In a recent note upon Strongbow's monument in Christ Church Cathedral, I remarked that I thought it, and the one by its side of the warrior's unfortunate son, to be of polished Purbeck marble. Mr. T. Drew, writing me on this point, says the truncated boy referred to and an interesting effigy of a lady (circa A.D. 1170-80), which I remember seeing in the chapel of St. Lawrence, are the only existing specimens of old Purbeck marble in the Cathedral. The monument attributed to Strongbow is of Irish limestone; but Mr. Drew points to the curious fact that the arms of Fitzosbert occur upon this tomb, making it very doubtful, indeed, whether this is the original monument which it is recorded was "broken by ye falle of yt Rofe and bodye of Christes Church." He believes the original monument was probably Purbeck, as was, so far as he can judge, all the other stone used there in the 12th and 13th century. What the fine oolite is that the present cathedral is built of, and which has stood so well, it would be very interesting to know.—Harry Hems.

[9490.]—**Measurement of Shafts.**—The flue either should not be deducted, or an extra price per rod should be allowed for the labour of forming and lining the flue.—G. H. G.

[9501.]—**Waterproofing Tank.**—In reply, I think there is nothing better than good fine Portland cement for pointing the glazed brickwork if done carefully; but it should have been made watertight in the construction, unless intended to be cemented after building, as the best means of insuring perfection.—Jas. Pulham.

[9501.]—**Waterproofing Tank.**—"B. P. G." would find the bituminous material, "Hygeian rock composition," suitable for pointing, if Portland cement fails.—G. H. G.

[9503.]—**Stock Size.**—"N." must be a very young practitioner to make the proposition he has done in your last number. The scantlings for roofs and floors of various dimensions are computed from data furnished by Tredgold and others. He should follow the practice of architects in days past now: spend some time in a builder's establishment, and become acquainted with the best manner of dividing the logs and planks imported into useful scantlings, and adapt them to the required purpose.—Z.

[9504.]—**Liability for Damage.**—The question is a difficult one to answer without knowing all the facts of the case. How can an old gable have all the weight of the new gable? Under the contract clause quoted by W. Scott, the contractor is liable to the owner if the extra weight of the new building has caused the adjoining lower gable to settle, as the new building, though heavier, is supposed to have been built with due precautions. With regard to the second question, the architect, under the circumstances, would have a right to retain any balance due to the contractor.

LEGAL INTELLIGENCE.

Re Esdaile and Co.—A first dividend of one shilling in the pound has been paid this week in the bankruptcy of Esdaile and Co. The total receipts since the date of the receiving order have been £13,028 4s. 6d., which, after deducting £8,112 12s. 7d. for payments as per trading account, leaves £4,915 11s. 11d. Of this, £2,889 19s. 9d. goes to the creditors, a balance of £350 is carried forward, and the rest goes in fees, law costs, manager's charges, allowances to bankrupts, &c. The debtors' estimate of amount expected to rank for dividend was £38,803 4s. 4d. The assets not yet realised are estimated to produce £1,750. The balances at the bankers were retained by them against the debit balances on the discount accounts of the debtors. The greater part of the stock and all the horses were distrained upon by the landlords and sold by them. The machinery and trade fixtures, owing to certain legal difficulties existing in connection with them, were sold for £500. The furniture at 27, Nicholas-lane, was distrained upon by the landlord and sold by him. Creditors can obtain any further information by inquiry at the office of the trustee, Henry Brown, 7, Westminster Chambers, Victoria-street, Westminster.

Alleged Infringement of Lift Patent.—Ellington v. Clark, Bunnett and Co.—(Chancery Division, Dec. 8, 12, and 19. Before Mr. Justice Kay.)— The plaintiffs were the patentees of an improvement in hydraulic lifts, such as are used in warehouses, hotels, and other large buildings. The great feature of the plaintiff's invention was that it economised the water. It was alleged that before the plaintiffs' invention the whole or nearly the whole of the water which was used each time the lift was raised was allowed to go to waste. The plaintiffs conceived the idea of so constructing the lift that only that portion of the water which was required for the purpose of raising the ram and cage should run to waste. The means whereby this was accomplished was, roughly speaking, by applying pressure separately at different points of the ram, and, by keeping the pressure constant at one point and varying it at the other, the lift could be lowered with the loss only of the water used at the point of varying pressure. In the plaintiffs' invention the constant as well as the varying pressure was a water pressure. The defendants had constructed hydraulic lifts which, according to the plaintiffs' allegation, were identical with those of the plaintiffs, except that the constant pressure was a weight which was applied at a different part of the machine. The defendants denied the infringement and the validity of the patent, alleging that the plaintiffs' invention had been anticipated by an invention of a Mr. Berly, the specification of which was filed a few days before that of the plaintiffs. Among other witnesses the plaintiffs called Sir Frederick Bramwell, who stated that the similarity between the plaintiffs' machine and that of the defendants consisted in the use of an annular piston and in the operative water being separated from the force which did the balancing. The dissimilarity consisted in this—that, according to the plaintiffs'

drawing, the balancing water was in the annular area, while in the defendants' it was the operative water which was in the annular area, and that in the plaintiffs' the balancing was done by water pressure and in the defendants' by the weight applied to the plunger. The Attorney-General (Sir R. Webster, Q.C.), Mr. Moulton, Q.C., and Mr. Micklem appeared for the plaintiffs, and Mr. Aston, Q.C., and Mr. T. Terrell, instructed by Messrs. Wetherfield, Son, and Barnes, for the defendants. Mr. Justice Kay delivered judgment on the 19th inst. He carefully considered the specification of the plaintiffs and that of Berly, and pointed out that the object of the plaintiffs' invention was the economy of water, which was not the object of Berly's invention. He held, therefore, that Berly's invention was not an anticipation of the plaintiffs' patent, which he pronounced to be valid. As to the question of infringement, his lordship held that a patent such as that of the plaintiffs, being for a combination, would be infringed by the defendants if they had taken the essential part of it with a mere mechanical equivalent for the parts not taken. This, he held they had done, and that the plaintiffs were entitled to the injunction they asked and to the costs of the action so far as the same related to the plaintiffs' first patent. With reference to a second patent, as to which plaintiffs had abandoned their claim, his Lordship held that the action must be dismissed, with costs to be set off in the usual way. Upon the application of defendants' counsel, a stay of execution was granted for the purpose of appealing, and on behalf of the defendants, Messrs. Wetherfield, Son, and Barnes accordingly have given notice of appeal.

STATUES, MEMORIALS, &c.

Liverpool.—A statue of the late General Earle, C.B., C.S.I., executed by Mr. C. B. Birch, A.R.A., was unveiled by Lord Wolseley on Friday. It faces St. George's Hall, and represents the general in the act of leading his men over rocky and uneven ground with his sword held aloft. The statue is cast in bronze; the figure is 10ft. in height, and, with the plinth, measures 11½ft. The shield lying at General Earle's feet is a copy of one picked up on the scene of the action, and is now in the possession of Lord Wolseley. The sword is also an exact copy of the one the general carried when he fell. The clay model of the statue was exhibited at the Royal Academy in 1886, where it occupied the centre of the sculpture room, and was illustrated in our issue of May 14, last year.

CHIPS.

At a meeting of the Cambridge Improvement Commissioners on Tuesday, it was stated that the Surveyor (Mr. Wood) had presented to the Sanitary Committee a lengthy report upon the three rival schemes for diverting the sewage from the River Cam, and it was resolved that the same should be printed and circulated amongst the members of the board.

The public hall at Smethwick was reopened on Monday after alterations carried out at a cost of £500, from designs by Messrs. Harris, Martin, and Harris, of Birmingham.

A new temperance hall has just been erected in Wallingford. It is in the Queen Anne style, and will seat 300 persons. The total cost, with fittings, has been £390. Mr. S. C. Johns, M.S.A., was the architect, the work being carried out by Mr. Higgs, of Goring.

The Queen has been pleased to grant to Miss Charlotte Robinson, of Manchester, a warrant of appointment as Home Art Decorator to Her Majesty.

The Wesleyan chapel at Canterbury, built in 1811, has just been reseated and restored, from designs by Mr. Charles Bell, of New Broad-street, E.C., from whose plans a committee and class-rooms are being added to the schools at the rear. Mr. Walter Cozens, of Dover-street, Canterbury, was the contractor.

Colonel Rich has inspected the new northern extension of the Cleator and Workington Railway from Workington to Linefoot, where it joins the Bullgill branch of the Maryport and Carlisle line; and his report being satisfactory, a portion of the line from Workington to Seaton will be opened for passenger traffic at the New Year.

Sir Thomas Hesketh, Bart., turned, on the 15th inst., the first sod of the Stratford-on-Avon, Towcester, and Midland Junction Railway. The new line will be 11 miles in length, and will extend from Towcester to a junction with the Midland system, two miles north of Olney, and will form a new and direct route between Stratford-on-Avon and London. Messrs. R. Liddell and Richards, of London, are the engineers; Mr. Beverley Griffin is the resident engineer; and Mr. Saul Isaac the contractor.

Our Office Table.

A distinct and important stage has been reached in the Birmingham Improvement Scheme, for, as the town council were informed on Tuesday, by the letting of the portion of land in Corporation-street between the corner of Martineau-street and Barrow's stores, the last site belonging to the Improvement Scheme in the portion of Corporation-street between New-street and the Old-square has been disposed of. Not only is this the last letting, but it is the only remaining site to be covered with new buildings, with the exception of the corner on which stands the old Conservative Club House. The Improvement Scheme, originally suggested by Mr. Joseph Chamberlain in 1875, has been in progress during eleven years, and has involved a total outlay by the Birmingham corporation of nearly one and three-quarter millions, borrowed for sixty years for about 3½ per cent. The town's operations have thus far been attended with a loss, averaging from £20,000 to £25,000 a year; but this is steadily diminishing, and the deficit, which is this year only £9,800, is expected to decrease till 1894, and a surplus will afterwards, in all probability, be shown. An area of 218,000 square yards, largely covered with unsanitary dwellings, has gradually been acquired by the corporation, and has been relaid out, the chief thoroughfares being Corporation-street, Martineau-street, and Dalton-street. In the working out of the scheme sixteen public-houses have been abolished out of fifty-seven acquired, and about a thousand unsanitary buildings have been demolished, while others have been repaired and made healthy; but no blocks of artisans' dwellings have been constructed, there being no demand for this class of property within the cleared area, on which the Assize Courts, County Court, fire-brigade station, and other public buildings, have been, or are, being built.

Builders are slow to introduce any improvements in building appliances. It is only the force of example that has led contractors to adopt of late years the overhead cranes for building in lieu of scaffolding, though it had been largely employed on the Continent and in Scotland for some years. The American genius for invention has been turned also to account in various appliances and methods of construction. One of the useful appliances that might be more generally used is the scaffold brackets by which a plank or temporary scaffold can be supported on a couple of ladders. The bracket is of wrought iron, made in three sizes, for different widths of platform, the horizontal part holding the platform being hooked on one "round" of the ladder, while a racked catch is made to hook on to the round above.

Considerable alterations are being made in the neighbourhood of the Elephant and Castle. The widening of the Walworth-road has necessitated a longer girder bridge to carry the lines of the Chatham and Dover Railway, the works of which are nearly completed. The old houses are being demolished on the west side of Walworth-road at this part. Further up, where the six streets diverge opposite the famous hostelry of coaching days, a new public-house is being built on the site of the old "Rockingham Arms" at the corner of Messrs. Tarn's premises, which have frontages in the Borough and New Kent-road. We wonder if the alterations will be a real improvement to this great southern centre? Sometimes it is otherwise. The alterations at Camberwell-green have destroyed a picturesque and semi-rural locality by the erection of lofty shops, and it can hardly be called now a suburban residence.

Painters and sculptors, remarks the Paris correspondent of the *Daily News*, have no reason to complain of the Republic. There never were so many statues and sculptured monuments erected in honour of great men as within the last ten years. The bare walls of the mayoralties are being covered with decorative paintings of a high school of art, in which allegory is modernised and made to represent the poetry of everyday life. An exhibition has been opened at the Hôtel de Ville of the works of sixty-one artists, who are competing for an order to decorate the ceilings of the Wedding Hall at the Mayoralty of the Sixth Ward. The each send three subjects, which are to fit in as many square divisions. Each subject taken from the trilogy, Liberty, Equality Fraternity. The calm sentiment and the simp manner of Puvis de Chavannes has visibly in fluenced the artists. M. Besnard was allowe to send to this exhibition three panels for th Weddings Hall of the Mayoralty which face the Louvre. One has for subject The Mornin of Life, and represents a spring morning, fresh dewy, roseate in a South of France vineyar which is the scene of an idyll. The Evenin of Life is personified by a rustic Baucis an Philemon, who watch a mellow autumn sun set from a bench at the door of a thatche cottage.

We hear that the Post-Office building a Chicago has to be bolted together by iron rod owing to bad foundation and construction. I this is so, who is to blame? The idea of attr buting the failure to poor materials and fault construction, says the *Builders' Gazette*, is a balderdash, and points to the office of th supervising architect as the place where blam should rest. These buildings ought certainl to be models of good construction, if their in fluence on other buildings is to go for any thing.

Trade News.

WAGES MOVEMENTS.

Edinburgh Joiners.—At a meeting of th joint committee of operative joiners held on Satur day night at Edinburgh, it was reported tha twelve employers met on Thursday night last t consider the wages question; but owing to th smallness of the meeting it was not considere advisable to notify a reduction at once, but it wa agreed to issue voting papers to all the employer asking them whether they were favourable to a re reduction or not. Circulars were accordingly issue on Saturday. It was stated that the proposed re duction was neither warranted by the state of trad in Edinburgh nor the country generally; and i was resolved to warn all shops and squads to be o their guard, and to be ready to resist any attemp at interference with present arrangements.

CHIPS.

At the last meeting of the Sheffield Schoo Board, a member called attention to the competi tions that had recently taken place amongst archi tects for plans for new departments. It seemed t him that the competitions were conclusively i favour of the capacity of Mr. Innocent to produce the required plans, and he suggested that the Board might very reasonably discontinue these competitions, which took up a good deal of time and also involved some expense. The chairman o the Buildings Committee said he believed the views of Mr. Leader were shared to a considerable extent by the committee. The subject dropped, no definite motion being made.

On Thursday Mr. J. T. Harrison, of the Local Government Board, held an inquiry at the Town Hall, at Newport, Mon., into an application of the Newport Town Council to borrow £2,000 for widening Skinner-street. After hearing the state ment of the borough surveyor, there being no oppo sition to the application, the inspector said he would forward his report in due course.

Dr. Theodore Thomson, who has been medica officer of health at Aberdeen for the past eighteen months, has received an appointment to a similar post in Sheffield at a salary of £500 a year.

Princess Christian unveiled on Friday, at the Royal Holloway College, a statue of the Queen, which has been executed in Tyrolese marble, by Prince Victor of Hohenlohe.

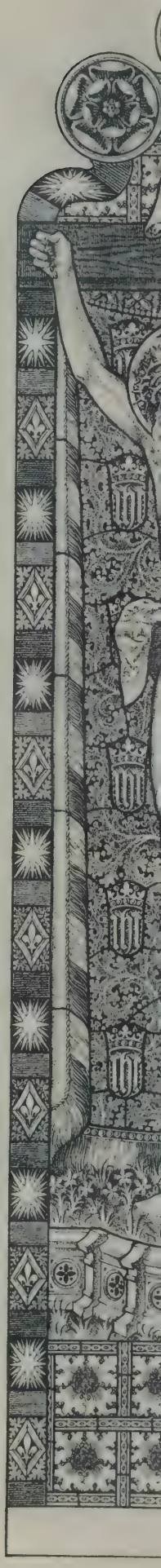
Henrich Ernst Schismer, for 35 years architect to the Norwegian Government, and the restorer between 1869 and 1871 of Drontheim Cathedral, has died at Giessen, Germany, to which town he had retired on a pension. He was 73 years of age.

The second annual dinner of the Birmingham Branch of the Institution of Civil Engineers was held on Thursday night at the Colonnade Hotel, Birmingham, Mr. E. Pritchard, M.Inst.C.E., in the chair.

Mr. T. W. Helliwell has just completed the glazing to the roofs of the new markets, St. Pancras, on his patent system, for the Midland Railway Company, the area covered being about 30,000ft.







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THE BUILDING NEWS
AND ENGINEERING JOURNAL.
VOL. LIII.—No. 1721.
FRIDAY, DECEMBER 30, 1887.

ARCHITECTURAL ENLARGEMENT OF BUILDINGS.

THE difference between designing a building and enlarging or restoring it, is very considerable, as many architects know who have been called upon to enlarge an old house or church. Simply adding a room or two as a wing to an old house may be easy enough work, when plan only is thought of; but when the elevation has also to be considered, the architect is expected to exercise a good deal of skilful adaptation in bringing the new work into agreeable unison with the old, and avoiding the appearance of addition. Here, too, is a problem about which all are not agreed. Should the attempt be made to disguise the appearance of addition, or, on the other hand, to boldly pronounce it? Some are strongly of opinion an addition should be a combination—a uniting with the old in such a way as to make both parts look one. They say with some justice, that the whole effect should be studied rather than only a part; that the style should be carried out, and that the design of the original architect should not be destroyed or interfered with. Others think the accretions should be rendered visible, and that it is destroying the original architect's design to make an addition that will at once alter the proportions. Now, of course, the practical architect is the best judge as to which course he should pursue. Sometimes he may find it possible, without interfering with the original integrity of the design, to add a wing or two on either side of an old Classical type of house, or to extend a gable, or make an addition to an old Tudor or Jacobean building in the same style; at other times to treat his work as an independent addition, asserting itself as such, rather than to attempt to destroy or conceal the evidences of the older structure. Time's hand quickly subdues and harmonises, and whether we adopt the first or the second mode is a matter, after all, of little vital importance—so long as our work is not a deformity, or by its connection with the old ignores those first principles of design and good taste which ought to prevail. Unfortunately, an enlargement often turns out to be a monstrosity, a building higher and clumsier in detail than the original, and so awkwardly joined to the old that it destroys all the interest and merit of the original design. We can hardly think such an addition is the work of an architect, but of some builder who feels little interest, and who is ignorant of detail. Many of the old 17th-century houses have been mercilessly tampered with by village builders and carpenters who have been called in to add a new wing or a billiard room, or it may be only a bay window. Their work is sometimes a cruel distortion, though attempting to bring the new portion into harmony with the old house by making a gable, for example, of the same design or pattern as the existing one; though, alas! much wider, to suit the wider rooms. Of course the design is irretrievably spoilt by such an attempt at harmonising, and yet we have seen monstrosities of the kind perpetrated. As the curves of the gables had to be flattened vertically or expanded horizontally, the new gable looks more like one of those indiarubber toy faces which children can elongate or flatten. We might give as examples a few instances of the ludicrous attempts made by this class of builders to connect new and old buildings, or to bring them into "harmony." In one of these a gabled porch of the 15th century character was repeated to make another entrance, but so narrow as to cause the gable to look more like a huge pinnacle at a little way off, the idea of the builder being evidently to maintain—which he thought to be desirable—the horizontal lines of the façade; but the most barbarous attempt we have seen was the masking of an old brick 16th-century house by a "compo" front in "Classic." Without question, the "harmonising" mania has irretrievably ruined half of our old houses and churches. What would the old builders have done? We look in vain for any evidence of such additions as we have described; wherever they occur, they are perfectly independent in style, and seldom do we find any endeavour to bring into a balanced unison the new part with the older.

What do we find amongst our old churches scattered through the land? Aisles of later date than the naves to which they have been added; of different widths and heights; Late western towers tacked on to Early English churches; naves of different—often later—date than the chancels, sometimes of two or three styles. Early addition and later insertion are visible and recorded. Look at any ancient parish church, and see the diversity of the windows, both in size and style—here a Late, flat-headed Perpendicular window close beside one of Decorated or Early English character, there a five or seven-light window next to a double-light. The whole history and development of church architecture is a most instructive and interesting illustration of enlargement as carried on by the Mediæval builders. Had church architecture been practised on the modern builder's idea of making every new addition a copy, it would never have afforded the ever-fresh interest it possesses to all who can read history in stones; there would have been a sameness and repetition that would have tired and wearied. As it is, the venerable parish church unrestored, with its legends and traditionary lore clinging to it, is a time-written record in stone which all who run can read. Restore it, or destroy its 16th-century additions, and bring the edifice to one style throughout, and no one will care to look at it; even the modern architect himself will look at it wearily, and only because, perhaps, a Sir Gilbert Scott has had a hand in its restoration, or it is the design of some architect who has stamped his individuality upon it. It may be worth while to trace how the ordinary church grew and expanded itself as time went on. The history of every one of our cathedral churches exhibits the extension of the choir or the addition of a Lady-chapel eastwards; an extension of the nave, or a rebuilding of it—sometimes of the transepts owing to the fall of central tower; these various accretions to the original fabric being all visible and in different successive styles—never a harking back to the Norman of the original. We can verify this law of growth by an examination of Canterbury, Norwich, Winchester, or Ely, or any other of our cathedral churches. At Canterbury the steps are well marked and easily traced. We have first Lanfranc's Norman church, with its short old eastern termination and apse; next, its enlargement by St. Anselm or his prior, Conrad; afterwards follow the later rebuilding of the two Williams; and finally the additions of chapels and Beckett's crown. The progressive changes in the character of the work have been noticed by the late Professor Willis; and Gervase's description has been traced almost stone by stone. Thus in the "Choir of Conrad," begun in 1175, can be traced both Norman and Early English details. At Winchester, every successive stage is to be seen. The additions to the presbytery, the Lady-chapel, the encased Perpendicular nave are all distinctly traced, and the original Norman in the transepts of Wakelyn. In our parish churches a similar process of development is to be observed in the old cruciform plan. The addition of a north aisle to the nave, as Mr. Micklethwaite has observed, was about the first alteration. Next followed one on the south side, except where that was impossible. Then we find an extension of the nave westwards, and the addition of a western tower; and, finally, the addition of a clerestory to the nave. The addition of aisles often destroyed the original cross plan. In all these changes no attempt was made to make the additions harmonise with the older work. On the other hand, we see aisles tacked on to the old nave of very different widths and heights, and with details totally dissimilar. The modern church architect has imitated the result without observing the principle of growth. He plans his church with nave and two aisles, chancel, vestry, and organ chamber—a copy of the old church with its four centuries of accretions; but his work looks mechanical and uninteresting. Accidental additions, the growth of ages, have been copied by him as a perfected arrangement, without thinking that had the old builders the planning of a new church for a large congregation, free from the restrictions of the Norman building, they would have set about a different plan.

But what we have mostly to observe is that these additions to old churches assumed a character of their own, and that no effort was made to disguise them by making them appear portions of the original design. The original plan had to be enlarged, and the builders set about it in a practical, commonsense manner, with no intention of inducing people to believe the church was originally built so. Every addition to such a building must more or less destroy the original design or make it subserve its new purpose; to try and make them agree would have ended in failure. Regular or symmetrically planned buildings are always less easy of enlargement than those of irregular shape, and hence it seems to be the duty of an architect who has the design of a building, say a block of schools or a hospital, to consider the probabilities of extension. A regular plan defeats this attempt, but an irregular one can often be developed with success. On a cramped site the structure may therefore be designed more as a perfect whole. Probably we have, for these reasons, an explanation of the prevalence and popularity of the irregular or Gothic styles for country buildings, and the Classical styles for town edifices. Take again an old parish church. The increasing accommodation necessary led the Post-Reformation builders of the 17th and 18th centuries to add galleries as the only method of enlargement to aisled churches; the Gothic revivalists sometimes increased the church by adding transepts. Even the galleries had the merit of being genuine additions, without any intention of being otherwise than means of increasing the number of seats, and on that account are historic records of the age of the Evangelical revival of the 18th century, when Wesley and his followers drew large crowds.

We have pointed to a few examples of enlargement with the object of showing that additions to a building cannot be always made to assimilate or agree with an original plan. Wherever the attempt has been made to add a new wing or an aisle and make it agree with the old design, the success has been very questionable, unless the architect has provided for additions in his plan. In all buildings where enlargements are contemplated, the architect would be consulting his own interests and those of his employers by sacrificing an immediate perfection of his design to providing for its future realisation. In the erection of new churches this plan ought to be invariably adopted, instead of following the common practice of building a complete edifice—cathedral-like in its com-

pleteness—which has no provision for the demands of a growing parish. In many of our recent edifices this precaution is being taken, thus adopting the sensible course which the old Mediæval builders of our churches followed in many instances.

RESPONSIBILITIES OF ARCHITECTS AND BUILDERS FOR STRUCTURAL INJURIES.

THE divided responsibility of the owner, architect, and contractor in a contract for building has made it sometimes rather difficult to say whether a contractor is really to be held liable for any failure or accident that may occur during the progress of the work. We will take a very usual instance. A builder takes a contract to pull down and rebuild some premises. The old party wall has to be under-pinned, and made thicker, to carry additional stories, and after the work has been proceeded with and nearly completed, the adjoining owner's wall settles, causing unpleasant cracks to appear in the rooms. The adjoining owner, therefore, claims damages of the building owner, which, of course, he has a right to do, for the injury done to his house. The fact that one house is in contact with another, and that one of them, more or less, receives support from the other, imposes an obligation on the building owner to use increased care in taking down his building. The adjoining owner may have a "right of support" by virtue of which he can apply for an injunction to restrain the building owner, or if injury has been caused, he can bring an action for damages—one or both of these remedies are open to him; but even when he has not acquired the right of support, he can still call upon the building owner for redress, and who will be responsible for any damage he may have caused. We may say, indeed, according to the ruling of the Courts, a man has no legal right to underpin a party-wall between his own and his neighbour's house if by so doing he is risking the safety of the latter, though it would often be impossible to know whether the underpinning could be safely performed or not. But to proceed with our supposed case. The building owner being called upon to pay damages for the injury caused to his neighbour's house, looks to the builder for restitution. Is he liable? The latter can say he has carried out to the letter the intentions of the architect, that every care was taken to prevent any injury to the adjoining building. In turn he says the employer or his architect are responsible.

On sifting the cases that have been brought before courts of law, it will be seen that the owner is generally held responsible, if he was aware of the risk attending the alteration. The reports of these cases are, however, conflicting with the general rule of law, which makes a contractor liable for the negligence of his workmen, and therefore it is safer for the architect or builder to rely upon the actual facts of the case. It may be reasonably asked how an employer is to know the pulling down of a building will cause an injury to his neighbour; the architect and builder are the individuals who alone ought to know whether the demolition or alteration they make is likely to inflict an injury on a third person. Yet there is a dictum of law that every person who directs the doing of an act which cannot be done at all without inflicting injury on a third person is personally responsible to that person. The taking down a wall from which an adjoining building has received some degree of support (though not by right or prescription) may be regarded as such an act, though the building owner may be quite ignorant of the results likely to follow its removal. But let us refer to two important ruling decisions, from both of which it appears that the above dictum is sustained. The first one is "Bower v. Peate." The owner of a house ordered it to be pulled down, and the foundations excavated and the house rebuilt by a contractor who was instructed to take all necessary precautions, but who failed to underpin the next house, the consequence of which was that it was injured. The owner was made liable for damages, although the builder undertook the risk of supporting the plaintiff's house and to make good any damage arising from the operation. In another instance ("Percival v. Hughes") the same principle was held. An owner employed an architect and builder to rebuild his house, and when the staircase was being constructed, the workmen negligently, and without the knowledge of the defendant or his architect, cut into the party wall on the opposite side, which caused the defendant's house to fall and to drag over the party wall of the plaintiff, thereby damaging his house. The operation of cutting into the wall was not required, nor hazardous if carried out with skill. The House of Lords decided that the law cast a duty upon the defendant to see that reasonable care was exercised, and he could not get rid of the responsibility by delegating the work to a third person, and was liable to plaintiff. So that, according to this decision, a building owner is called upon to see that reasonable skill and care are exercised in any operation performed by the contractor he employs, which involves a risk to the party wall. The parties were owners of adjoining houses, and the party wall was the property of both. The decision is one that cannot safely be relied on in the majority of cases, for an employer cannot be supposed to be competent to say whether reasonable skill and care were being exercised by the builder. In other instances the legal tribunals have maintained that where the work is of a hazardous kind both employer and builder are responsible. Of course, if an employer interferes with and controls the builder, he makes himself liable under all circumstances. The one question to be settled in all operations of this kind is that of risk, or whether any injurious consequence to the adjoining owner is expected to arise? If there is none, the contractor is liable; if there is, the employer may become responsible by any accident or injury.

The subject is so important to builders and architects that we have adverted to it at some length. The architect is often involved in some unforeseen accident arising out of the construction. He owes a duty to his client in preventing him from undertaking any hazardous work, on the other hand, and the contractor looks to him for advice. Plans and specifications may be scrupulously full and exact, and measures of precaution may be provided for in carrying out the work; still, there has been miscalculation somewhere, perhaps in the foundations, which has caused a settlement or a crack in the adjacent house. The French code is very stringent in defining the architect's responsibility. He is held responsible if he fails in superintending the work; if he permits a defective foundation to be built on; or allows the use of improper materials. If he directs a defective mode of construction, he and the builder are both liable, and his responsibility extends to the term of contractors' liability of ten years. In this country, unfortunately for architects, the question of responsibility has to be decided by judges and juries who have no practical knowledge of building. It often happens that when a contractor is held liable under his agreement for some injury to the premises of a third party, he is ready to cast the blame on the architect. In a question in our Intercommunication columns the other day, a case in point is given. The owner of an adjoining building claimed damages for an injury done to his gable by the new building, the increased weight of which had caused the injury; the employer called upon the contractor, who in turn looks to the architect. Such instances are not rare. The owner or his architect can obtain from a contractor an indemnity against any damage caused by the work, and it is only in this way that any difficulty can be removed. In many contracts there is a clause to the effect that the contractor is to be held responsible for and make good all injuries, damages, and repairs to the building and adjoining premises, and to hold the employer harmless from any claims for injuries to persons, or for structural damage to property through any neglect or want of proper care in the execution of the works. The builder, of course, who contracts with his eyes open will not by such a clause be led into a trap; but will, by increased forethought and examination, before he signs the contract make sure of any risk, and be better prepared to meet any emergency should it happen. It is in the interest of both the contracting parties that possible responsibilities should be foreseen and met. Responsibilities of the kind we have been discussing are entailed in all buildings, but more especially in the rebuilding of premises adjoining other property. The dealing with party structures always involves a certain degree of risk, more particularly when the walls of the adjoining premises have to be underpinned for the purpose of extending the depth of basement of the new building. In the metropolis there is a certain procedure described by statute, though instances of failure are common. A building owner is allowed to pull down or raise any party structure on condition of making good all damage arising therefrom to the adjoining premises, and the Act imposes certain duties on both him and the adjoining owner; but in other towns the work is too frequently left to the builder, who consults only the interests of his employer, and thereby brings upon him the penalties of the law, should any damage to the adjoining owner's property be inflicted. Both parties have rights which it is the duty of the architect to see have been carried out.

"BUILDING NEWS" DESIGNING CLUB.

REVIEW OF DESIGNS—SUBJECTS A AND B.

THE conditions and instructions for these subjects were printed in the Building News for November 4th last, and in order to judge of our award, reference should be made to that number. Over a hundred drawings have come to hand.

A DETACHED VILLA RESIDENCE, TO COST £1,500.

"Ghost," as a whole, is the best. He realises very nearly the proper idea which should govern the design for a modest villa of this type, and his scheme, while having the merit of compactness, has also the reasonable chance of being executed for the money stipulated. He fails to show how his basement would be arranged, and he does not supply seven bedrooms. These are omissions, because the instructions stipulated for them. The superiority, however, of the plan outweighs such objections, though it is but fair to the other competitors to say that they have been duly noted. The point to which we would direct attention is that "Ghost" concentrates his administrative part of the house very cleverly. There is nothing novel in this, but in a small house compactness must of necessity dominate; next, it must not be cramped, giving odd nooks and quaint corners, which may be all very well, and no doubt picturesque; but they overcrowd a small place, give it a fussy effect, cause endless trouble to keep them clean, and, what is more important still in a problem like the one before us, they cost money. First of all we will run through "Ghost's" plan, and note its faults. The front door is a little too much out of sight, making the tradesmen's door a competitor, in spite of the big gate at the corner. The entrance-lobby doors awkwardly swing against the drawing-room doorway. The

screen in the hall is unnecessary, but may have been introduced by too literal a reading of our instructions, which said that the staircase was to be screened from the entrance. We really intended that it should be out of sight of the front door by being contrived, so to speak, round the corner. The hall should have a fireplace in it, and the way to the basement ought to be better protected from the tradesmen's doorway. The kitchen is rather small. The store has no window, as all stores should, and the lobby next the back door is not big enough for practical people; while the servants' w.c. is in a thoroughfare too nearly in view of the tradespeople's door. There seems no fault with first-floor plan; and the top floor would comply with the instructions if the box-room were changed into a bedroom and a box-room managed out of the landing. The latter is not too light, and the bedroom over the kitchen would be rather small when the slope of the roof is taken into consideration. With such an indictment some may question our award, especially should their own plans not be found fault with in detail. Want of space precludes, of course, our printing such an essay. The architectural treament of "Ghost's" design may be judged by the illustration printed herewith. There is a breadth and dignified character about the house which seems to be obtained without apparent effort and with simple detail. The competitors for the second place are not easily arranged in their order of merit, and most of them fail because of the expensive character of their plans. A bad design, however, is dear at any cost, and in judging between members of our club we also must consider the points gained by merits of draughtsmanship. "Boreas" is the motto of the design which in the main deserves the second post of honour, in spite of the fact that the building looks very like a small schoolhouse as seen in the sketch. The plan is a nice one, roomy and compact, though needlessly crowded in the offices. The landing is good and the lighting is ample. A door here and there opens the wrong way, and the building is not so cheap as "Ghost's" in its finishings. We illustrate it on another page. "Northumberland" comes next with a simple arrangement of gables which attracts our attention, and in some respects we rather like his plan, though the hall is not wide enough; while a great waste of space is consequent upon the passage running along the dining-room wall from the tradesmen's door to the kitchen. The elevation facing the main road is very pretty, notwithstanding the fact that the perspective makes the building look like a toy house. "Faith" should arrange his drawings in one sheet, or at most, two, and in no case on four. All that need be shown can generally be set out on one sheet, and for illustration purposes this is a necessity which cannot be ignored. His design is of a very superior order as compared with many before us, but he has made his building too expensive for the limit named. His hall, its vestibule and landing, are a trifle too extensive for such a small house; but they are none too large in themselves, and would be very convenient. The hall, though, is none too light, and the kitchen is not an inch too big. We believe in "Faith" and hope for more from him. The arches of his porch in perspective are drawn very badly, and he ought to know better. "Aughrim" has a practical plan and a good elevation, free of fuss, and well considered generally, though crude in details of arrangement. The author has a right notion in the main, and will, with study, soon win a place in our club. "Uncle Toby" is too fond of corners in his planning, bringing his rooms together in a chance sort of way, which shows him to be a trifle careless in his work. This will not do for a man who can devise a front elevation like that before us. The perspective, too, needs more care. We note the merits of the plan, but expect better work next time. "Uncouth Swain" is a follower of Mr. Ernest George, whose influence seems now to have superseded that which Mr. Norman Shaw in his palmy days held among students. He follows his master without method rather, and without much regard to £ s. d. His composition is pretty, and his plan is clever, based, however, on the idea of a larger building, partaking too much of the character of a big house cut down. With good taste, and a little more care, "Uncouth Swain" will deserve a more refined motto. Draw by preference in pen-and-ink in future. "Use," with the late E. W. Godwin's house at Northampton in his mind, exhibits, in a bald way, and crudely drawn, by no means a bad style of small house, which would look better in execution than here. The hall is roomy and the circular staircase in the turret is ingeniously managed; but this kind of staircase is not the best for ordinary use and service. Draw more neatly, and in a more finished style on better paper. "Netsukie" we praise for his good taste in avoiding what designers call "features" and his common-sense treatment of plain breadths of walling. His design wants "go," and is devoid of relative proportions which constitute the spirit of architecture even in the smallest examples. The plan is spoilt by the unfortunate way in which the staircase is pushed up a passage beyond the service door. Do not wash over your section another time. "Brickbat" makes a design which fails because it attempts too much in the elevation, "putting it all on in front," so to speak, and on plan space is wasted in the hall and landing; added to which, on the ground floor is the ugly elongated vertibule passage. The sheet is nicely arranged; and the drawings are neatly finished. "Exonia" is free from the last-named competitor's faults, and seems a better architect than draughtsman; but his designs, if not shown in a more careful way than the sheets before us, will never stand a chance of illustration in our pages. The back staircase is unnecessary in so small a house as this. The porch to the front entrance is a proper feature, in spite of the balusters; but generally the composition externally is too commonplace. "Ars Longa" is a Scotch-like design, very well studied in detail, but somewhat pinched in effect on the front façade. Had the projecting central gable been dropped a floor, and greater prominence been given to the main gable at the angles, the elevation would have been very much better. The bedrooms are not well contrived, and double the number asked for. The central area in so small a building is quite unnecessary, and is a bad arrangement. "Transome" copies a house in Collingham-gardens, and "Mumps" does the same, only with a trifle more skill, though with even less regard to financial consequences, giving a house which would cost nearly double the amount at our disposal. We cannot go, therefore, into details with either. "Milosis" demands attention, because he endeavours to meet our instructions, and that with fair success. His second staircase, facing the tradesmen's door in a lobby all to itself, and going right up into the attics, could only be proposed by a man having no experience in housekeeping or management. We need say no more: the objection is fatal. The landing on the first floor slices the house into two, and wastes good space. The elevation is rather clever, and so are the drawings. "Jumping Frog" proposes an ambitious country residence in every way beyond our means and intentions. We can see that he knows what he is about, and draws well, taking pains with his work; therefore, we expect him to rank higher another time. "Pupil" and "Westminster" conclude the designs classed among those of the first order of merit.

The contributions which rank second are too numerous to allow of our particularising them in detail; but we have carefully arranged them in order, and thus name their mottoes. "Lawton's" house would be a fairly good one; the hall would look spacious with the screen at the end, and the elevation is effective. The porch to "Huz's" design is too large and clumsy, making the hall dark, and overcrowding by its scale the otherwise neatly composed façade. "Simplex et Prudens" suggests a familiarity with the red-brick houses of Queen's-gate and Cadogan-square. In this study he is right, and we commend him for following good examples. Cost is against him this time, else the building is not a bad one. Had his drawings been better, he would have been placed much higher in our list. "Spare Time Well Spent" draws well, and should spend more of his leisure in the study of good examples of house-building. With this his results will no doubt improve. At present he lacks ideas. "Hudibras" is too lordly in style with the tall portico to his front door. It puts so false a face on a simple man's home, and is out of place in such a house. "Ossian," if not so niggling, would be better than the last; but then his hall has no light whatever. "Bee" has a really good plan, but his elevation looks all doorways of all sizes. "Hernani" is simplicity itself, and poor in style; but the plan ranks high in our opinion, though it is wasteful on the ground floor in its administrative parts. "Mancunium" is less compact still, and rambles about regardless of roofing and money. "Rusticus" will do better, but his plan is crude, and his elevation is wanting in composition and proportion. "Samivel" knows how to plan, but not quite how to design, a house externally. The view is chiefly answerable for our opinion, as the front elevation is passable. "Wolfruna" is scrappy and scratchy, both in drawing and design. "Abington" draws in elevation well, and ought to rise soon. "Veritas Vincit" has a barbaric porch, but otherwise not a bad notion generally, though in detail his plan is poor. "Aidsan" is certainly clever, but not so economical as he should have been. "Tat," to you we say ditto. "Janitor" makes shaped gables a strong feature with poor effect. "Midas" draws with spirit, sketches well, and plans badly. "Cosmos, jun." cramps his kitchen, and draws his staircase window out by the acre, so to speak, for it is enormous in size. "First Attempt" will, we hope, do better next time. "Alban's" plan is better. Note rule about size of paper. "Coila" comes next with a broken-up design, and then "Beamish Boy," who gives us a hall far too large, but nice drawings. "Solus" and "Recruit" follow, the latter having one big gable like a town-house rather, and two halls which are wasteful. "Streona" gives a house as one of a row; and, like him "Etna" is lacking in style, in spite of good draughtsmanship. The others placed in the second class are "Glencoe," "Apex No. 1," "Henery," "Leodiensis," and "Buggins."

In the third series we arrange the remainder thus:—"Lotus," "'Arry," "Compta," "Rab," "Leonhardt," "Acute Angle," "Crom-a-Boo," "Design," "Towser," "Nabob," "Texas Bill," "Chimo," "Young Albion," "Rob Roy," "Angle," "Beaumont," "May Fly," "Midland," "Nemo," "Jack," "H.M.S. Conway," "Bagged Ape," "Civis Mundi," "Celt," "Pedro," "Lancashire Lad," "Elean," "Frost," "Venator," "Liso," "Power," "Lucilius," "Sapphire," "Tempus Fugit."

We propose to notice the designs for subject B, "A suite of dining-room furniture," when we illustrate the best design sent in.

NOTES FROM EDINBURGH.

THERE have been no clear indications till very lately, here as elsewhere, of reviving trade during the past year, but building operations have been extensive. The comparative relief from complete stagnation, which has been more or less the case of late years in Edinburgh, has passed into the stage of apparent promise of prosperity. Building operations have never been on so large a scale since the time, ten years ago, when the high wages began to fall. The average wage for the preceding year, 1886, was from 6d. to 6½d.; it is now 7d. or 7½d., and will remain at this figure whilst large contracts are being executed and speculative schemes astir. In districts advantageously placed by railway access or passenger cars the speculative builder is still providing fresh accommodation, as indicated by the proceedings of the Guild Court. The Northern Cable Tramway system has been virtually started, and many new four-storied tenements of good class have been, and still are being, erected at Golden Acre, the present terminus of that system. In the districts of Mayfield, Morningside, and Murrayfield, where the Suburban and Caledonian Railways have provided liberally for the convenience of passenger traffic, great additions to the city have been made. West of Merchiston, about 150 acres of land beside the Craiglockart Hydropathic Establishment are now to be laid out for villas and tenements of similar kind, and as the builder is busy in the heart as well as the extremities, the prospects for the coming year cannot but be promising as far as labour is concerned. Contracts are not probably so profitable as in brisker times, and are certainly less plentiful, but a revival of trade is prophesied as likely to take place. If wages are lower now than they were ten years ago, the prices of lodging and provisions are

much less; as also the prices of materials—circumstances which must not be overlooked in estimating more hopefully the present aspect of affairs.

Among the permanent attractions of the city, the Forth Bridge may be considered one likely hereafter to attract visitors from all quarters of the world. During the fine summer and autumn of the past year great numbers have gone daily to inspect the works, and for this every facility is afforded by the contractors. The completion of the three gigantic towers (to which the cantilevers are attached), 350ft. high, forces itself on the notice of the spectator from even the most distant heights; but perhaps the best impression of their altitude is got by contrast with the hills on either side, as they are seen from the entrance to Leith Harbour on sailing up the Firth. The work of extending the cantilevers goes more slowly on, and it requires great faith in most people to believe that, when they are completed, means will be found to stretch girders 40ft. deep and 350ft. long between their extremities. Excellent photographs, both on a large and small scale, are to be got, showing both the general design and details of the construction.

The cable tramways for the Northern District have just commenced to run, and are another attractive novelty for the season. The trial trips have been satisfactory, and it is understood that the remaining section, to acommodate the Stockbridge district, will be immediately begun. The engine-house and sheds are located midway between the present terminations in Princes-street and Ferry-road—i.e., in Henderson-row. Here the company has reared a tall chimney, which, however, adds only one more to the many factories, &c., which have been allowed to take possession of what might, with more advantage to the city, have been healthy recreation ground, and an adornment in place of disfigurement to the locality. The engine is horizontal, driving three wheels, and is about 180H.P., with two large boilers for using alternately. The engine and machinery for driving the cable are housed in a shed, with handsome gallery, from which the whole apparatus can be inspected. The front towards the street projects beyond the line of houses to allow of the passage of the cars to the turntable, which carries them back into the shed. This front is in two floors, of low elevation, and the whole treated in too ponderous a style, the upper part having a very heavy lumbering appearance, which is not helped by putting a heavy cornice moulding, where a stringcourse is the proper architectural detail. The system adopted in Edinburgh has some novelties designed by the engineer, Mr. Colam, which make the working more equable and secure under the enormous strains on the cable, when stopping or turning the somewhat sharp curves of the roadway. Each car carries sixty passengers—first, second, and third class—and has four wheels before and four in the hinder part, each wheel with its own brake and four supplementary brakes which can be forced down upon the roadway. The gripper has also a novel arrangement, which improves the security of its hold on the cable, and allows greater freedom in removal of the cars.

The access to St. Bernard's Well has been greatly improved by a handsome flight of steps and ornamental gardening. The bank of the Water of Leith is guarded by a parapet wall of good design, and the well itself and statue of Hygeia, in the summerhouse over it, will no longer be suggestive of discomfort, and give occasion to youthful admirers to treat the latter with the hard hits which had disfigured the statue. The interior of the chamber is being decorated with a very elaborate design in marble mosaic. The water is sulphurous and harmless, taken in any quantity, and the well has always had a band of early visitors, which will now be greatly augmented. This work is the gift of the late Mr. W. Nelson, who has also made some important work of restoration in the Castle. Of these the Argyle Tower had been completed before his death, and he had the satisfaction of knowing that the work met with the unqualified approval of the authorities and the public generally. The building is now a small, square tower rising a little above the line of the lower fortifications, with house on top of it, and so agreeably breaks the monotony of appearance presented by the latter. The details are all in keeping with the surroundings and the workmanship excellent. In the hall or Parliament House of the Castle the workmen are putting in new windows and restoring the interior, which retains the ancient roof. The windows have heavy mullion and transom, of proportions rather wide than lofty, which suits the low elevation of the courtyard front, with its heavy cornice table; but exception must be taken to the insertion of a new string-course below the windows, omitted in the original design, as it very much intensifies the low altitude of the quadrangle front.

The vacancy on either side of the U.P. Synod Hall in Castle-terrace is now filled up by the large erections of the School Board offices to the south and St. Cuthbert's parochial offices on the north. Juxtaposition does not improve the appearance of Sir James Gowan's *magnum opus* or that of its companions. The St. Cuthbert's offices are designed in the Scotch Baronial style, which, in the larger examples, has much of massive breadth relieved by picturesque variety. But in this case this point of affinity with the Cyclopean masonry beside it has been altogether sacrificed to meet modern requirements in its many floors; and with the long, slender lines of its projections in bay windows, &c., it is more like the Perpendicular Gothic than the Scotch, and makes unseemly contrast with the almost Egyptian repose of its gigantic neighbour. The School Board offices are much better, as more in harmony with the adjoining street. The Synod Hall frontage is really nothing but a wall-screen of monster proportions, and the effort to evolve the picturesque at the side of it might have been spared with great advantage to the aspect of the three combined. This appears to have been dominant in both the new erections, and we have accordingly a square sentry box planted on the corner of the School Board buildings, whilst a Scotch house, with a much more perilous altitude, adorns the long angle tower of the St. Cuthbert's Building.

A good deal has been done, as in past years, in redressing shop fronts and rebuilding. It may be assumed that the speculative builder is now more sharply looked after in matters sanitary, and there is no marked alteration in the style of building, if we except the tendency, mostly in shopfronts, to adopt a more decorative treatment, generally borrowed from that negation of style known as the Queen Anne Renaissance. In porches, shopfronts, and details of doors and windows, &c., the influence of the mantelpiece and overmantel is conspicuous, as also is the more general use of leaded lights of stained glass. Some show a marvellous delight in the pediment of the Queen Anne, and plant it everywhere, very frequently in transom lights of doorways, of bad proportion, to exclude the light. Its attenuated lines and minuteness of detail are altogether unsuitable for out-of-door work or dusty and dirty weather, and unless carefully varnished and washed at least once a week, the result is a disagreeable and dirty look, which makes the spectator regret the labour spent on the details. There is less of ornamental frippery in the stone, and a block of houses near the Barclay Church is evidence of the capabilities of the style, which seeks to combine the Gothic and Classical ideal. In the obscure Lady Lawson street or wynd a very elegant and somewhat original building has been erected, of the Jacobean period, as a front to the premises of a cattle sale shed, and here and there reconstructions are often a great improvement. None of these later variations, however, are really any improvement on the stately buildings of purely Classic design; and though considerable licence may be granted to shops projecting beyond the solid masonry of the streets, these accessories are better, perhaps, at least for display of goods, with plainer detail and seemly proportions. The somewhat obtrusive London house-front of the Café Royal in Princess-street is covered with detail, which is lost in the near distance, and more suitable for a mantelpiece or a sideboard than the solid piers of doors and windows.

One new church has been opened during the past year, as in the preceding, and the present needs of the city appear to be supplied. The Braid U. P. Church is an octagon, and, like Free St. Andrew's, is designed with the circus arrangement. The latter forms a very imposing architectural addition to the street, its magnitude being out of all proportion to the accommodation, which is moderately large, for 750. The style is Early Renaissance, and the church proper is buried in its accessories in the way of porches, staircases, and passages. The grouping of the principal and subordinate buildings in the frontage is very good, and there is a splendid flight of steps to the loggia. This is made rather gloomy by four projecting piers, which look as if they had no business there, carrying nothing—not even the usual vases and flower-pots. The magnitude and consequent cost of this edifice, which, though plain in style, has been nearly double the ordinary expenditure per sitter, is occasioned by the large floor space set aside for corridors about the auditorium, lobbies, and other spaces. The interior, however, cannot be considered in any respect as an improvement on the old-fashioned arrangements of the continuous-galleried church. The light is badly distributed, and the attempt made to give the pulpit command of both area and galleries has resulted in bringing the latter too near the heads of people underneath it. The octagon, as most architectural students very soon discover, cannot be made pleasing or dignified as an exterior, except on a small scale or in conjunction with a large building. This difficulty has not been overcome in this latest sample of the octagon. St. Stephen's is also octagonal in plan, and on a greatly larger scale; but Playfair masked the octagon to get breadth for his frontage and the tower. It is not easy to imagine any great advantage in the curious arrangement for either sight or hearing when the congregation is of ordinary size, unless the advantage of everybody seeing everybody is taken to account. These modern samples of the arrangement are very inferior every way to that which has been long approved in St. Andrew's Church, where the plan is an ellipse with little eccentricity, and the pulpit placed at the extremity of the minor axis. The interior is very comfortable, and egress by three doors, immediate, and without any exterior corridors, except that in the vestibule in front. The roof flat is not very sightly, as it lies obliquely; but the circular church, with fine spire in front, is beautiful beside the monotonous proportions of an octagon. Professor Blackie has compared the design to an archangel astride on a beer barrel; but the contrast between the body of the building and the spire is hardly so bad as that.

THE ROOF OF THE NATIONAL AGRICULTURAL HALL, KENSINGTON.

At the meeting of the Civil and Mechanical Engineers' Society held on the 21st inst., Mr. Arthur T. Walmisley, M.Inst.C.E., read a paper on the construction of the roof of the National Agricultural Hall, opposite Addison-road Station. The building was designed by Messrs. Henry E. Cox and Stephen Robinson, both now deceased. Messrs. Max. am Ende and A. T. Walmisley were engaged as joint engineers to assist the architects in the preparation and carrying out of the ironwork contract. The light appearance of the construction which has been adopted was attained not by sacrifice of safety, but by adaptation of every detail to meet the various stresses found by calculation, in order to avoid any unnecessary surplus material, and by a careful study of all the possible stresses resulting from equal and unequal loading, including the effects of wind pressure in varying directions. In bridge construction or in a railway station roof the use of webs and flange-plates seems quite reasonable; but in a roof such as this, where all the ironwork is under cover, it was felt that an opportunity was presented for a greater development of the parts, and a design remarkable for an entire absence of long wide plates and webs was accepted, in which the various parts of wrought ironwork are composed wholly of flat bars and angle irons riveted together, plates being only introduced where required for covers in the joints. Mr. James Edmeston was appointed architect after the deaths of the original designers, and the work was carried out for about £131,000 by Messrs. E. Lucas and Son, the general contractors, and Messrs. Handyside and Co., who arranged the ironwork, amounting to 1,200 tons, and Mr. T. W. Helliwell, who carried out the zincwork and glazing. The great hall of

the main building covers a rectangular space of over 2½ acres, being 440ft. by 250ft. between walls, and its erection was personally superintended by Mr. Am Ende and by the author. The main ribs have a clear span of 170ft., and are placed 34ft. apart, forming eleven bays between the end screens. The clear height to the crown of the roof is about 100ft. The main ribs are of box-girder shape, 7ft. deep and 2ft. wide, the lattice construction adopted enabling the material to be placed further away from the axial lines than is usual when plates are introduced. Although the soffit of each main rib is semicircular from a level of 15ft. 9in. above the ground, the constructive rib itself springs from a higher level, and should therefore be described as a segmental rib. The open space under the curved roof amounts to 374ft. by 170ft., or nearly an acre and a half in the clear. This is surrounded by a gallery 40ft. wide upon the north, the west, and the south sides, and 26ft. wide upon the east side. The gallery is covered by a lean-to roof, which abuts against the curved rib upon the north and south sides, and is attached to the horizontal member of the screens upon the east and west sides. Below the top of the roof over the side galleries the arched rib forms on each side an ornamental spandrel, which rests upon a column, the resistance to the thrust being assisted by the lean-to roof over the gallery. The connection between the main rafter of the side roof and the arched rib is formed by a top plate, which practically acts as a hinged joint, whereby the complication of a fixed connection does not occur in the calculation of the stresses. The main rafters of the side roof are connected to a braced frame of 14ft. effective depth, and the thrust is thus conveyed down to a foundation girder 12ft. deep, which is continued horizontally underground to the base of the columns supporting the main arched ribs. Thus the surrounding brickwork is not called upon to resist any portion of the thrust of the arched roof, as the side frames through which the gallery floor passes form a self-contained system of ironwork in which the thrust is ultimately conveyed to the ground. The chief points of support to these side frames are formed in each case of two main concrete blocks, one placed at the lower outside corner under the outside wall, a cast-iron bed-plate being built into this concrete block to receive the side frame, and the other placed under the base of the pivoted column. The foundation girder of the side frame is placed with its top flange 6in. below the floor level, and is embedded in a mass of concrete to protect it against the effects of dampness. The mechanical couple required at the springing of the rib to maintain its rigidity is supplied by the main rafters and the transverse floor girders of the side galleries. The upward pressure is neutralised by the whole weight of the structure resting upon the column, which is under all circumstances sufficient to resist the upturning action of the abutment when the wind is blowing upon the opposite side. The maximum load upon the column under the springing of the rib amounts to 49½ tons upon the lee side and 82½ tons upon the weather side. These columns are made of cast iron, and are constructed with a true ball and socket bearing at each end, which is concealed at the top by a foliated capital, and at the base by a casting which gives the appearance of an ordinary column. By the introduction of the pivoted connection the strains which these columns resist are always vertical, and, therefore, definite. This would not be the case if the connections were made rigid, as the facia girders supporting the inner sides of the gallery are continuous girders, and would be constantly exerting excessive bending movements of various intensity in the columns, to say nothing of the indeterminate stresses which might be caused by the ribs. These gallery facia girders have curved bottom flanges, and continuous girders of the same type are placed vertically immediately below the point of junction of the side roof with the curved rib and radially throughout the curved rib at distances 18ft. 6in. apart to act as main purlins. These purlins have been made continuous from screen to screen, to avoid the necessity of strengthening the flanges of the purlins between the main ribs, and for appearance sake to avoid great differences in the size of the diagonal bars forming the web. Another point of detail is the simultaneous application in the arched roof of radial and tangential purlins. The curved roof is surmounted by a ventilator, between which and the side roof a steel-framed ladder of light construction is introduced upon both sides of the arched roof in place of the ordinary gantries. The screens which close the semicircular ends of the arched roof consist of a vertical ridge and furrow construction, whereby the appearance of the usual heavy horizontal members in a gable screen is avoided. This construction offers great resistance to wind pressure combined with a minimum amount of weight and material. The framework of this part of the structure is made of mild steel. The covering follows the zigzag-shaped surface resembling corrugations, and presenting a near approach to a folded curtain screen. The wind bracing has not been indiscriminately introduced throughout the structure, but has been confined to the side roof and the two end bays of the curved roof, the nine intermediate bays of the curved roof where it is not required being free. The inner longitudinal girders to the gallery floor, at a distance of about 14ft. from the outside wall, upon the north and south sides, are continuous girders. The cast iron columns upon which they appear to rest contain the wrought iron member of the braced framework. This member, which is formed of four angle irons in a cruciform section, takes the tension produced by the thrust of the roof, and is jointed by cover angle irons to permit the body of the column being slipped over it during erection. The caps and bases to these columns were made as split castings—*i.e.*, castings made very thin (about $\frac{1}{16}$in. in vertical lines) upon opposite sides, but of the proper thickness all round so as to be easily divided into two upon these vertical lines when required to be fixed, and so to provide a true curved surface at the joints. They are then joined by a plate let into the surface and connected by tap screws. This vertical member is constructed to act both as a strut and a tie. The intermediate floor girders and the intermediate purlins in the arched roof have their bottom flange constructed in a fish-belly-shape with the object principally of preserving a uniform section for the diagonal bars. At the east and west ends the columns are placed at 34ft. apart, the same as those upon the north and south sides, dividing the span of 170ft. under the screens into five bays. Compared with other roofs of large span, the iron roof is both a little wider and a little higher than St. Pancras Station. Owing to the spread given to the feet of the ribs and the holding-down bolts being placed at a distance apart of 11ft. 5in., they act with considerable leverage, and prevent the stresses in the rib causing any change of angle at the feet of the rib. The theoretical effect of this arrangement is similar to that produced by making girders continuous over piers, and reduces the stresses in the rib to about half the amount that would exist if the ribs were hinged or unsecured at the abutments. By this means a great saving of metal is effected, which is an important consideration in roofs of large span, as the road increases in a much greater ratio than the span. In addition to the massive abutments there are also horizontal girders running across the station below the level of the rails to carry the platforms, and with a view to insure perfect stability a wrought iron tie runs below these girders consisting of a $\frac{5}{8}$in. plate riveted to the bottom flange of the wrought iron main-floor girders. The cost of the iron and steel work erected complete has been from £26 to £27 per square of 100ft. superficial area. The author has subjoined a calculation of the stresses in the main ribs assuming the wind to blow horizontally and to act normally upon the curved surface. A wind pressure of 30lb. per foot super. has been taken. The Metropolitan Board of Works have no fixed rule upon this point. The unit pressure they adopt depends upon the height and position of the building under consideration, and the method which it is best to adopt in estimating the amount of pressure is also much open to dispute. Further experiments need to be made before a satisfactory conclusion can be arrived at.

CALCULATIONS OF STRESSES.

The equations have been deduced from the following works :—"Civil Engineering," by Professor Rankine ; "Die Lehre von der Elasticitat und Festigkeit," by Winkler ; "Stresses of Rigid Arches," by W. Bell, M.Inst.C.E. ; and "The Theory of Arches," by Max. am Ende, M.Inst.C.E., have been employed in the following consideration of the calculation of stresses in the main principal.

I. $\Sigma - Fx + 2H(b + y) = 0.$
II. $\Sigma Fxy - 2Hy(b + y) = 0.$
III. $\Sigma Fxz - 2Vz^2 = 0.$

Σ = Sum.
F = Force at the various points.
x = Leverage of force.
H = Horizontal thrust at the crown.
b = Vertical distance of H from the crown.
y = Vertical distances of points round which moments are taken from the crown.
z = Horizontal distances of points round which moments are taken from the crown.
V = Vertical shearing force at the crown.

Table showing value of y and y^2.

y	y^2
1·8	3·24
7·2	51·84
16·0	256·00
27·9	778·41
42·3	1789·29
58·7	3445·69
Totals...153·9	6324·47

Table showing values of x occurring in equations :—

WEIGHTS.

Points.	1	2	3	4	5	6
1	17·8					
2	35·0	17·0				
3	50·5	32·7	15·7			
4	64·2	46·3	29·3	13·6		
5	75·0	57·2	40·1	24·5	10·9	
6	82·7	64·9	47·8	32·2	18·5	7·7
Totals...	325·2	218·1	132·9	70·3	29·4	7·7

Table showing values of Fx.

Point.		Products.
1.	$3·2 \times 17·8$	56·960
2.	$3·2 \times 35·0 + 6·03 \times 17$	214·510
3.	$3·2 \times 50·5 + 6·03 \times 32·7 + 5·02 \times 15·7$	438·595
4.	$3·2 \times 64·2 + 6·03 \times 46·3 + 5·02 + 29·3 + 4·87 \times 13·6$	697·947
5.	$3·2 \times 75·0 + 6·03 \times 57·2 + 5·02 \times 40·1 + 4·87 \times 24·5 + 4·75 \times 10·9$	957·308
6.	$3·2 \times 87·2 + 6·03 \times 64·9 + 5·02 \times 47·8 + 4·87 \times 32·2 + 4·75 \times 18·5 + 4·56 \times 7·7$	= 1175·744

$\Sigma F x = 3541·064$

Table showing values of Fxy.

Point.	Fx		y		Fxy
1	56·91	×	1·8	=	102·528
2	214·51	×	7·2	=	1544·472
3	437·595	×	16·0	=	7001·520
4	697·947	×	27·9	=	19472·718
5	957·308	×	42·3	=	40494·124
6	1175·744	×	58·7	=	69016·170

$\Sigma Fxy = 137631·532$

Statement of Equations for Dead Load.
Load being symmetrical.
Equations I. and II. only will be required.

I. $-2 \times 3541 + 2 \times 6Hb + 2H154 = 0.$
II. $2 \times 137631 - 2Hb\,154 - 2H6324 = 0.$

Solving H = −19·7.
b = + 4·3.

Statement of Equations for Wind Forces :—

I. $-3588 + 2 \times 6Hb + 2H154 = 0.$
II. $151503 - 2Hb\,154 - 2H6324 = 0.$
III. $259227 - 2V20678 = 0.$

Solving
H = + 12·5
b = − 1·75
V = + 6·27

The strains in abutment framing are worked by the method of moments, combining the thrust of the arch rib with the loads on the galleries as they occur in the various members. The greatest stress in the flange of the arch rib occurs where the curve of equilibrium is farthest removed from the neutral line of the rib. By taking moments round the flanges :

Stress in flange at a = − 15·83
" " " b = + 63·33
Stress in one set of diagonals between a and b = − 6·5 tons
Each set being in duplicate stress in each bar = − 3·10

It is announced that Sir Robert Rawlinson, C.B., chief engineer of the Local Government Board, who is in his seventy-sixth year, has tendered his resignation, and is leaving Whitehall at the close of the present week.

FIRE PREVENTION AND EXITS FROM PUBLIC BUILDINGS.*

I PROPOSE to refer chiefly to theatres; not, however, because other buildings can be exempted from restriction, but because theatres present greater difficulties and dangers than other buildings. There is greater liability to fire in a theatre, and greater danger in the event of fire, so that, if we shape our regulations to secure the safety of theatres, we shall much more have secured the safety of other public buildings, provided that we make the latter amenable to corresponding restrictions. It is acknowledged on every experience that the existing regulations, not merely in Glasgow, but throughout the kingdom, are inadequate. The authorities charged with the administration of these regulations are alive to the responsibility of their position, and are conscious of the insufficiency of their powers, and that they would welcome any discussion that should contribute to the formation of a strong, united, and reasonable public opinion on the subject of the regulation of such buildings. The best restrictions are those which leave the most liberty—the most, that is, within defined limits—and these the very limits that a proprietor and architect with sufficient knowledge of the subject and due sense of responsibility would have voluntarily adopted in the absence of all restrictions. I do not propose to confine myself to legislative restriction. It is my purpose rather to note a few of the points that should be kept in view with reference to safety in designing a theatre, and to point out where the designer should be controlled by regulations. My wish is to bring before you some of the points which most urgently claim the attention of those whose duty it may be either to design a theatre or to frame regulations, and to invite discussion on them. The subject falls naturally under two headings:—1st, Fire, its prevention, restriction, and extinction; and 2nd, The safety of the occupants of a theatre or other building in the event of fire or panic. One point of a general character may be said to be common to both divisions of the subject—the situation and surroundings of a theatre. Obviously the situation of a theatre is of the first importance in regard not only to its own safety, but also to that of surrounding buildings. The ideal site would be one isolated on every side. The Italian Government have recently enacted that every new or reconstructed theatre shall be so isolated, and Messrs. Henry Irving and Alfred Darbyshire have together produced a plan for a safety theatre which is supposed to have open frontages on every side, or, failing that, at least a carriage-way all round it. The only objection to this is that it is almost impossible of attainment, in this country at all events, however desirable it may be. As an ideal, it is good; and if we can even approximate to it in practice we may congratulate ourselves; but as an enactment it is out of the question. We may, however, enact that a theatre is not to be smothered up among other buildings as so many at present are, and, I think, the sooner we do make such an enactment the better. The regulations of the Metropolitan Board of Works and those of the Lord Chamberlain's office are silent on the subject. After all, the safety of a theatre depends more upon its immediate proximity to a street than upon its having access from more than one street. I should rather have a site having one ample frontage and with no other buildings intervening between the theatre and the street, than one surrounded with other buildings and having access only by means of passages or lobbies through those other buildings. The New York Building Law, as amended in the present year, provides that every theatre shall have at least one frontage on the street, and it requires also a certain amount of free space on each side of the auditorium, with balconies at the level of each gallery, and stairs to the ground. The enactments of this law are so complete and effective that I shall have occasion to refer to them repeatedly. The enactment secures a free space all round the three sides of the auditorium, with ample means of egress in each of the three sides. The ordinary means of ingress and egress are confined to one side, and they are on such a scale that the theatre could be quickly emptied by their means alone. The other two sides are wholly occupied with emergency exits, so that it does seem as if the means of escape was developed in almost the highest degree possible. And yet it is accomplished without laying any oppressive restriction on the proprietor. I do not think that we shall find anywhere in this country a theatre whose plan is arranged upon better or safer lines than those of this enactment. We come now to the first of the two headings already given—Fire: its prevention, restriction, and extinction. There are few places that offer more risk of fire than the stage of a theatre, and still fewer that present such opportunities of swift destruction. Two improvements suggest themselves at once here—the first, that electric lighting should take the place of gas on the stage; and the second, that the scenery and drapery should be protected by treatment with some non-combustible solution. The electric light has now been introduced into so many theatres, and its advantages are so universally admitted, that it seems unnecessary to enlarge upon them. In Paris its use is compulsory; in New York it has not been made compulsory. There can scarcely be any difference of opinion regarding the advantage of fire-proofing the scenery so far as that can be done. Such preparations as cyanite and pyrodene are well known and largely employed. Mr. Verity, surveyor to the Lord Chamberlain, writes, regarding the former:—"By its means scenery, canvas, &c., can be rendered entirely incombustible without interfering at all with the usual processes of the scenic art." While everything should be done to render the scenery unburnable, too much reliance should not be placed on this precaution. The fire at Exeter is believed to have originated with gauze mediums which had been steeped in alum. Professor Watson Smith admits that wood treated with pyrodene is not fireproofed through and through, but that only an outer fireproof covering is given to it. My own experiments have led me to believe that it is not rendered incombustible, but only less easy of combustion. Again, the scenery of a theatre is constantly changing, and nothing but constant—almost daily—inspection could insure that it is always subjected to this protective treatment. I would certainly enact that it should be so treated. I would endeavour to enforce the enactment rigidly; and then I would act with reference to other precautions as if there were no provision of the sort at all. The situation of workshops, painting-rooms, property-rooms, and store-rooms is important with reference to prevention of fire. The Board of Works Regulations provide that no workshop, painting-room, or dressing-room shall be formed either over or under the auditorium, and that no scene-dock, property-room, or store-room shall be permitted unless separated by brick and fireproof construction. That is very well, but it does not go far enough; it allows a workshop over the stage as there was at the Exeter theatre. Such as it is, it may be questioned if it is enforced. Dr. Percy recommends thin, mild steel or iron as a substitute for wood, and wire gauze instead of canvas; the stage to be iron trellis, covered with papier-mâché boards. While the Board of Works prohibits workshops, &c., over or under the auditorium, the New York law goes a step further and prohibits them over or under either auditorium or stage, or in any of the fly galleries. They may be in the rear or at the side of the stage, but must be separated by brick walls, the openings in which must have double wrought-iron doors. Generally speaking, the New York Act provides for fireproof construction throughout, all walls and partitions being fireproof, as well as the entire main floor of the auditorium and vestibule; also the entire floor of the second story of the front superstructure over the entrance lobby and corridors. Even the shelving and cupboards in the dressing-rooms, property-room, and other storage rooms must be of metal, slate, or other fireproof material. The exception to this rule is the roof, which is not required to be fireproof. The roof is, in fact, severely let alone in this Act. It would unquestionably be a great improvement if we could make the roofs of our theatres fireproof. Many of our theatres at present have iron roofs, while in Mr. Terry's theatre the roof is iron and concrete. Next to preventing a fire altogether, the best thing is to confine it to the smallest possible area. It is of the greatest importance that the different parts of which a theatre is composed should be divided from one another by solid fireproof walls and floors. The corridors, lobbies, stairs, and vestibules should be absolutely separate from the auditorium. The stage should be separated from the auditorium as far as it is possible to be so. The question of an iron or other fireproof curtain has been much discussed. The authorities in Paris have made an iron curtain compulsory, and such have been introduced into several theatres in this country also. Asbestos has been used in Mr. Terry's new theatre by Mr. Walter Emden, and this material is recommended by Messrs. Henry Irving and Alfred Darbyshire. The New York Act makes a fireproof curtain compulsory, but allows it to be either of metal or of asbestos, or similar fireproof material. It also wisely insists that it "shall be raised at the commencement of each performance and lowered at the close." In connection with provision for the restriction of fire, an important matter is the restriction of the products of combustion, smoke and noxious gases, and their diversion from the audience. In a theatre fire the loss of life is usually due almost entirely to suffocation, caused either by the smoke and poisonous gases from the fire, or by the congestion of the audience in the stairs and passages. In some of the most fatal theatre fires that have ever occurred it has been said that not one person was burned to death. Frequently the smoke from the burning stage fills the auditorium and overpowers the occupants of the gallery before they are able to escape, and in this consists the great value of a fireproof curtain, that it may confine the smoke to the stage for a time at least. The lesson of the Exeter Theatre would seem to be clear that, among the dangers of a burning theatre, that from smoke is one of the deadliest, and that a passage connecting the stage with the foot of the gallery stair is among the most fatal defects a theatre can have. The control of the smoke arising from fire on the stage, even from fire in front of the stage, is a matter that must engage the most serious attention of the architect. It should be cut off if possible from all passages, lobbies, and stairs, and a means of escape must be provided for it elsewhere. There should be one or more shafts over the stage which would admit of the escape of a large volume of smoke. Mr. Terry's theatre is so provided. Mr. Henry Irving's proposed theatre is also provided with a smoke shaft. A clause in the New York Act provides for shafts over stage, protected by thick glass skylights. By opening up the roof of the stage we may be increasing the rapidity of the fire, but we must run that risk, as it is essential that a means of escape should be provided for the smoke and gases of combustion; but it would be well if we could secure that all doors to the stage should close automatically, and be as nearly as possible air-tight. If the fire then found an open way upwards, it would at least not be fanned by blasts of air from below. The question of the extinction of fire is very important. If a fire in the scenery of a theatre is to be extinguished at all, it must be caught at the moment of outbreak, and unfortunately the point at which it originates is usually not very accessible. I would say this about hydrants and hose pipes—have them by all means, but distrust them. There is one other means that may be employed and that seems to offer a prospect of being effectual. I refer to sprinklers. These are of two sorts: those worked by means of valves and those having fusible plugs, which are melted by the heat, and the water thus brought into action automatically. Mr. Walter Emden has made use of sprinklers, but declines to adopt the automatic principle. His plan is to have them worked by valves, not in the flies or any place of danger, but at the stage door. There is no doubt at all that sprinklers are the most effectual method that has been devised for extinguishing a fire. I go further, and say they are the only means yet discovered which can be relied upon with reasonable assurance to extinguish a fire amid scenery on the stage of a theatre. The inference to me seems plain, that they should be introduced into every theatre. There is a difference of opinion as to whether they should be automatic or worked by valves. One objection to automatic sprinklers is that the heat of the stage might occasionally melt the fusible plugs of automatic sprinklers when

* A paper read before the Architectural Section of the Philosophical Society of Glasgow, December 12, 1887, by T. L. Watson, F.R.I.B.A.

there was no danger of fire. The usual temperature at which the plugs are arranged to melt is 160 degrees, and the sprinklers would serve a useful purpose if they only insured that the temperature was never raised to that point. I admit, however, that the risk of opening when they are not wanted may be an objection to the fusible plugs. But it is one that is overborne by the great additional security against fire which they offer. I do not think it can be argued that they are unsuitable for theatres when I say that they are rendered compulsory by the New York Building Act. With the automatic sprinklers we avoid several distinct elements of uncertainty that attend the use of valves; there may be no one to work these valves; those on the spot may be ignorant how to work them, or they may lose their presence of mind. When found, they may be out of order, or too stiff to work. At the very best some time is lost before they are operated. With the automatic sprinklers the water is discharged the moment it is wanted, and at precisely the spot where it is wanted. Further, the best automatic sprinklers have never been known to fail. They have always extinguished a fire with merely trifling damage. Of course there is a slight possibility of accident, and of some destruction of scenery with water. There is a risk even from ordinary water pipes and hydrants, and there is a risk from sprinklers worked by valves. All things considered, I arrive at the conclusion that automatic sprinklers are by far the most reliable method for the extinction of fire on the stage. Next to them I place the sprinklers worked by valves—a long way behind, but a long way in advance of any other method. We come now to consider the means of escape of an audience in the event of fire or of panic. The auditorium of a theatre usually consists of the parquet, and at least two tiers or galleries above it. Sometimes there are four tiers above the parquet, as at the Haymarket Theatre, London; but the more usual number is two or three. Messrs. Irving and Darbyshire's proposed model theatre shows only one gallery; but we doubt if such a plan will ever become general. Assuming a theatre, then, which may have several tiers or galleries, we have to consider (1) the number (2) the width, and (3) the general character of the exits. The New York Act provides for every theatre accommodating 300 persons two exits, and for 500 persons three exits; but it does not increase the number for larger audiences except when the number of galleries is increased. It also provides that each gallery above the first shall have a separate and distinct exit; but the main floor and the first gallery may have but one exit between them, provided its capacity be sufficient. Thus the number of exits in a three-gallery house may be three only, or one less than the number of tiers, including the parquet. The number of exits here specified, in the case of a large theatre, would certainly be insufficient, although, of course, the fewer there were the larger they would each have to be. The Metropolitan Board of Works requires one exit for each floor or level, and one additional communicating with all the floors or levels. The number here seems a reasonable one, although there might be great danger from an exit stair communicating with all the levels or floors. The ideal theatre, if it is a large one, should have two exits from each floor or level, though not necessarily separate and independent, to the street. If we cannot get this we should insist that from the upper floor or gallery, if it seats more than say 500 persons, there should be at least two exits. It must, however, be always remembered that the safety of a theatre will depend, not merely on the number or the width of the exits, but on their skilful and careful arrangement, and that for this no regulation will provide. We come now to the important question of the width of exits in proportion to the number of persons who are to use them. This matter has never been fully discussed, but is well worthy of consideration. There are several rules in force in different places; but these differ from one another so widely that it must follow that some of them are either insufficient or excessive. Mr. T. B. Jackson, the first person to write on the subject, suggested as "a safe basis – viz., to allow 15in. width of exit for every 100 seats in a house—that is to say, 12½ft. for 1,000, 25ft. for 2,000, 37½ft. for 3,000, and 50ft. for 4,000; and thought with such exit any two-gallery house can be emptied in five minutes, provided all the passages, lobbies, and staircases were proportioned to the same." The London Board of Works Regulations say: "No staircase, internal corridor, or passage-way for the use of the audience shall be less than 4ft. 6in. wide. Every staircase, corridor, or passage-way for the use of the audience, and which communicates with any portion of the house intended for the accommodation of a larger number of the audience than 400, shall be increased in width by 6in. for every additional 100 persons, until a maximum width of 9ft. be obtained. The New York Act says: "Stairways serving for the exit of people must, if straight, be at least 4ft. wide between rails, and if curved or winding 5ft. wide; and for every additional 50 people to be accommodated, 6in. must be added to their width." Lastly, the rules drawn up by the Glasgow authorities, but not yet enacted, declare that "The exit or exits for the first floor shall not be less than 1ft. of width for every 70 persons who can be seated in said floor or section thereof. Where there is more than one floor, the number of persons to be allowed to be accommodated in each upper floor shall be diminished in the proportion of ten persons for every lineal foot in width of exit for each floor of the building ascended; and no building, or part thereof, shall be used as a place of amusement unless there is exit not less than 4ft. in width."

One other matter may be referred to—the width of passages in auditorium. The clause in the New York Act seems to adapt itself to circumstances. It is: "All aisles in the auditorium shall have a width of at least 22in. for every one hundred persons, or part thereof, and no aisle shall be less that 3ft. wide at its narrowest part, and the same shall be increased in width towards the exit at least 1in. for every five running feet or part thereof." Captain Shaw contends that the lobbies, corridors, and landings of a theatre should be sufficiently large to contain the whole audience without crowding, and gives 250 square feet for each 100 persons as the space required. This is precisely what is demanded by the New York Act. It does seem more than the bare requirements of safety call for, but undoubtedly it would add to the comfort of the house. The last point to touch upon is the general character of the exits. This is very much a matter for careful planning, for which rules cannot be laid down. A few suggestions only can be given. A long, straight passage, and, still more, a long, straight stair, are open to the danger of accumulated pressure from a crowd seeking to escape. Stairs turning at a right angle, and thus going round a square on plan, are probably the best, and each flight should consist of from six to eight steps. Steps doubling back on themselves are not quite so good, because the people at the inside, next the newel, have so much less distance to travel at the landings than those next the outer wall, that the movement is not uniform. The people are not only moving out; but they are necessarily struggling past one another at the same time. A wheeling stair on a large scale would obviate that difficulty; but to it there is the fatal objection of the accumulated pressure. On the whole, I believe the best stair for a crowd is one going round the four sides of a square, with the corners rounded off, and with, of course, landings at every corner. It has to be said that we cannot always get such a stair; but it is good to know what is best, and to approximate to it as nearly as we can. The proposed Glasgow rules provide for steps not more than 6in. high; that is too small as a maximum. A gallery stair might well have 7in. risers; in New York the limit is 7½in. Handrails are of the very utmost importance, and it would be well if we could arrange that every person in a crowded stair should be able to hold on to one. It has recently been proposed in the professional journals that handrails should be carried up every stair less than 2ft. apart, so that each person should have hold of two all the way down. I should be content to have them 3ft. 6in. apart, so that each person should have hold of one all the way. There is one danger attaching to stairs which is, at least, minimised by giving to each person the opportunity of supporting himself by means of a handrail. In going down a stair the foot has to be placed precisely on the tread of the stair. If it is advanced an inch or two too far, or not far enough, you almost certainly fall. With a panic-stricken crowd this is only too likely to happen, and the handrails are wanted to minimise this danger. A correspondent of the Building News of September 16th proposed that instead of steps inclined planes should be employed; he did not state what inclination. A few weeks afterwards our secretary, Mr. Miller, made the same proposal, suggesting a rise of 5ft. in 12 or 13, or about 1 in 2½. The idea is a somewhat taking one, as it would obviate the danger of tripping to a considerable extent; but it may be open to a still more serious objection. The accumulated pressure would be much more dangerous in the case of panic than even the risk of tripping. On this subject Captain Shaw tells us that a gradient for a crowd should not exceed one in ten. "When there is a gradient," he goes on to say, "it is most desirable to avoid any pressure near it—as persons, after entering a gradient downwards, invariably attain an increased speed, and if this be further accelerated by pressure from behind, accidents may happen." In connection with doors, I may refer to what is called a "panic exit lock," invented by Sir George Hayter Chubb. On the inside of this lock there is a plate displaying the word "push," and with the slightest pressure on that plate the door at once flies open. I have now indicated some of the points that must be considered in connection with theatre-building in the future. I have tried to show what is required to secure almost absolute safety. I have no doubt that many persons will think some of the conditions unnecessary, and some of them unduly onerous to proprietors. I am far from saying that a theatre is unsafe unless every precaution that I have referred to is taken. I have tried to show rather what should be aimed at in the endeavour to produce a theatre in which serious disaster would be impossible. I think, for my own part, that the time has come for stringent legislation with reference to new theatre buildings and, in a modified form, to existing buildings. No doubt great hardship, and even injustice, will be inflicted upon proprietors. I do not see that it is within my province to enter on that branch of the subject. But I may say that proprietors have a right to know exactly what is to be required of them, and that as soon as possible. It is of more importance to them than to any one else that there should be real safety in a theatre and a sense of security in the public mind. And, lastly, something of compensation should be derived from the reduction of insurance premiums. The proprietors of the Grinnell Automatic Sprinklers state generally, and not with reference to theatres, that, on the introduction of their appliances to a building, mutual insurance companies reduce their rates from 20 to 50 per cent., and tariff companies from 20 to 30 per cent. There would be here a saving that itself would justify considerable expenditure. I need scarcely enlarge on this side of the subject, as it will be admitted on every hand that what is really required to insure public safety should be made compulsory. It is not good to have one authority at the same time framing regulations, administering them, and sitting in judgment on their administration. It is a high testimony to the ability, fairness, and moderation with which these different functions have been exercised by various bodies, that they should have worked even so well as they have done; but it is no reason for the continuance of an arrangement which is at the best anomalous and unsatisfactory.

THE METROPOLITAN BOARD OF WORKS AND THE THEATRES.

At Friday's meeting of the Metropolitan Board of Works, Mr. Shepheard, the chairman of the Building Act Committee, brought up a report on the recent charges in connection with the supervision of the construction of theatres in the metropolis. The report, which possesses a special interest just now, in view of the total destruction by fire of the Grand Theatre, at Islington, on Wednesday night, stated that the attention of the Building Act Committee had been called to certain public statements of recent date with respect to the Avenue Theatre and the Oxford Music-hall, to the effect that in each of these cases the Board's regulations for the construction of places of public entertainment have been in-

fringed with the connivance of the Board. The result of the committee's investigation was that the Avenue Theatre had been erected on a portion of the land acquired by the Board for the formation of Northumberland-avenue, at the southern end of Northumberland-street. The drawings submitted by Mr. Sefton Parry for its construction were approved by the Board on the 10th of December, 1880, upon the recommendation of the committee, and the Board's certificate under the Metropolis Management and Building Acts (Amendment), 1878, was sealed and issued upon the completion of the building on March 10th, 1882. The 11th of the Board's regulations enacted "that no workshop, painting-room, or dressing-room shall be formed or constructed over the auditorium or in the space under the same." Section 12 of the Act of 1878 empowers the Board to make, alter, vary, or amend any regulation. The specific charge made against the Board in this case is that a suite of dressing-rooms has been permitted to be constructed under the auditorium, contrary to such regulation. The committee admit that there are dressing-rooms under the auditorium, and they were aware of this fact when they recommended the drawings for approval, and mentioned it in their report to the Board. But they also mentioned in the same report an important fact—namely, that these dressing-rooms (each of which is shown on the plan to be lighted and ventilated from the external air, and is surrounded by a brick wall), are separated from the auditorium above by brick arches 9in. thick at the crown, the haunches being filled in with concrete. Under such circumstances, the committee recommended the Board to exercise the power conferred upon them by the 12th section of the above-named Act, and to dispense with the regulation as to the dressing-rooms in the case of the Avenue Theatre, which was done accordingly. The second instance referred to in the public Press—namely, that of the Oxford Music-hall, in Oxford-street, was of a totally different character, coming, as it did, under the category of an old building, having been licensed before the passing of the Act of 1878, and could therefore only be dealt with under the 11th section. The charge made against the Board in this case is that the hall was rebuilt, but that it has no proscenium wall as required by the fourth regulation. This statement is incorrect in more than one particular. The hall was not rebuilt, but merely had such alterations made to it as were specified in the Board's notice. The Board did not consider it necessary to order a proscenium wall to be erected at this music-hall, and such a requirement would have been contrary to their usual practice with regard to music-halls. The report was approved and ordered to be printed and circulated.

STANDARDS OF PROFESSIONAL MEMBERSHIP.

TO raise the standard of professional requirements is now the one great subject of discussion in this country as well as in America. Architects of the States are combining themselves for the purpose of obtaining some recognition of an architect's qualifications. In America, as in England, the profession of architect has been an open one, with the result that anyone having a knowledge of drawing plans on one hand, and of building cottages on the other, considered he had a perfect right to assume the title of architect. The Committee on Professional Requirements, which have been discussing the subject in connection with the Western Association of Architects, have submitted a report, in which the question is dealt with. The chief difficulty they had to consider was the standard for admission to membership. By fixing this too high the growth of the Association would be checked, and its usefulness impaired: a large number of practitioners of average capacity would be excluded. If the standard were too low, on the other hand, the membership would lose character and tone. This difficulty is one which every society has had to face in the enrolment of its members, and is one which the Federation Committee will be called upon to deal with sooner or later. The report of the American Association is dictated by a broad policy. It objects to set up "factitious barriers" against those who ask for admission; it wishes to "count amongst its members every thoughtful, earnest, ambitious man in the profession"; it desires that its strength and stability should be derived from the standing and capacity of the average man; it encourages the fervour of youth, the honourable record of old age. The leading desires of the Association are that the applicant should reveal an honourable career, give evidence of "fair artistic, constructive, or executive skill." These motives are excellent in themselves; but, unfortunately, it is easier to express in general terms the objects to be aimed at, than to be prepared to carry them out in a practical manner. An honourable record should, of course, be one of the first requirements of an applicant for membership, though it is one that cannot very satisfactorily be proved. Evidences of fair artistic and constructive skill are more within the scope of an examining committee's functions, though experience has shown that candidates with very little artistic feeling or discernment obtain admission, and constructional knowledge may be learned without any constructive ability to apply scientific principles to actual work. We believe the American architects have wisely resolved, prior to raising the standard for admission, to declare the standard which they are willing should govern their own course. They suggest the promulgation of a code of ethics which shall define a desirable relationship of the members of the association to one another, and to the incorporate body; and the report recommends the preparation of a code to be considered at next year's convention, in the consideration and composition of which every State is to be represented, and the several reports be collated, the consensus of the revisions being brought up. Before influencing outside members it is necessary that a society should institute, for their own guidance, some general rules, and acknowledge certain requirements. It ought not to be hard to define what those should be, and towards the preparation of some practicable scheme we may suggest the following. It is now a standing requirement with most societies that a member shall have been in practice some years—say seven—and have carried out certain works. As a proof of the character of the buildings executed, photographs may be usefully called into requisition when the works are not known, and a pledge given that the buildings have been erected from the designs and under the supervision of the applicant. For this purpose it would be necessary for him to supply the name of the owner and that of the contractors. In addition to this practical evidence there ought to be a guarantee on the part of a member to agree to certain rules of practice—for example, that he should strictly confine himself to architectural practice and surveying and their allied branches, and agree not to receive commissions from builders or tradesmen directly or indirectly; to adopt a scale of fees approved by the society, abstain from unprofessional dealings in relation to other architects, and undertake to promote professional attainments and the standing of the architect in every way that he can. Modes of conducting business, the management of contracts, and the relations with the contractor ought to be agreed upon. These are the practical qualifications which might be considered sufficient to enable any architect in practice to join. But there are other requirements necessary for a large number of applicants who have not been in practice long, or who have not carried out buildings, and for all students desirous of becoming members. For this class of persons a preliminary examination becomes necessary; it should at first be elementary. The applicant may prefer to elect himself the kind of examination—whether it should be written or oral, and on what subjects. Others may submit probationary work, measured drawings, or designs. At a first examination, we believe the subjects would be better left to the students, from which they could select those they would like to be examined in. Thus one individual strong in construction might be willing to subject himself to an elementary examination on the properties of building materials, the theory of their strength, and their application; another might be better informed on general architectural facts and building trades, and be willing to be tested on the characteristics and history of the styles of architecture of any particular period, or of the principles of the trades. Candidates devoted to one class of work may prefer that class of construction to be made the subject of his examination. Young surveyors would prefer specifications and methods of estimation. By leaving to each applicant the selection of his own class of subjects, a sufficient test could be established as a preliminary condition of membership, and with the prospect of enrolling all the more competent members of the profession, be they architects, civil engineers, artists, or surveyors. The standard could be raised every year. One uniform system would be impossible at the initial stage of registration or enrolment; it would meet with little or no response from the rank and file of the profession, and would reduce the number of applicants. The Surveyors' Institute have three main subdivisions in which they examine candidates—the first taking in land and estate agents, the next valuers, and the third building surveyors. An architect's examination should, in the same way, divide the subject into three or more parts—one to include artists and decorative artists; a second, the practical architect; the third, the surveyor or engineer.

SEWAGE TREATMENT.*

THE sewage question has been so completely threshed out by those who have written and compiled treatises and handbooks, that it is somewhat doubtful whether anything more can be said on so problematical a subject. These books have been chiefly the works of theorists or inventors and of practical engineers, and have been addressed chiefly to local boards and sanitary authorities. "Sewage Treatment, Purification, and Utilisation" is the title of another practical manual for the use of corporations, local boards, medical officers, and others, by Mr. J. W. Slater, F.E.S., the late editor of the *Journal of Science*, and who writes upon the subject with a practical knowledge of the question. Mr. Slater comes to the conclusion that there is no one process universally applicable. We agree with him there. The author deals with the various systems of disposal and treatment of sewage. No one will gainsay his remarks on what he calls the Bazalgette system, the discharge of sewage into the river through storage tanks, and the costly scheme of conveying the sewage down to Thames Haven in a colossal culvert 20 miles in length. The method of irrigation under certain conditions is recommended, and Mr. Slater points out some of the objections to irrigation of the ordinary kind. Where suitable land is available, the aspect warm, and the drainage good, irrigation is probably one of the best methods of disposal; that it destroys the morbific germs has been denied, though such destructive action must take place if there is sufficient aëration of the soil. Irrigation, to be adopted advantageously, ought to be carried out with some means of screening the coarser sewage, and hence precipitation processes are useful and allow the more fluid part of the sewage to enter the soil. Mr. Slater does not favour "intermittent downward filtration"; he says that the soil would quickly become waterlogged, and the quality of the soil would be ruined by the intermittent doses. Precipitation processes occupy a long chapter, which is prefaced with a few remarks on the principle of action by chemical agents. The author writes: "It is said that chemical agents, though they may clarify—*i.e.*, withdraw suspended impurities—cannot purify—*i.e.*, they are unable to remove dissolved impurities." It is difficult to understand how any chemist can make such an assertion without placing himself in a dilemma. "It is further evident that suspended organic matters, under which heads we must include living organisms, the germs of disease and putrefaction, must, in the strictest sense of the word, rank as impurities. If we remove them we, *pro tanto*, purify the water. It is also known there are two methods, if not more, in which dissolved substances can be separated from the solvent liquid—precipitation, in the strict sense of the word, and occlusion or absorption. In a well-planned precipitation process these

* Sewage Treatment, Purification, and Utilisation. By J. W. Slater. London: Whittaker and Co.

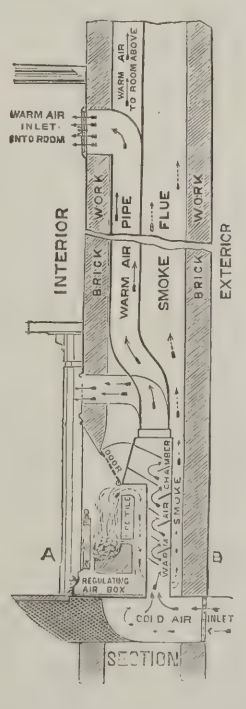
two modes of action are systematically combined." The author shows how this can be effected, and how dissolved organic compounds can be precipitated. "By occlusion a dissolved substance can be thrown down, not by forming a definite chemical compound with some other body introduced, but by becoming entangled in its pores. Gelatinous silica and hydrated alumina, when freshly precipitated, are capable of thus entangling dissolved organic matters." Having disposed of the assertion that organic impurities dissolved in water cannot be got rid of by chemical agencies the author proceeds to deal with the question, What organic matters can be eliminated by chemical processes? Mr. Slater mentions albumen, gelatine, mucus, peptones, and other compounds, and all those most likely to occasion mischief on decomposition of blood are amenable to precipitation. Pointing out the properties required for a precipitating agent, the author says it must be cheap, not actively poisonous like certain salts of lead, nor such as yield an alkaline effluent, thereby excluding lime which renders effluent water alkaline, thus favouring decomposition. Speaking of those agents which are free from objection, he names first the salts of aluminium, which are cheap, colourless, and harmless. They have a great affinity for organic matter. The best of these salts is said to be the hydrated chloride known as muriate of alumina. We cannot enter into all the *pros* and *cons*, but recommend the chapter to all interested in precipitation. The author's practical chemical knowledge has been called into requisition, and the question of precipitating agents is certainly one that only an expert chemist can deal with. Other good precipitants are soluble salts of manganese. The manner of precipitation or the best means of employing the agents is considered in some detail, and a plan of a system of tank is given now in use at Aylesbury. Some good advice follows on "bogus" patents and contracting for purifying sewage. Other chapters of the book deal with deodorising destructive processes, such as that patented by the late General Scott for cement-making, sewage manures, and there is a very complete list of sewage patents, with abstracts of specifications for the chemical treatment of sewage. All local authorities will do well to read the book.

THE ASSOCIATED CARPENTERS AND JOINERS' REPORT.

THE twenty-sixth annual report of the Associated Carpenters and Joiners has been issued by Mr. James Beveridge, Glasgow, the general secretary. In the outset details are given of various disputes in Scotland and England, and in the whole of them the employés are stated to have been successful. One of these occurred in Edinburgh, where the men, "by a short and sharp struggle, succeeded in raising the standard value of their labour to 7d. per hour," or an advance of ½d. on the old rate. It is said in the report that "there is as yet no perceptible improvement in the state of trade, but it would seem from the higher freights which are being obtained in the shipping trade that the reduced building is beginning to tell on the available tonnage, there being now scarcely enough to meet the demand. Until some substantial progress is made in the shipping industry, those employed in our house shops will be unable to regain their old position. The building trades would be fairly good but for the unlimited supply of men, and a revival in shipbuilding would absorb the surplus men seeking for employment in our house shops." The income for the year amounts to £5,940 12s. 10½d., or an increase of £504 7s. 11½d. over the income of the previous one. There has been paid as sick aliment, £2,530 8s. 3d.; as funeral allowance, £369; as superannuation allowance, £520 17s. 6d.; as tools compensation, £199 14s. 4d.; as strike allowance, £120; as law expenses, £23 15s. 7d.; and £100 as bonuses to two disabled members. The gross expenditure for the year is £5,438 12s. 8½d., which yields a surplus of £502 0s. 2d. on the year's transactions, and brings up the funds on hand to £8,339 6s. 8d., which, on a membership of 3,877, is £2 3s. 0½d. per member. Of this sum, £5,199 4s. 9½d. belongs to the trade fund; £3,048 7s. 9½d. to the sick fund; and £91 14s. 1d. to the idle fund—being a gain of £464 12s. 9½d. to the trade, and a loss of £54 6s. 8½d. to the sick fund, which, with the loss of £76 9s. 4d. as interest, makes a total loss on this fund of £130 16s. 0½d. The return of plant held by the Association amounts to £323 6s., making the total worth of the Association £8,662 12s. 8d. On comparing the above figures with those of last year, there is a decrease in the amount paid as sick aliment of £220 15s. 2d., a decrease of £139 7s. as funeral allowance, a decrease of £200 as bonuses to disabled members, and a decrease of £141 3s. 9½d. as tools compensation; while on the other hand there is an increase of £117 4s. as strike allowance, and an increase of £63 8s. 10d. as superannuation allowance. There is a decrease in the membership as compared with last year of 200. The arrears of trade payments amount to £238 6s. 9d., or 1s. 4¾d. per member; the sick payments to £393 14s. 5d., or nearly 2s. 2¾d. per member; and the arrears of idle payments to £14 6s. 3d., or 6¼d. per member—showing a decrease of 1¾d. on the trade payments, and an increase of 3¼d. on the sick payments, as compared with the arrears, per member of last year. This is regarded as highly satisfactory, for although the arrears of sick payments may appear to be 3¼d. per member in excess of those of last year, yet they are actually 1¾d. less in proportion to the amount contributed; the arrears of last year being 1s. 11½d. against an annual payment of 17s. 4d., while this year they are 2s. 2¾d., against an annual payment of £1 1s. 4d. The total amount levied per member during the past year was 1s. 10d., and this was exclusively for the purpose of preventing any further diminution on the capital of the sick fund until the higher rate of contributions came into operation, and was the only call which was made during the twelve months. The altered rules have been in operation for six months, and have proved an improvement on the old code.

SHORLAND'S IMPROVED MANCHESTER GRATE.

WE have always recommended the "Manchester Grate" as one of the best and cheapest contrivances of its kind. Mr. E. H. Shorland, of St. Gabriel's Works, Manchester,



and Imperial Buildings, Ludgate Circus, E.C., has, we see, recently patented an improved form of the grate specially designed to burn any description of fuel, to consume its own smoke, and to generate warm air. The grate consists of a warm air chamber placed at the back of the fire, between which and the fire is a fire tile, with openings for passage of flame and smoke. The flame and smoke pass through these openings, and down between the fire tile and the warm air chamber, then up back of warm air chamber into smoke flue, in their passage warming the air chamber and consuming the smoke. The door over fire is perforated to allow the escape of any smoke which is left. The ashpan or regulating air-box is provided with a sliding grid, which regulates the draught of the fire. This ashpan is loose, and can be removed and the ashes cleared out. Cold air is brought from the outside to the warm air chamber, and is there heated by the waste heat of the fire, and is then conveyed by pipes and delivered into same room, or any contiguous apartment. The advantages claimed for this grate are: 1. It will burn coke, anthracite, or common coal equally well. 2. Consumes its own smoke. 3. Cures smoky chimneys, by the ample supply of warm air into room, by the draughts created in the neck of chimney, and by the special construction of firebox. 4. Great economy of fuel, by making use of the spare heat, which otherwise would all pass up the chimney, and insuring by its construction more complete combustion and increased radiating powers. 5. Ventilates the room in which the fire is situated. 6. Maintains a uniform temperature in all parts of the room, and prevents draughts. 7. Warms additional room or rooms by pure warm air. We honestly think the grate does all its inventor claims for it.

REGISTRATION OF PLUMBERS.

THE good work of the registration of plumbers is proceeding, and, thanks to the Plumbers' Company—and in no small degree, as is an open secret, to its energetic and public-spirited secretary, Mr. W. R. E. Coles—the movement which we have supported from the first is now solidly established on a national basis. An interesting and useful *résumé* of the objects and methods adopted in registration has just been issued by the company, and should be obtained by every master and journeyman plumber in the country. All will see how much it is to their interest to fall in with the aims of their own guild. Nothing unreasonable is demanded. The declarations expected are of the most equitable and simple character, and the examinations to be passed such as any apprentice who has properly served his indentures can undergo. In connection with the examinations, it should be noted that in addition to the admission to registration, and in order to encourage the highest efficiency of craftsmanship, the Plumbers' Company, under special conditions, confers the Freedom of the Company on Plumbers passing their examinations with honours. This admits all who so pass to the benefits of pensions and other privileges of the Livery, and is a most wholesome return to the spirit and purpose in and for which the old City Guilds were founded. If every other Trade Guild followed the example of the Plumbers' Company, and set themselves to revive the old traditions of good work and craftsmanlike emulation, and mutual confidence and esteem between master and man, and if all this could be supplemented by the registration of architects legally empowered once again to direct the great company of workmen, we believe the present evil system of slop work and lowest prices would speedily be extinguished, and that the public would have reason to rejoice.

There is seldom a movement of this kind without more or less hindrance from separatists, who, working possibly with the best of motives, really do harm. We notice a "Society for the Registration of Scottish Plumbers" has been started at Edinburgh. Seeing that Scotland is already embraced in the Plumbers' Company's national and comprehensive scheme, we cannot recognise the need for the existence of the newer organisation. Its rules are certainly less elastic than those of the old Guild, and its objects are certainly not more comprehensive. The plumbers of Glasgow and other important Scottish towns evidently prefer the companionship of the Plumbers' Company, and so we expect will most of the others.

At a special meeting of the members of the South Staffordshire and Worcestershire Institute of Mining and Mechanical Engineers held on Thursday, it was decided to remove the home of the Institute from Dudley to the Mason College, Birmingham.

WAYSIDE NOTES.

VIENNA is not a place that I have included in my wayward wanderings; so I have read with profound humility the report of the lectures given at the last R.I.B.A. meeting, and have followed with interest the remarks of the various commentators. According to the descriptions of Mr. Thomas Blashill and Mr. F. R. Farrow, the Austrian capital, whereon the attention of the world is just now riveted, appears to be as noteworthy in its modern architecture as it is reputed to be in other ways. The gay Teutonic city is reported to possess some remarkable specimens of Neo-Greek. Mr. Blashill said that the Houses of Parliament was the only instance he knew of the successful employment of the Greek style in a large and complicated design. That is stating a great deal, and makes one long to behold the edifice in question. Doubtless the marbles rich and rare that have been employed in its construction go a long way towards making it so attractive; and I expect Mr. Blashill, in describing it as the *only* instance of the kind, intends to refer to a design with details of a purely Grecian character. Anyhow, until I have seen the Vienna Houses of Parliament, I will remain true to the Brussels *Palais de Justice*, and hold up this building to my readers as an example of the most successful attempt to produce a monumental design in a refined style of Trabeated architecture.

Some two hundred and twenty-two Private Bills have been deposited for the next session of Parliament. Two of these have been promoted with the object of obtaining powers to carry out street improvements. One of them relates to the proposed construction of three new streets, and the widening of others, in the vicinity of Kensington-square. The other was promoted last year, and seeks powers for making a new street from Whitehall to the Embankment, which is to be called Horse Guards "Avenue"—a thoroughfare designation that appears to have been much affected of late. I presume the new street is contemplated to join the Embankment with "Whitehall Yard," connecting with the former somewhere between the end of Whitehall-court and the new police offices. Whatever may be its exact position, the necessity for such a thoroughfare is not strikingly apparent—at least, until the Embankment be more lined with buildings. Perhaps it will be at no very distant date. I note that the foundations for the new police offices are being prepared on the site of the mournful old Opera House that was to have been. A pretty job it seemed, too, when I passed the works a week or so ago, the water being very troublesome here, as it is, indeed, all along the western portion of the Embankment and at Westminster. Incessant steam-pumping seems to be the order of the day in foundation work in this district.

One of the 222 Bills has been deposited by the Grand Junction Water Company, which asks for sanction to construct a new aqueduct on the shore of the Thames at Dorny, in Buckinghamshire, in connection with which the company proposes to lay down conduits and pipes for increasing our London water supply. In another Bill the United Telephone Company asks to be allowed to put up "overhead wires"—a request which the U.T.C. will probably be disappointed in, even though it seeks to approach no nearer than within twelve miles of St. Martin's-le-Grand. I observe that the South London Tramway Co. have *not* submitted their proposed Bill to enable them to construct a line of tramway along the Victoria Embankment and over Westminster Bridge. What a blessing!

I expect, Sir, that you will receive a few letters *re* the Gloucester Baths Competition, as it has resulted in the selection of a local man. But the unsuccessful competitors should remember that they have an able assessor in the person of Professor Roger Smith. The plans you promise to reproduce will prove interesting. So far as I could judge at the time, there was not over-much room on the ground for the baths, &c., that were required. The Turkish Bath itself, I should have imagined, would have taken up a lot of space, as such require considerable area if they are to be made effective in working and appearance.

The so-called Turkish Bath is an institution that has of late found increased favour in this country. It therefore behoves the architect to render himself familiar with its plan and construction. There is a considerable field for the display of ingenuity in its design, both as to construction and artistic treatment; and, although we have had many fine baths erected in London and the provinces, there are still many details that will reward study. One of the handsomest and best in London is the bath in Northumberland-avenue, where the *Tepidarium* has been rendered a thing of beauty by means of marble, faïence, mosaics, and stained glass; while in the ample *Apodyteria* the splashing waters of a little fountain soothe the erstwhile bathers. I know a good many Turkish baths, but none that are rendered so architectural as that in Northumberland-avenue. It is worth a visit of inspection.

It will not, I think, be denied that few architects are in a position to design a Turkish bath, chiefly, of course, because so few ever enter them and become acquainted with their necessities and the possible points of failure in their design. One hears of ridiculous failures in the newly-constructed baths, arising, however, solely from ignorance of their first principles, of the action of heated air, and of the means of insuring perfect ventilation, while at the same time keeping up a uniform temperature. I speak from experience—I am an old hand at taking the hot-air bath, and have long been interested in it, both from a hygienic and an architectural point of view. It is a subject that should be studied by the young architect, as it is likely in the future to frequently be included in competitions such as the late one at Gloucester. But as it is necessary, if he would penetrate the mysteries of Freemasonry or Forestry, that he should become a member of the fraternity, so if he would thoroughly understand the Turkish hot-air bath, he must become a bather, even at the risk of that awful death which, to the minds of the many, is the sure result of such a procedure. There are plenty of books and pamphlets on the theory of the hot-air bath, but a practical knowledge of their construction and arrangement can only be obtained by the study of working examples—an operation that rather taxes one's energies in temperatures ranging from 120 to 220 Fah.

The band of agitators who, a short time back, "demonstrated" before the Metropolitan Board of Works, had, it would seem, little cause for complaint against that body in respect of actual works undertaken. The rate of 8·39d. in the pound has been mainly produced by the large sum of money expended on engineering, building, and allied works. "The Board have spent no less than six millions on main drainage, two millions on embankments, nearly twelve millions on street improvements, £846,000 on minor improvements, over two millions on bridges and the Woolwich Ferry, £1,444,000 on dwellings for the industrial classes, £577,000 on parks, commons, and open spaces, £425,000 in Fire Brigade Stations, and £45,000 on undertakings to prevent floods from the Thames." As Mr. Urquhart said, this is no slight record! Neither is the 8·39d.

Commenting upon the Rev. T. G. Bonney's book on the "Abbeys and Churches of England and Wales," the last issue of the *Saturday Review* says that "The parish churches of England have undergone, during the past fifty years, a fiery trial. A few—the minority—have come out of it unscathed. The majority have been transformed, some without wholly losing their old identity, but others so that no man can say 'This is the old parish church in which my forefathers worshipped.'" The "*Saturday*," however, did not mention the extra strain of the Jubilee year, which I referred to last week. So many old buildings have of late come under my notice as worth commenting upon, that I have a whole list that it will never be possible to mention in these columns. There were some interesting facts connected with old Pentney Church in Norfolk, that Mr. E. Guy Dawber recently restored, and also some about the old Cheddar Cross in Somersetshire, that Messrs. Lingen Barker and Alfred W. Cross will shortly restore on the lines of a scheme prepared by the late William Burges, which I should have liked to have detailed. But space forbids. There is, however, one old building about to be restored that is of more than ordinary interest. Darenth Church is, I believe, now to be dealt with. "Alas! poor Darenth, I know it well!"—a simple Kentish fane in the valley of the river of a similar designation to the village. It is remarkable as possessing a very Early Norman chancel, with three tiny end windows that look like the germ of an Early English triplet. The whole valley of the river Darenth, by the bye, is most interesting. From Otford, with its castle, and church that nestles in an escarpment in the North Downs, to Dartford, on the Thames Valley marshes, there is a beautiful valley that contains many an interesting piece of old architecture. In the Devonshire-like Lullingstone Valley there are the churches of Shoreham and Eynsford, the former with a porch of solid chestnut, and the latter with a quaint shingled spire. There is Farningham with an old font, and Sutton-at-Hone with a little squared flintwork that reminds one of East Anglia; and near Darenth there is Horton-Kirby church and village. Lastly, there is old Dartford church that stands sentinel-like at the end of the valley, where, through grass-green marshlands, the river runs out to meet the waters of the Thames.

GOTH.

CHIPS.

The Corporation of Hertford is increasing the water supply of that town by sinking an 8½in. Abyssinian tube well about 100ft. deep, to draw an additional supply of about 170,000 gallons per day from the chalk springs. This work is being carried out under the supervision of Mr. W. H. Wilds, the borough surveyor, and the contract for the tube well has been given to Messrs. Le Grand and Sutcliff, of Bunhill-row.

The foundation stone of the New Junior Travellers' Club was laid on Friday with Masonic ceremonies. The new premises will occupy a commanding site in Piccadilly.

The London and North-Western Railway Company contemplate a large expenditure upon Holyhead Harbour and a considerable development of their already extensive accommodation there. Holyhead is expected to become, in North Wales, what Cardiff is in the south of the Principality.

The Glasgow Town Council have awarded the second part of the contract for the Duchray Tunnel to the contractor for the first part, Mr. Geo. Lawson, of Rutherglen, at £50,000, which was the lowest offer; and 450 tons of cast-iron pipes have been contracted for also, the lowest offer being from a Middlesborough firm at £1,972, which has been accepted.

A special meeting of the Carnarvon Town Council was held on Friday, to decide upon the site of the statue of the late Sir Hugh Owen, which is presented to the town by the subscribers. It was arranged that the statue, which is from the studio of Mr. Milo Griffith, should be erected in Castle-square, about 30 yards from the public fountain, which was opened by the Prince of Wales. It was also arranged that the pedestal, should be of Anglesey marble or Llanaelhaiarn granite.

Mr. Wm. Cairns Hardy, architect, Morpeth, died on Tuesday from an attack of rheumatic fever, at the early age of 24. Mr. Hardy was a native of this town, and was the son of the late Mr. J. R. Hardy. Some three years ago he entered into partnership with Mr. H. J. Boolds, and they together commenced the practice of their profession at Newcastle-on-Tyne, and also at Morpeth. In the latter place they eventually settled down, under the style of Boolds and Hardy. In the practice of his profession he showed energy and marked ability, and his early death is a matter of general regret.

A memorial reredos was dedicated at St. Saviour's Church, Torre, Devon, on Thursday, the 22nd inst. It is Perpendicular in style, and is made of Austrian oak. The three central panels are designed with a representation of the Crucifixion, and in the panels in the wings on either side are the Agnus Dei, and the valoring pelican. Mr. R. Medley Fulford, of Exeter, designed the reredos, which has been carried out by Mr. Harry Hems, of Exeter.

Two new board schools lately completed are about to be opened in Islington, one being situate in Pakeman-street, Hornsey-road, and the other in Blackstock-road, Finsbury Park.



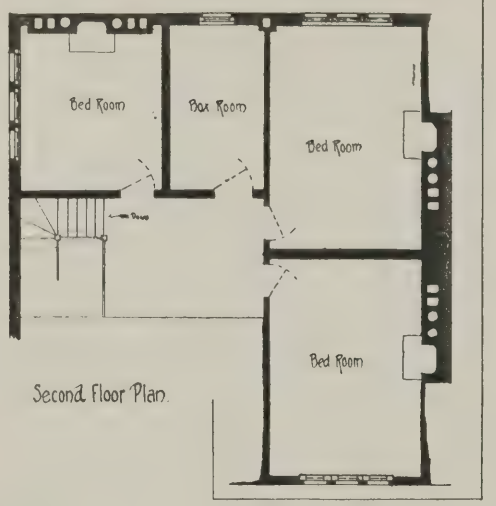
Building News Designing Club.

A Suburban Residence by "Ghost"

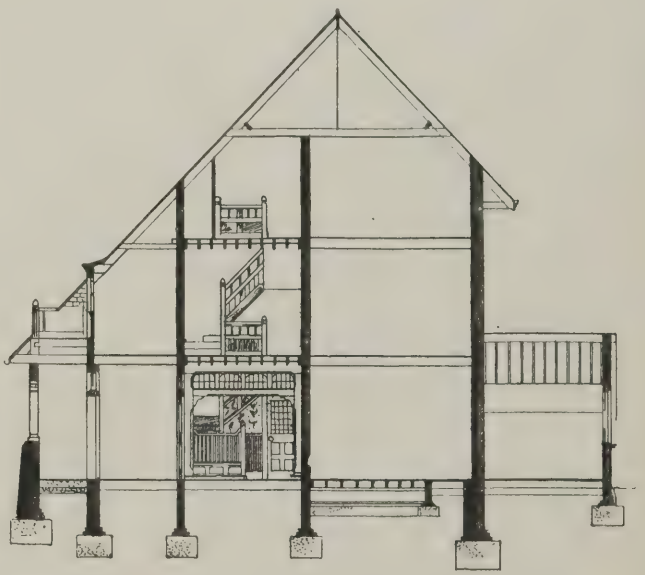
DESIGN PLACED FIRST



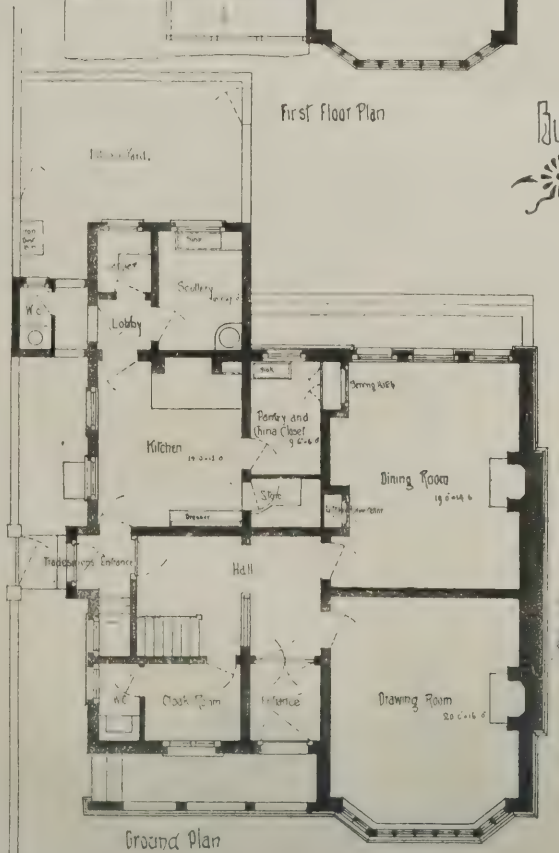
First Floor Plan



Second Floor Plan.



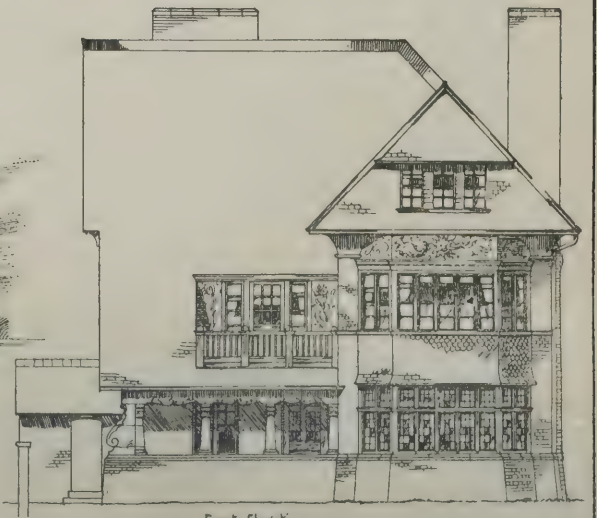
Section.



Ground Plan

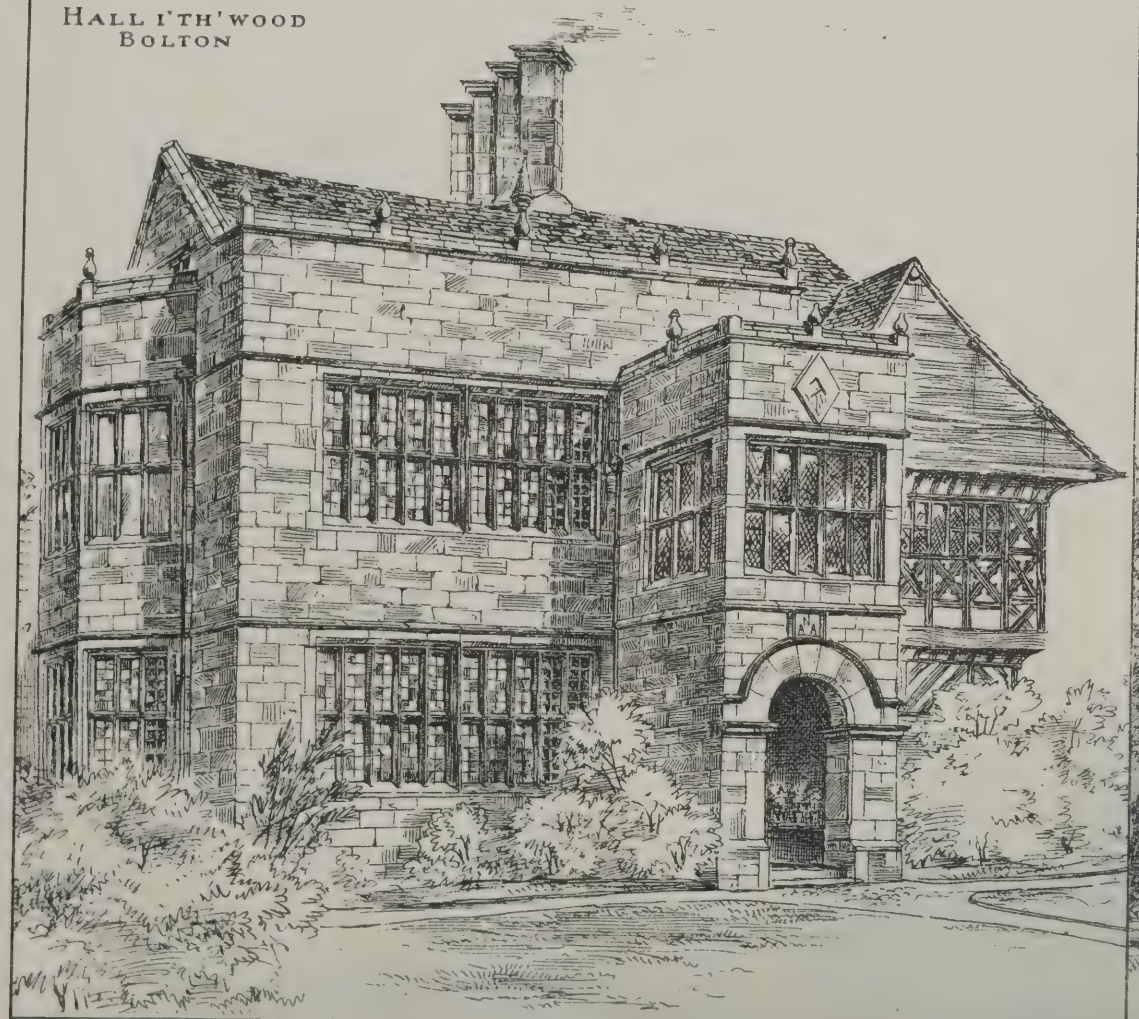


Sketch.

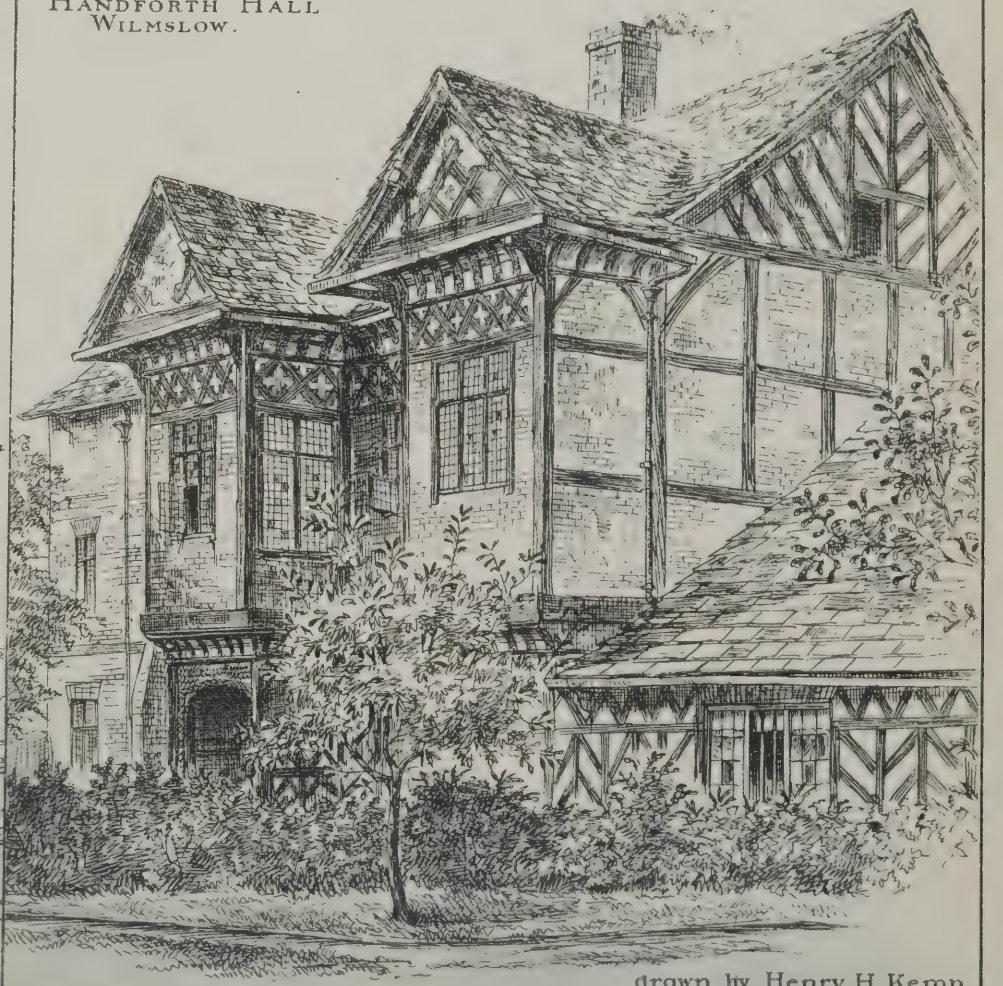


Front Elevation.

HALL I'TH' WOOD
BOLTON

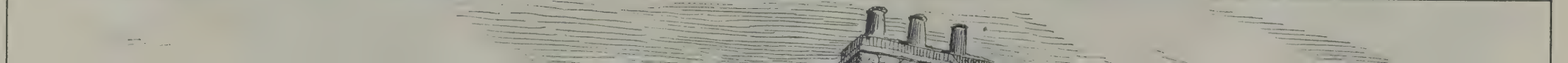


HANDFORTH HALL
WILMSLOW.



drawn by Henry H Kemp

THREE OLD LANCASHIRE MANSIONS



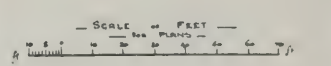


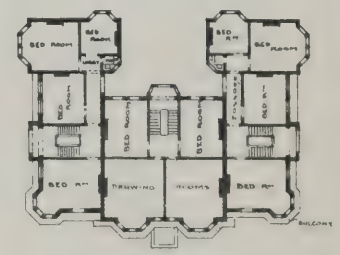
drawn by Maurice B. Adams

BRADSHAW HALL NEAR BOLTON

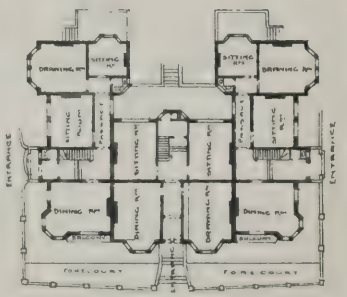
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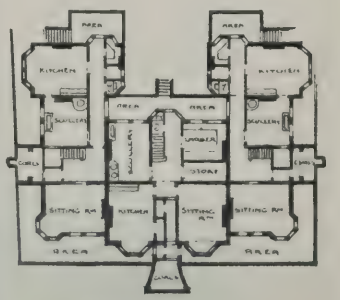




FIRST FLOOR PLAN.



GROUND PLAN



BASEMENT PLAN

Photo-Lithographed & Printed by James Bierman, 6, Queen Square, W.C.

THREE HOUSES ON THE MARINA, BEXHILL.

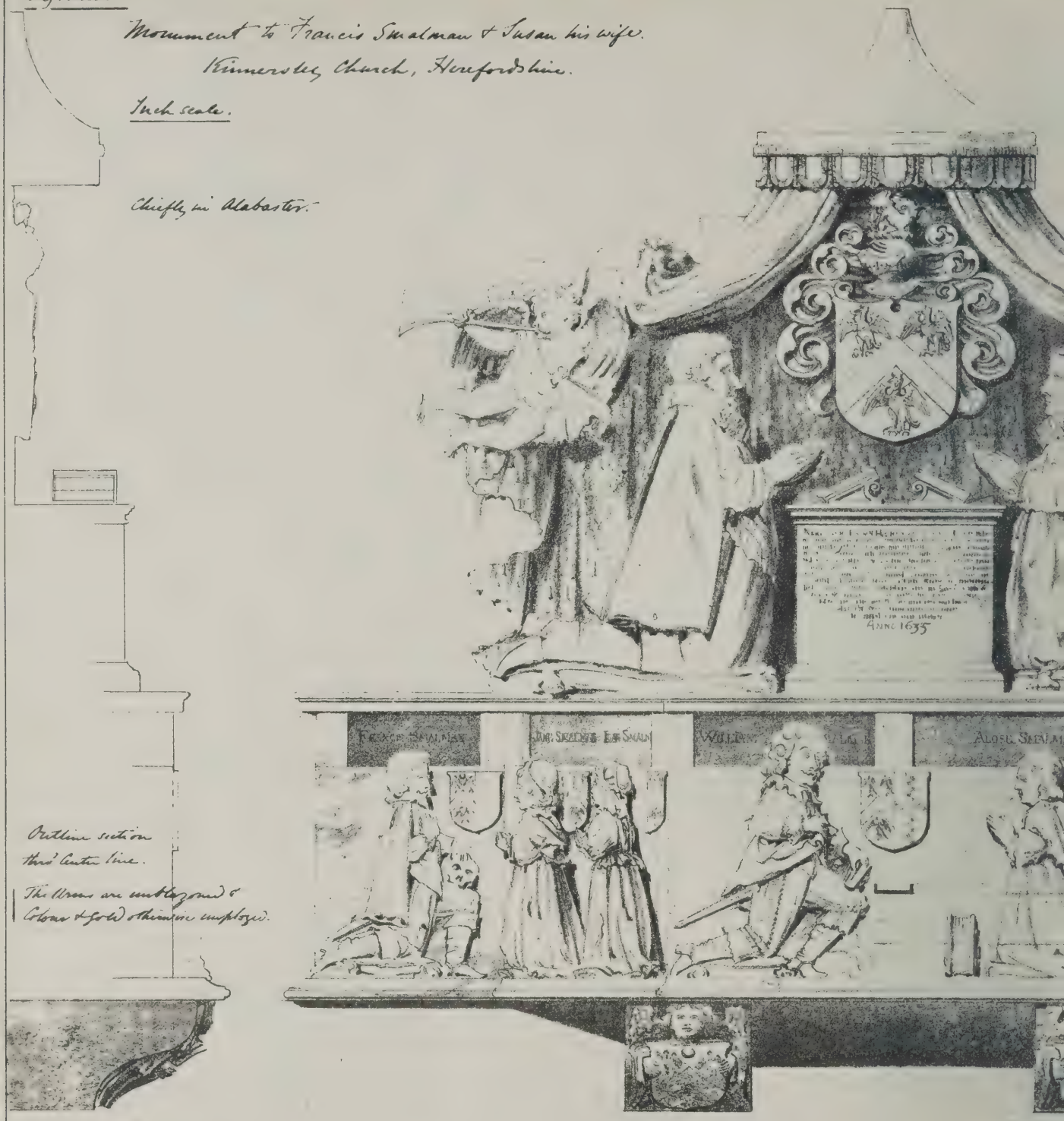
— JOSEPH WALL A.R.I.B.A. —
— ARCHITECT —

England.

Monument to Francis Swalman & Susan his wife.
Kimmersley Church, Herefordshire.

Inch scale.

Chiefly in Alabaster.



Outline section
thro' Centre line.

The Arms are emblazoned &
Colour & Gold otherwise employed.

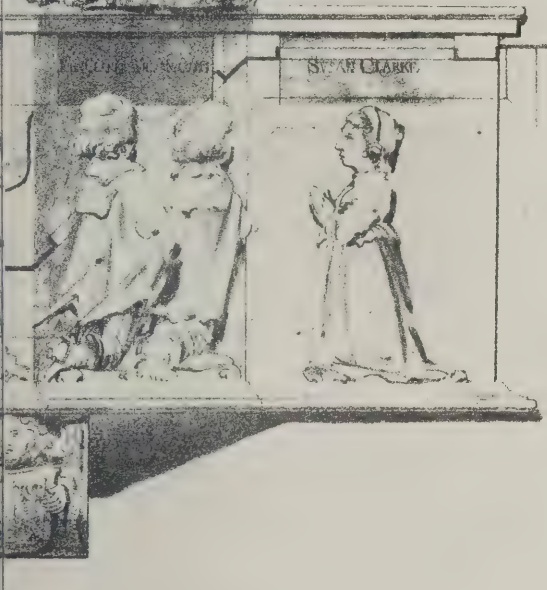


France Sarcophagus Arles Museum

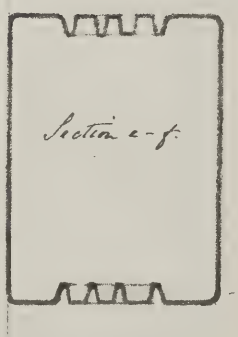
Scotland.

Cross at Kildalton, Islay.
Argyllshire



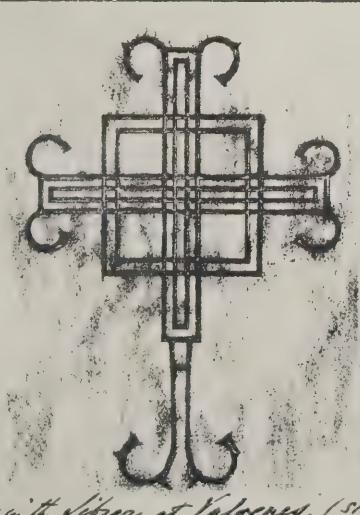


Plan.



Section e-f.

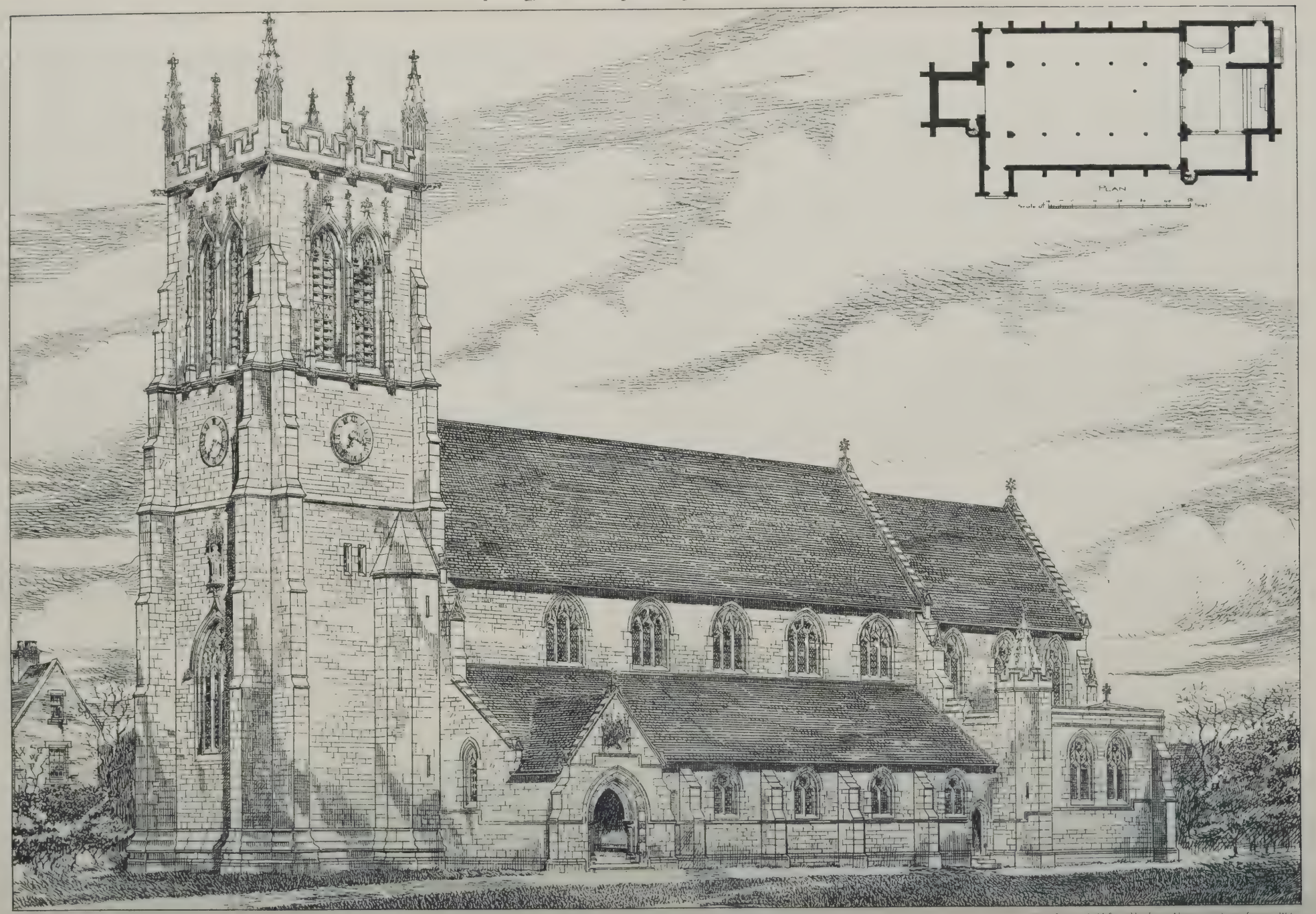


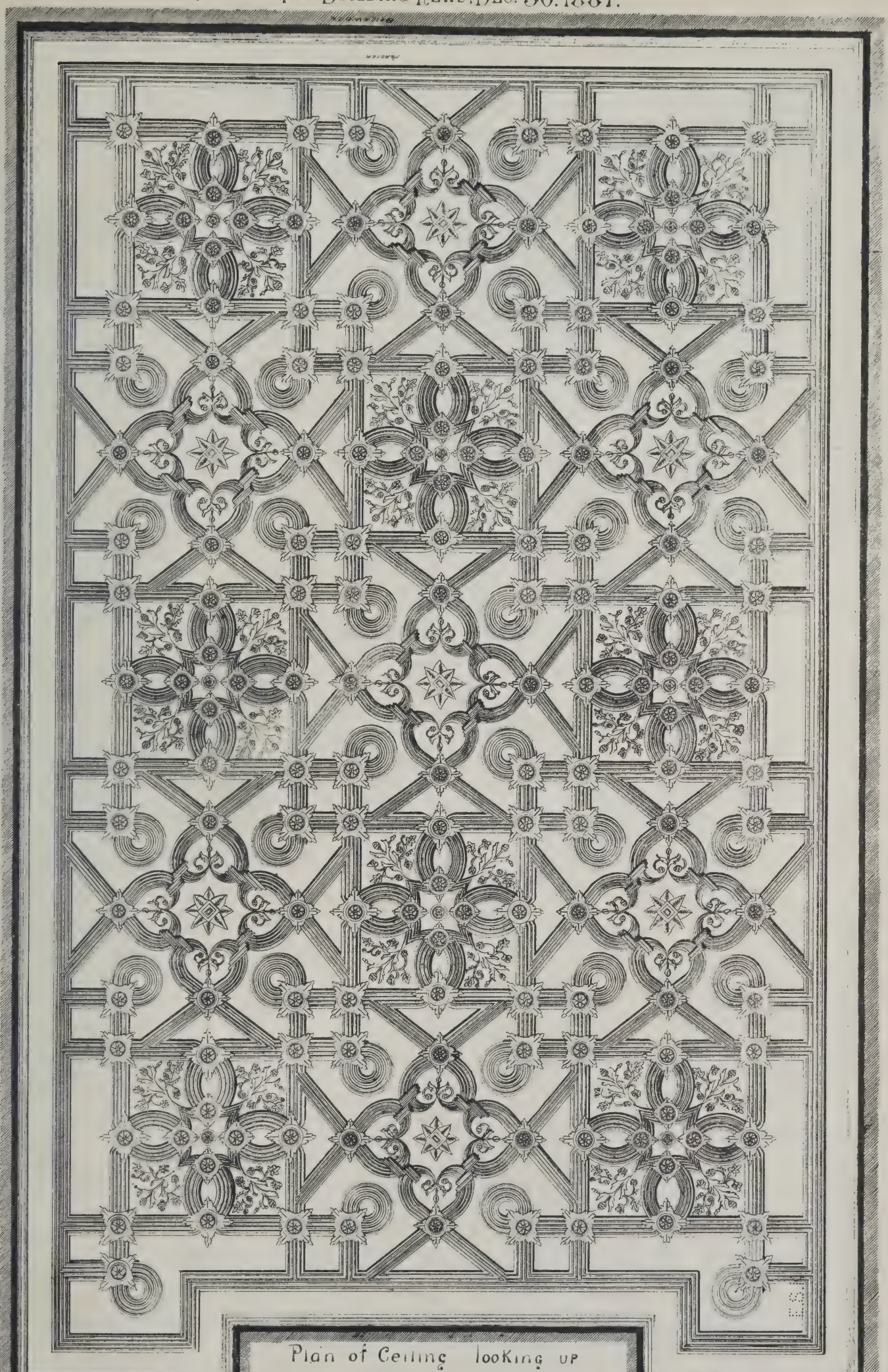


Drawn in the Library at Valognes. (Stone)

Printed by James Akerman, 6, Queen Square, W.C

W. BRINDLEY AND W. S. WEATHERLEY.


PLAN



Plan of Ceiling looking up
Room N°4 South Quay
Gt Yarmouth 16 Century

Drawn by Charles John Brooke

Queen's Prize Drawings.

HOLME WOOD . IPSWICH .

Brightwen · Binyon · Architect ·

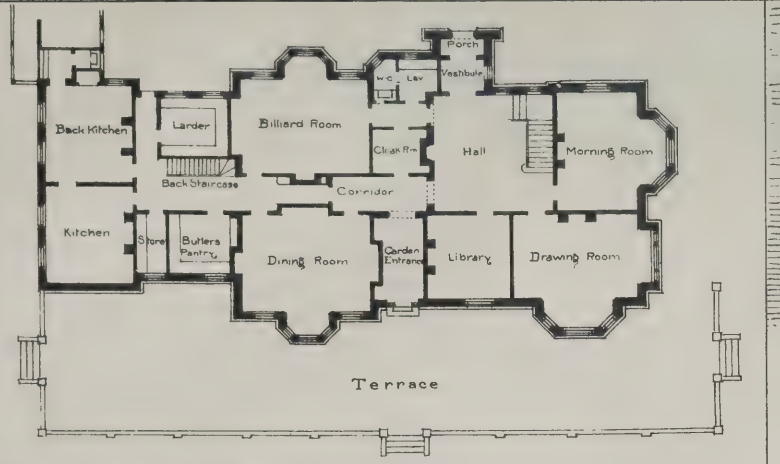


Photo-Lithographed & Printed by James Akerman 6, Queen Square, W.C.

"Building News" Designing Club

A Detached Villa Residence

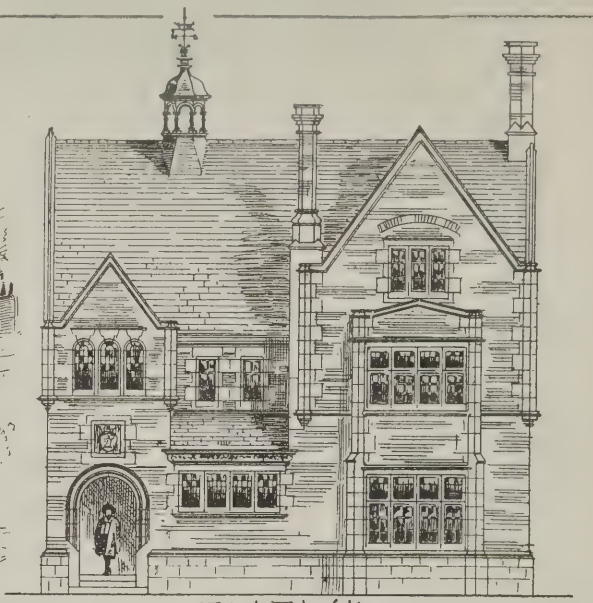
Scale 10 0 10 20 30 Feet

DESIGN PLACED SECOND "Boreas"

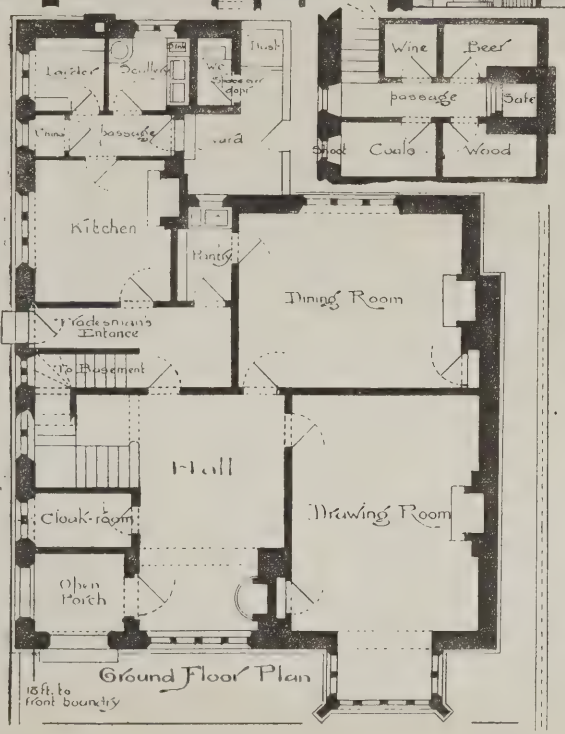
Section



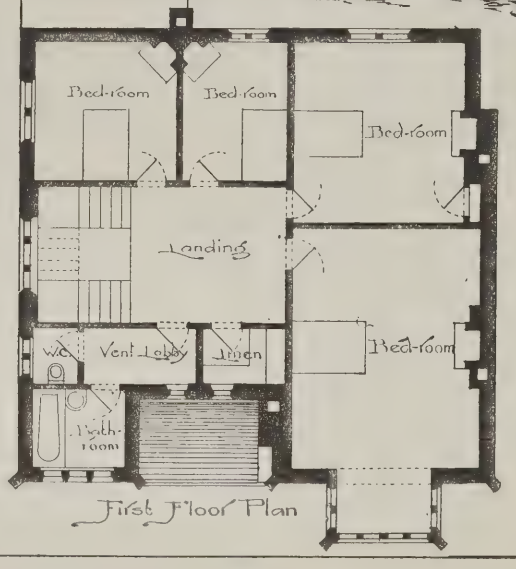
Sketch



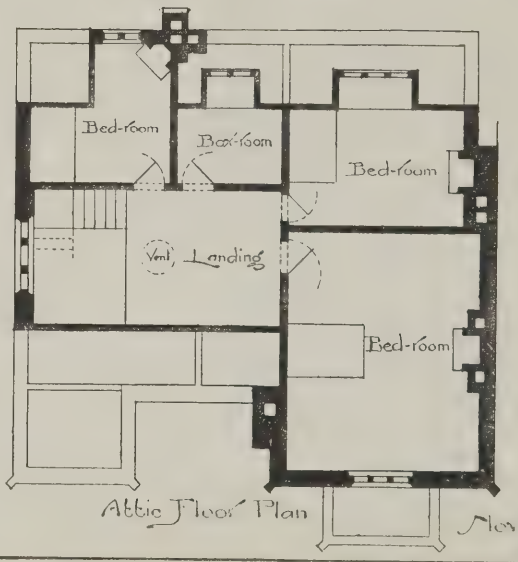
Front Elevation



Ground Floor Plan



First Floor Plan



Attic Floor Plan

Nov. 30th 1887

LIBRARY
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CONTENTS.

Architectural Enlargement of Buildings 961
Responsibilities of Architects and Builders for Structural Injuries 962
BUILDING NEWS Designing Club 962
Notes from Edinburgh... 963
Roof of the National Agricultural Hall, Kensington.. 964
Fire Prevention and Exits from Public Buildings ... 966
The Metropolitan Board of Works and the Theatres... 967
Standards of Professional Membership 968
Sewage Treatment 968
The Associated Carpenters and Joiners' Report... ... 969
Shorland's Improved Manchester Grate... 969
Wayside Notes 970
Our Lithographic Illustrations 991
Compressive Strength of Steel 992
The Architects', Civil Engineers', and Surveyors' Bill 992
Building Intelligence 992
Engineering Notes... 993
Architectural and Archæological Societies 993
Correspondence 993
Intercommunication 995
Our Office Table 996
Legal Intelligence... 997
Meetings for the Ensuing Week 998
Tenders 999

ILLUSTRATIONS.

NORTON CHURCH, YORKSHIRE.—HOLME WOOD, IPSWICH.—THREE HOUSES ON THE MARINA, BEXHILL.—MEASURED DRAWINGS, ROOM 4, SOUTH QUAY, GREAT YARMOUTH.—HISTORIC MONUMENTS.—THREE OLD LANCASHIRE MANSIONS.—"BUILDING NEWS" CLUB DESIGNS FOR A DETACHED VILLA RESIDENCE, TO COST £1,500.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NORTON CHURCH, YORKSHIRE.

MALTON STATION on the North-Eastern Railway, well known to all visitors to Scarborough, is really in the parish of Norton, the two places being generally known by the former name. The existing parish church of Norton immediately adjoins the railway, and is a very small, poor building in Modern Classic, much out of repair, and built in an old churchyard densely crowded with graves. It has therefore been determined to build a new church on a different site, away from the noise of the railway, and more centrally situated for the parish. Designs for a church holding 700 persons have been prepared by Mr. C. Hodgson Fowler, F.S.A., of Durham, and approved by the Archbishop and the Committee, and it is hoped that the work may be begun early in the spring.

HOLME WOOD, IPSWICH.

THIS house was built for Mr. J. E. Ransome, from designs by Mr. Brightwen Binyon, A.R.I.B.A. The plan was arranged with a view of retaining the shell of a house which was upon the site, but it was afterwards determined to pull it down in order to improve the position. The house stands upon high ground in the centre of several acres of well-wooded pleasure grounds and gardens, about a mile from the centre of the town. The view we publish to-day is from the south-east, the main garden front facing south. The building is of red brick, with Broseley tile roofs, and some half-timber work on the gables, &c. The contractors were Messrs. J. B. and F. Bennett, of Ipswich.

THREE HOUSES, MARINA, BEXHILL.

THIS drawing illustrates three houses now in course of erection at Bexhill, and are the first that have been erected on the Marina facing the sea; the plan has been arranged for three complete houses. The internal structural details are being carried out with the view that when required the three houses will be easily convertible to a private hotel, containing 60 apartments, including coffee and billiard rooms, with their accessories. The whole of the fronts will be cemented, the mouldings, cornices, and window dressings being formed of the same material; Portland cement being found the most favourable medium for withstanding for any lengthened period the ravages of wind and weather on the south coast. Mr. J. B. Wall, of Walbrook and Bexhill, is the architect, and is also surveyor to the estate. The builder is Mr. James Cole, of Western-road, Bexhill.

OLD PLASTER CEILING, SOUTH QUAY, YARMOUTH.

THIS plan, illustrating the beautiful ceiling in No. 4, South Quay, Yarmouth, forms one of the series of drawings for which the Queen's prize was recently awarded to Mr. Charles John Brooke, of Southtown, in connection with the Science and Art Department. We hope, at an early date, to publish some of the other sheets from the same set, giving details of the screen and woodwork. The house from which this ceiling was taken is thus described in Manship's History of Great Yarmouth, published in 1819:—"The residence of Chas. John Palmer, Esq., F.S.A. It was built in 1596 by Benjamin Cowper, a wealthy merchant of Yarmouth, and Burgess in Parliament for the town. The front has been modernised, but it contains a room on the first floor 30ft. long by 18ft. wide, elaborately adorned with carvings of great beauty and elegance, which remain in the most perfect state. The dining and other rooms are also panelled and ornamented with carvings." Although the date of this publication is some time back, the state in which they are at the present time, Mr. Brooke writes, fully justify the above remarks.

HISTORIC MONUMENTS.

WE heartily welcome the book of ancient examples just published by Messrs. Brindley and Weatherley,* giving illustrations of over 600 specimens from various countries, and from the earliest periods down to the end of the last century. The selection seems to have been limited rather by the idea of representing mainly only such monuments as are likely to afford types of design or suggestive models for modern uses; so that many grand and otherwise remarkable instances, both in England and from the Continent, are omitted, such as the Tomb of Aylmer de Valence and Henry VII. Tomb in Westminster Abbey, or the Cardinals d'Amboise monument from the Lady Chapel of Rouen Cathedral, not to name other numerous specimens of large size and magnificence like the Scaligeri Tombs at Verona, or that of St. Chiara at Naples. To the antiquary the plates afford a singularly continuous chapter of historical instances chronologically grouped with descriptive indices. The drawings are enhanced in usefulness by being mostly drawn to a uniform scale of one inch to the foot, thereby rendering the comparison of various designs much easier. No work on this subject, so complete is this one, can be expected to include more representatives of every style and design which have marked its history; but if we may point to an omission, it is to refer to the unique terracotta monument at Layer Marney in Essex, and similar work in the chancel of Wymondham in Norfolk, both of which illustrate a particularly refined class of detail admirably adapted for present uses, and not too big in scale. The samples, which, by the courtesy of the authors, we have been allowed to group together in our double-page plate to-day, distinctly show the wide range of subjects brought together, however, in the volume before us. The earliest example, though the smallest, is one of the most interesting shown on our plate. It represents a rich cross from the centre of a stone altar top of the 7th century preserved in the library at Valogues, La Manche, France. The other four incised crosses on the same slab are smaller, and inclosed in circles. The beautiful body of a sarcophagus of white Greek marble, from the museum at Arles, figures to the left of the last-named subject, and is drawn to inch scale. The ends of the sarcophagus are quite plain, and measure 2ft. 7½in. wide. The coped lid is gone. The arrangement of trees forming niches for the full-length statues grouped along the front is very ingenious in design, and if we remember rightly, was skilfully adapted by the late Wm. Burges in the drawing-room chimney piece for his house at Melbury-road, Kensington, introducing the beautiful garden dreamt of by Gillaume de Louis, the hero of Chaucer's Version of "Roman de la Rose." Between the trees are figures of Largesse, Richesse, Joliveté, Liesce, Beauté, and others, with names in Provençale. In the example at Arles birds are grouped in the foliage. The pre-eminently Celtic treatment of the Kildalton cross delineated to the right of our page is at once to be noted. The divergent spirals growing as it were from the massive bosses which serve as jewels in the design, produce a fine ornament. The principal group on the other side of this cross represents the "Virgin and Child," a subject which appears on the St. Martin's Cross, Iona, and on the slab at Crail. These crosses are unique in character, and are possessed of great interest as works of early art, which, with their decay, will become extinct. The section shows the sinking of the interwoven pattern to the circle round the head of the cross. Our last specimen is of comparatively recent date, and is entirely different in every way, while some purists may consider it unworthy of publication—at least, as an example to be imitated. No one would probably advocate the reproduction of composition curtains and the conical, testerlike top which surmounts the design; but like many another piquant and clever monument of the same date (1635), it is unquestionably possessed of a quaintness and breadth, coupled with a recognition of sculpture which is worthy of imitation. The monument is in alabaster and black marble. It was originally highly elaborated with gold and colours, and these have lately been restored by Mr. G. F. Bodley, A.R.A., who renovated the church a few years ago. Its position is on the north side of the chancel in Kinnersley Church, situated some eight miles from Hereford. At the end of the volume, we may add, are some useful alphabets of various dates. The plates, which measure 15in. by 10in., are all executed in chalk lithography.

* Ancient Sepulchral Monuments. By WILLIAM BRINDLEY and W. SAMUEL WEATHERLEY, F.R.I.B.A. London: 20, Cockspur-street, S.W. Published by the authors. Printed by Messrs. Vincent Brooks, Day, and Sons. 1887.

THREE OLD LANCASHIRE HALLS.

BRADSHAW HALL is, perhaps, one of the least known of the many old houses near Bolton-le-Moors, and so far as we are aware, has not been illustrated before. No mention is made of the building in "Parker's Domestic Architecture," and the history of the place appears to be devoid of any special points of interest. The mansion was built by the Bradshaws, then owners of Marple Hall in Cheshire, one of the most beautiful Elizabethan houses in that county. Judge John Bradshaw was the president of the court that tried Charles I. This regicide, of yeoman origin, was born in a farmhouse at Wybersley, and was related to John Milton, to whom he bequeathed £10. Clarendon describes him as "not without parts, but of great insolence and ambition." Bradshaw Hall was a 17th-century house; but it has been very much altered since its more palmy days. The Jacobean front seen in our view is, however, very quaint and interesting, having a porch of some dignity, enriched by engaged columns surmounted by a broken entablature, and finished with sugarloaf terminals of odd design. These are somewhat coarse and meaningless; but the mouldings of the arch and the details of the Order are refined and effective. In general idea the porch is similar to that of Hall-i'-th'-Wood, illustrated on the same sheet of drawings, both houses, perhaps, being the work of the same architect. No records remain to tell of an eventful history, for the story of the Cromptons' home at Hall-i'-th'-Wood is unmarked by any particulars of moment, and the building, like many another old English house, depends upon its own style and features for the evidence of its history. The earlier half of the house to the right of the entrance is entirely of timber and plaster, built possibly towards the close of the 15th century. Over the porch are carved the letters "A. A. N.," said to be the initials of Alexander Norris, who is believed to have built the stone south front of the house, dating his work 1648. There is a very good oak staircase in the house, of Jacobean workmanship; but otherwise there are not many remains of interest within the building. Mr. R. Knill Freeman, the architect, is, we understand, about to carry out some improvements here. A plan of the place, together with other views and details of the woodwork, will be found in the BUILDING NEWS for Nov. 9, 1877. Handforth Hall, not far from Manchester, is near Wilmslow, on the borders of the county, the station of Handforth being well known in connection with Norcliffe Hall, on the banks of the Bollin, as a favourite Cheshire rendezvous for picnics. The grounds at Norcliffe are very beautifully laid out, and are exceedingly well situated. Handforth Hall evidently has seen better days, but now is shorn of much which once gave the house a charm. The timbers, which are filled

in with brickwork, are very simply framed, save in the gables (seen in the sketch), but here much of the detail has gone. The composition is boldly treated, and the first-floor rooms were of unusually lofty proportions considering its date. The work in some other respects resembles the earlier wing of Hall-i'-th'-Wood already mentioned.

COMPRESSIVE STRENGTH OF STEEL.

AN elaborate investigation into the relation which compressive strength of steel bears to tensile strength is the subject of a paper read before the American Society of Civil Engineers by Mr. Charles A. Marshall, C.E. Solid rolled bars from the rolls were the samples tested. The general law demonstrated by these tests is thus given : "That the elastic limit of the material is the chief factor in determining the ultimate resistance of struts of ordinary length made out of wrought iron or steel, excepting the very hardest kind ; and that the two quantities' elastic limit in compression and ultimate compressive strength are identical within a considerable range of length-ratio of columns." The tables and diagrams given by Mr. Marshall are interesting and corroboratory of this general law. No less than 74 flat-ended compression tests of 28 different sizes of bars, ·44 to 6·0 square inches section, all from same blow of Bessemer steel, and of lengths 2, 12, 18, 24, and 30 times the shortest diameter, are recorded in the first table. Table 2 exhibits average results of full-size tensile tests of the twenty-eight different bars above named. No less than fourteen tables of compression and tensile tests of steel bars of different manufacture and sizes are given. The tests were chiefly made in the laboratory of the Cambria Iron Company, Johnstown, Pa., and the machines used are detailed by the author, who describes also the mode adopted. The author refers to two phenomena exhibited on the diagrams. 1st, When a load equal to the elastic limit of any of these materials is imposed and allowed to remain for some time, it causes permanent change of length, amounting, it is believed, to much more than has been generally understood, and which is apparently a very definite quantity for each case. 2nd, This change of length having begun under a load equal to elastic limit, will continue under a less load. It was shown that in cases of the 100,000lb. steel, the 67,000lb. steel, and the hard iron made from scrap, that the total is obtained equally as well, though requiring greater time, with a load of 1,000 or 500lb. less than primitive elastic limit, as with a load equal to it. The amount of stretch at elastic limit, as taken from the diagrams, show—

For the	100,000lb. steel	0·3	per cent.
„	80,000lb. „	1·4	„
„	67,000lb. „	1·85	„
For hard iron	„	1·3	„
For soft iron.....	„	2·3	„

It is said the specimens under compression reach their maximum change of length under constant load in less time than those under tension, thought to be due to the more rapid action. We cannot here follow the author's minute particulars of these experiments. The tables show that crippling strength does not bear any definite ratio to ultimate tensile strength, and they appear to establish the law that the crippling strength of steel in the form of moderately long struts is approximately equal to the elastic limits. The greatest differences are small when compared to the agreement of the quantities registered. Another fact worthy of notice is that a bar very seldom exhibits a higher resistance than this limit when 12 diameters long or over. In those cases where the law is not evident, the bars had some defect, or the stress was not true to the section.

Other facts deduced from the rules are that the elastic limit varies more with size of bar than does any other property of the metal, and the thicker the bar the lower is the elastic limits and ultimate strength. The same law applies to iron, though the exceptions are more numerous, owing probably to the defects in the material. The steel from which these tests were made was very uniform, as proved by the small variation in ultimate strength, though the thickness of sections were widely different. Diagrams showing the range of elastic limit in compression, and the curve of resistance, according to Euler's formula, are instructive. From the author's experiments, the engineer will be safe in taking the elastic limit in compression and ultimate strength as the same within a considerable range of length ratio of columns. The author shows that while this law is true as to strength, where Euler's curve crosses the line of elastic limit it falls off immediately, and therefore for pin-ended columns the length ratio at which elastic limit ceases to be the measure of the column, strength varies with the limit, and is determined by plotting the intersection of Euler's curve and a horizontal line representing the elastic limit.

THE ARCHITECTS', CIVIL ENGINEERS', AND SURVEYORS' BILL.

WE have been requested by Mr. Edgar Farman, the hon. secretary to the Architects' and Engineers' Registration Act Committee, to publish the following list of gentlemen who have consented to act as local hon. secretaries to, and been appointed by, the committee, with the object of making known the motive and scope in all parts of the United Kingdom of the proposed Architects', Civil Engineers', and Surveyors' Act, and to facilitate the passing of the Bill. The principal duties of gentlemen appointed as local hon. secretaries will be to seek interviews with Members of Parliament for their several districts, with a view to obtain their support and votes, as well as to invite signatures to the petitions that will be presented in support of the Bill.

The Bill will be presented to the House of Commons by Colonel Duncan, R.A., C.B., M.P., at an early date after the opening of the coming Session ; it is, therefore, requested that gentlemen willing to serve as local hon. secretaries in towns not already provided for, as shown by the following list, will kindly send in their names to Mr. Edgar Farman, 39, King-street, Cheapside, E.C.

LOCAL HON. SECS. TO A. AND E. REG. ACT COMMITTEE.

Ashton-under-Lyne, E. Garside ; Aberdeen, James Souttar ; Armagh, J. Fullerton, A.R.I.B.A.; Brighton, E. J. Hamilton, M.S.A.; Banff, N.B , G. W. Cosser, M.S.A.; Banbury, E. W. Mills ; Bristol, J. H. Jones; Bradford-on-Avon, C. S. Adye, M.S.A.; Blackburn, J. H. Stones, M.S.A.; Barnsley, B. Turner; Bury St. Edmunds, J. Rodwell, A.M.I.C.E.; Bangor, J. P. Mumford; Burton-on-Trent, R. Carpenter; Brighouse, J. Lord, jun.; Bath, Major Davis, City Architect; Birmingham, W. F. Cross, M.S.A., and E. Mansell, M.S.A.; Belfast, W. F. Fennell, M.R.I.A.I.; Cheltenham, A. E. Pearson, M.S.A.; Cardiff, E. Seward, A.R.I.B.A.; Cork, F. McMullen, Sec. South of Ireland Society of Architects; Carnarvon and Conway, J. P. Mumford ; Dublin, W. Stirling, F.R.I.A.I.; Dundee, J. M. Robertson ; Denbigh, R. Lloyd Williams, A.R.I.B.A.; Elgin, C. Doig; Exeter, O. Ralling, M.S.A.; Ennis, W. Carroll, jun ; Enniskillen, T. Elliott; Edinburgh, R. Cameron; Gloucester, J. F. Trew, M.S.A.; Godalming, S. Welman, M.S.A.; Hull, W. A. Gelder, A.R.I.B.A.; Hastings, F. Burr, M.S.A. ; Hereford, J. Parker, City Surveyor ; Holyhead, J. P. Mumford ; Jersey, Adolph Curry, M.S.A. ; Kidderminster, J. Mossop, A.R.I.B.A. ; Leamington, F. Foster ; Liverpool, J. Price, A.M.I.C.E.; Limerick, M. A. Hennessay ; Llandebie, D. Jenkins ; Londonderry, W. Harte ; Llandudno and Menai Bridge, J P. Mumford ; Norwich, A. Lacey, M.S.A.; Newcastle-on-Tyne, J. M. Rich, sec. Northern Architectural Association ; Newmarket, P. Holland ; Penzance, O. Caldwell, M.S.A.; Portmadoc and Pwllheli, J. Mumford ; Redruth, James Hicks, M.S.A.; Ryde, J. Salter, jun., M.S.A.; South Shields, H. Metcalf, M.S.A.; Southsea, C. W. Bevis, M.S.A.; Southampton, E. Evans, M.S.A. ; Swindon, W. Drew ; Stafford, N. Joyce, A.R.I.B.A ; Shrewsbury, A. E. Oswell; Sunderland, T. Milburn, A.R.I.B.A.; Torquay, G. S. Bridgman, C.E, M.S.A.; Truro, S. Trevail, M.S.A.; Taunton, G. Strawbridge; Weymouth, R. C. Bennett, C.E, M.S.A.; Wrexham, J. E. Lash; Walsall, H. Lavender, M.S.A.; Weston-super-Mare, A. W. Cross ; Wakefield, F. Simpson ; Wolverhampton, M. Johnson ; York, W. Hepper, President York Architectural Association.

Gentlemen in the following places have offered to act, and will come before the Committee for election at the next meeting :—Nottingham, Newport, Mon., Rochdale, Canterbury, Yeadon, near Leeds, Westgate-on-Sea.

At the Ashton-under-Lyne County Court on Dec. 22, Thomas Bevan, a bricklayer, recovered £100 under the Employers' Liability Act from Messrs. J. H. Gartside and Co., Limited, of Buckton Vale, Ashton. The plaintiff was seriously hurt through the collapsing of a building which he was assisting to unslate, and it was alleged on his behalf that the manager had ordered the men to proceed with the work after a "cracking noise" had been heard, telling them that the roof would not go down.

Building Intelligence.

JOHNSTONE, N.B. — The new Municipal Buildings, Johnstone, N.B., were opened on Wednesday last. The accommodation consists of a court hall and magistrates' rooms, police cells and official rooms, such as charge room and captain's room, a superintendent's house, besides fire-engine and ambulance sheds, mortuary, tool house, &c. The total cost, exclusive of site, is about £2,000. The building is executed of light-coloured freestone from Falla-hill Quarry, from designs by Mr. C. Davidson, architect, Paisley, and is an expressive treatment of the Scotch Baronial style.

PRESTON.—The Bishop of Manchester consecrated on Friday additional burial ground and the new Church of St. Andrew, at Longton, near Preston. The church has been erected at a cost of nearly £4,500. It is in the Gothic style, and has been built from the designs of Messrs. J. E. K. and J. P. Cutts, London, by Mr. John Fecitt, of Blackburn. The building at present consists of nave, chancel, north and south aisles, organ chamber, and vestry. A north-west tower is provided for, and a parish room is to be added to the vestry. The pulpit, reading desk, font, and mural tables have all been removed from the old chapel into the new building, and a parishioner has presented a lectern. In the north aisle has been placed the stained east window from the old chapel, now about to be demolished.

STREATHAM, S.W.—The corner-stone of a public hall for Streatham was laid on the 19th inst. by Mr. Henry Kimber, M.P. The building, which is already considerably advanced, and will be finished by next March, is situate in the Gleneagle-road, close by Streatham Station. The exterior is of red brick and rough-cast, with carved and moulded enrichments to the entrances, windows, &c., and the hall will be roofed-in with green slates and surmounted by a ventilating cupola. The large hall, which will contain a stage, will be 80ft. long by 45ft. wide, and is calculated to seat 800 persons. Two smaller halls will also be provided, and will have stage platforms. In addition to these there will be rooms for Masonic lodges, political meetings, musical and other societies. The construction will be fireproof. The total cost, together with the freehold site, will be about £10,000. The architect is Mr. W. T. Hollands, F.R.I.B.A., of 27, Chancery-lane, W.C., and the contractors are Messrs. A. M. Deacon and Co., of Norwood.

SOUTHWELL. — It is announced that the Archbishop of Canterbury will reopen Southwell Cathedral on February 2, after its restoration from plans and designs by Mr. Ewan Christian, as architect to the Ecclesiastical Commissioners. The ancient roofs of the Minster were destroyed by fire in 1711, and were replaced by flimsy slate. The building had lost much in appearance by this change, and by the removal, at the beginning of this century, of the lead-covered spires which previously terminated the western towers, and also by the destruction of the conical roof of the chapter. The roof of nave and transepts have been reconstructed on the old lines, and that of the chapter-house and the western spires have also been reproduced, the latter being designed after comparison of all the old prints, drawings, and documents relating to the building, so as to follow as closely as possible the old outlines. The new roofs and spires have been executed in English oak and covered throughout with cast lead on a double thickness of boarding ; the western spires are each 150ft. high from ground to capstone, of which the towers contribute 98ft. The central tower, which remains untouched, is 106ft. high to parapet, and 115ft. to top of pinnacles. The new roof to nave and transepts are open to the rafters, the old ones having been flat ceiled. We illustrated Mr. Christian's works of restoration by double-page photolithographs in our issues of Dec. 23, 1881 and Jan. 13, 1882, and a series of four views of the unrestored Minster appeared in our issue of March 3, 1882. The choir screen was shown by measured drawings (by Mr. H. Hardie Kemp) March 30, 1883, and (by Mr. H. C. Pigg), Feb. 25, 1887 ; a section

of old nave roof Sept. 19, 1879, and the exterior of chapter house, sketched by Mr. H. Harrington, Oct. 19, 1883; 14th-century foliage carving from drawings by T. F. Pennington, Dec. 21, 1877.

Engineering Notes.

FOUNDATIONS.—At the fortnightly meeting of the East of Scotland Engineering Association, held on Friday night in the Oddfellows' Hall, Edinburgh, Mr. J. H. Anderson read the first portion of a paper on "Foundations." After stating the pressures to which different soils, from rock to silt, should be subjected, the methods usually adopted by engineers to obtain satisfactory foundations in different strata were explained. In peaty ground works were often and successfully founded by digging holes through the peat and filling these in with sand—a method which had been adopted on several German railways. The various methods of using piles were next considered. In certain cases, he contended, it was advisable to use cast or wrought-iron columns, which might be driven in the same manner as timber, or screwed into the ground by means of levers. The various forms of screws, depending on the nature of the soil, were detailed; Mr. Brunlees's process of inserting piles by means of a jet of water was explained. This process worked very well in sand, but in clay or stony ground gave trouble in sinking.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

CHESTER ARCHÆOLOGICAL SOCIETY.—At the last meeting of this Society, held in the Grosvenor Museum, the Ven. Archdeacon Barber in the chair, Mr. W. Thompson Watkin, of Liverpool, gave an account of the Roman inscribed stones recently found in the City Walls. The lecturer gave a graphic description in detail of all the inscribed stones, some 18 in number, lately unearthed in the course of the repair of the north side of the City Walls, near the Phœnix Tower. A discussion, taken part in by Rev. G. Preston, Mr. E. W. Cox, Mr. G. W. Shrubsole, &c., followed the lecture, and a vote of thanks was passed to Mr. Thompson Watkin, on the proposition of the chairman, seconded by Mr. Percy Wyndham.

EDINBURGH ARCHITECTURAL ASSOCIATION.—At a meeting of this Association in the Architectural Hall, 42, George-street, on Dec. 21st, Mr. Patrick Geddes read a paper on "Architecture and Decoration in their Social and Economic Aspects." Mr. Hippolyte J. Blanc, the president, was in the chair. Mr. Geddes pointed out that the importance of architecture from an economic point of view was far greater than was usually admitted by economists, since the architect not only directed the highest form of production and consumption of wealth, but at once exhibited the division and organisation of labour in a way far more developed than that of the lower industries, and was concerned always with the accumulation of the social inheritance, and never with that of mere social debt, which was so often expressed in money. Passing to history, the conditions of rise and decay of the great styles of architecture were outlined both from the particular standpoint of each age and in terms of the constant relation of thought and action; and the rise of each style was shown to depend on the proportion in which art was popular and social—in fact, adapted to the wants of the mass of the people. The means at present beginning to be employed for the improvement of housing and decoration for the people were briefly alluded to, and the lecturer closed by urging that the bettering of the housing of the poorer quarters of the Old Town of Edinburgh, and the decoration of its public halls, would afford a means of technical education for younger architects unsurpassed by all the present resources of teaching and examination boards. On the motion of Mr. W. D. M'Kay, R.S.A., seconded by Mr. D. M. Westland, C.E., Mr. Geddes was heartily thanked for his paper.

ROYAL INSTITUTE OF ARCHITECTS OF IRELAND.—The annual meeting of this Royal Institute was held in their rooms, 37, Dawson-street, Dublin, last week. Mr. Thos. Drew presided. The hon. secretary (Mr. Albert E. Murray) read the annual report, which reviewed the work of the Institute during the year. They had to record with regret the death of two of their life members—Mr. W. H. Thomson, of Belfast, and Mr. Henry Hill, Cork. The council had acted very successfully as a Board of Arbitration, and if its services in that capacity were more frequently availed of as between architects and clients, much costly litigation might be prevented. The question of architectural federation was making steady progress, and last year a Bill was printed and circulated called "The Architects and Engineers' Registration Bill," the object of the measure being that after its passing architects should be obliged to undergo an examination before entering the profession. Mr. J. L. Robinson, A.R.H.A., of Dublin, in moving the adoption of the report, said that no doubt there were a great many people who were not properly qualified at present practising as architects, which was a great grievance to the regular members of the profession. He criticised the action of the Office of Works in furnishing plans for nothing in the case of many buildings, to the detriment of the profession. The Chairman remarked that these plans were frequently totally unsuited to the sites and requirements. Mr. J. R. Carroll, of Dublin, seconded the motion, and the report was adopted. A communication was received from the committee of the Technical Schools, and it was resolved that a donation of three guineas should be made to them on behalf of the Institution. The Chairman advocated that some step should be taken to ascertain the statutory powers of the Corporation to interfere with new buildings. The following gentlemen were elected on the council for 1888:—Messrs. Albert E. Murray, Sandham Symes, J. J. O'Callaghan, J. R. Carroll, George C. Ashlin, Thomas Drew, Charles Geoghegan, James H. Owen, William Mitchell, Thomas Deane, and J. L. Robinson. Messrs. J. H. Fullerton, Armagh, and R. Langishee, Athlone, were elected Fellows. Messrs. J. H. Pentland and T. N. Deane were reappointed auditors. Mr. S. Symes was presented with an illuminated address on the part of the Institute in recognition of his services as hon. treasurer. The annual dinner was afterwards held at the Grosvenor Hotel.

CHIPS.

Mr. G. F. Watts, R.A., has presented his great picture "Love and Death" to the Whitworth Committee at Manchester, which has been formed to carry out a proposed gift of a public park and museum of arts by the trustees of the late Sir. J. Whitworth. The artist had lately declined an offer of £3,000 for the work to become the property of the city.

A new mansion, to be known as Beechy Lees, has just been completed at Otford, near Sevenoaks, from the designs of Messrs. Roger Smith and Gale, of Wellington-street, Strand. Mr. A. Bush, of London, was the general contractor, and Mr. James Redden is the clerk of works. The terracotta has been supplied by Messrs. Doulton and Sons; the enriched ceilings have been executed by Messrs. Jackson and Sons; and the mosaic paving by Messrs. Burke and Co.; and the stable fittings are by Messrs. Musgrave and Co.

The north aisle and clerestories of St. Peter's Church, Great Berkhampstead, have just been restored as a memorial to the late Mr. T. Curtis, of Berkhampstead Hall, by his heir.

The tenants' memorial to the late Earl and Countess Dalhousie will assume a twofold character, viz.:—First, an erection of a monumental character in the Edzell district, on a site to be afterwards selected; and second, a stained-glass memorial window in St. Andrew's Episcopal Church, Brechin.

The Corporation of Sheffield are now building an additional smallpox hospital in an isolated spot at Lodge Moor, on the west side of the town, and a Local Government inquiry was held by Mr. J. T. Harrison, an inspector of the Local Government Board, on Thursday, with respect to their proposal to borrow £12,500 for the purpose.

The parish church of South Lynn, Norfolk, has been reopened after internal restoration, including the reseating of the nave with oak benches, and of the chancel with choir stalls.

The memorial stones of new Church of England Schools were laid at Pannal, near Harrogate, on the 22nd inst. Mr. Dickinson, of Harrogate, is the builder.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, STRAND, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All Drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front page advertisements and alterations in serial advertisements must reach the office by Tuesday Morning to secure insertion.

NOTICE.

Bound volumes should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLIV., XLV., XLVI., XLVII., XLVIII., XLIX., L., LI., and XII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

Cases for binding the half-yearly volumes, 2s. each. Reading cases 2s. each.

RECEIVED.—W. Co.—J. G. M. and Co.—J. W. and Co.—W. T. N.

LIGHT. (Hayward Bros. and Eckstein are the firm for anything of that kind. The other things you speak of are no use.)—CHAS. F. MOXON. (We do not wish to interfere with the good work our contemporary is doing for the Registration Bill. Such remarks as those you allude to are really doing more to commend it to all right-minded architects than all our very insignificant efforts.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Boreas," "Mayfly," "H.M.S. Conway," "Herz," "Elean," 'Frost," "Angle," "Samivel," "Exonia," 'Pedro," "Lawton," "Student," "Mancunium," "Dutch Clinker," "Jack," "Vis-a-Vis," "Penarth," "Glen Coe," "Lancashire Lad," "Recruit," "Sapphire," "Celt," "'Arry," "Pecksniff," "Hernani," "W. H. L." in circle, "Texas Bill," "Simplex et Prudens," "Transome," 'Aughrim," "Design," "Mumps," "Gilbert," "Leodiensie," "Janitor," "Towser."

Correspondence.

REGISTRATION.

To the Editor of the BUILDING NEWS.

SIR,—Mr. Jackson's paper at the A. A. is meant to excite discussion on the question of the proposed registration of architects, and I beg to offer a few remarks which my foreign experiences suggest to me.

To begin with, if, as Mr. Jackson puts it, on the authority of Mr. Spiers, English architects are superior to the Continental ones, the question may be considered as closed. We need not try to alter what has given such splendid results. I should rest satisfied if I did not remark that our superiority is claimed solely by ourselves. Of course, every race of men have a right to consider itself as the standard of perfection, and the Negro woman is quite justified in airing her superiority in beauty over the Venus of Milo. The only point which we have a right to ask from everybody is "consistency." I often hear English architects disparaging Continental architecture as tame, hard, cast-iron, monotonous, and I take the liberty of asking them why they go into en-

thusiastic admiration over the temples of Greece, which are more monotonous in their design, and more rigid in their details, than any modern building in France or Germany?

Some of Mr. Spiers' affirmations on the subject of the relative merits of English *versus* French architecture seem to me questionable, even from the basis of reason common to English and French alike. The mere imitation of past works of art has never been considered as a very meritorious achievement, and when Mr. Spiers speaks of our healthy ecclesiastical architecture, I am tempted to ask: Where are the English buildings in which modern aspirations and modern constructive progress are embodied? Now, if I turn to Paris, I find, in the Eglise de la Trinité, a building perfectly original, perfectly modern in character and its means of construction. As to whether the character be more or less ecclesiastical than other churches, that is a question for priests to solve. It is a question which differs with every country, and with every sect; the Japanese are, no doubt, more religiously impressed by the aspect of their timber temples than by our Westminster Abbey.

In discussing all questions relative to architectural education we should, I believe, make a wide difference between private and public buildings. The principles of design which govern these two departments of architecture not only differ, but are antagonistic. A private dwelling reflects the requirements and tastes of an individual: its architecture should be so supple as to bend itself to every caprice, not only of the present owner, but also of the future owners. In fact, its composition should be so loose, that any amount of alterations and additions may be made to it without offending the eye. However complex the plan of a private house may be, the dwellers are so intimately acquainted with it that it will never be objectionable. Public buildings, on the other hand, reflect the requirements of communities, and their dispositions must be clear and systematic to facilitate their being used by everybody. In England architects have numerous opportunities of getting experience in private architecture; but they have very little opportunity of getting experience in the designing of public buildings, and therefore I conclude that in the interest of the public it would be well to have a school to prepare architects for designing and carrying out our public buildings.

If the registration of architects were limited to recognising the proficiency of architects who compete for public buildings and for public appointments, there would be no particle of objection to the scheme. Architects of public buildings are public servants for the time being, and the Government has an undisputed right to gauge the proficiency of its servants before it employs them. But if registration is, as proposed, to comprise all architects, it would be an interference with the liberty of private individuals unknown in any other country of Europe.

Instead of registration, what is wanted is a clear definition of the responsibilities of architects. If an Act of Parliament be passed, enacting "That for every new structure or structural alteration a plan and specification signed by a responsible person shall be deposited, and that the signer of the plans and specifications shall be for ten years responsible for all structural defects which may occur, and will have to make them good at his own expense," all the advantages which are sought from registration will be obtained, and architectural students will think it worth their while to learn construction as well as sketching.—I am, &c.,

Lawrence Harvey.

THE REGISTRATION BILL.

Sir,—How will the proposed Registration Act apply to architects now in practice who have commenced since 1882, but who have been properly articled to established men, say, before 1870? Are they subject to any examination? If so, it seems very unfair that men who, until a short while before 1882 were only clerks of works, but who are now practising as architects, should be free from interference, when men who have paid premiums and given years to qualify, find themselves outdone because they did not start practice by or before 1882.—I am, &c.,

Perplexed.

PERSPECTIVE.

Sir,—Mr. "M." leaves entirely out of consideration the perspective of the picture surface itself, whether it be a "plane" or the "*plane*" which, according to his idea, "ought to be a curve." I suppose he means that the perspective should be projected upon a portion of a vertical cylinder, the centre of the base of which should be the station point. There is no difficulty in this; but it would carry out his idea completely if the projection were made on the inner surface of the portion of a sphere, the centre of which should be the station point, as is done in some panoramas (or is "dioramas" the proper word?). But then in all three cases, whether the picture surface be plane, curved, or spherical, the picture must be viewed in that form and from the exact point of sight; otherwise great distortion must occur. You distort your plane picture by curving it when looking at it, and your curved pictures by laying them flat for view. In either plane or curved picture a correctly-projected globe will appear as an ellipsoid in the perspective, which the picture itself forms when viewed from the wrong point, unless a line from the centre of the globe to the eye be at right angles to the picture plane. On the curved picture which "M," advocates, the globes level with the eye will appear properly as circles; but when the picture is viewed from a distance too great, although but slight, then the circles become elliptical. Again, a globe at the side of a plane picture, projected correctly thereon, will appear as a circle when viewed from the right point; if it were drawn as a circle it would appear to the eye as an ellipse when viewed from the right position. All this can be proved by a few simple experiments with the pencil.

If "M.," having drawn his curved picture, will take the trouble to project a perspective of the picture itself on a *plane* in front of it, he will find himself compelled to project his *circular* globes as ellipses. Or, *per contra*, having correctly projected on a plane a globe as an ellipse, he can then project the plane picture on his favourite "curved plane," placed in front of the plane picture with the station point of the latter as the centre of his curve, when he will be able to project the elliptically-drawn globe on his curved picture as a circle, much to his satisfaction; but by this means he will prove no more than that the circle is the proper projection on the curved picture, and the ellipse the correct drawing on the flat drawing.

Notwithstanding, where globes must be at the sides of my picture, I should draw them, similarly as "M." would, as circles, but not for the same reason;—not because that would be the *right* projection, but for the reason that the picture would always be viewed from the *wrong* position and distance. But I would also take care to have no globular form of great magnitude except at, or near, a position equidistant from the sides, as the "cooking" or "fudging" the proper ellipsoidal projection into a circular form would cause an effect of "out-of-drawing," viewed from any position. With globular forms of minor magnitude the defect is not so striking, but even in these cases an awkwardness is to be detected in the delineation from many points of view, when the objects are drawn as circles.—I am, &c.,

R. W.

Sir,—"M.'s" letter is surely misleading. Ordinary linear perspective, which applies only to drawings done on a flat surface using a picture *plane*, has one fault, and one only—viz., it supposes the observer to use but one eye. This fault is of little consequence in life-sized pictures, but in small-scale drawings it becomes important, and the more so the nearer the E.P. is to the picture plane. But, in the worst cases, a perfect representation can always be obtained by the inconvenient method of closing one eye and placing the other in a correct position. Of course, "Perspective" does not propose to make a picture look correct unless viewed from the exact E.P. The E.P. is often placed too near the picture plane, widening the angle of vision, and where it is seldom found by anyone viewing the picture. This, however, gives a drawing not wrong, but inconvenient to view correctly, and the fault lies not in the rules but in the draughtsman.

To take "M.'s" example—viz., a sphere in perspective. Suppose a number of spheres be hung up, and a *plane* of glass be placed between them and the eye. If the outlines of these spheres be traced on the glass, moving the eye, but keeping the head in the same position, we obtain a perfect but correct-looking representation on the glass of the spheres beyond it. Now, only a sphere exactly in the line of sight will be traced a circle; all the rest will be traced ellipses, the more eccentric the further they are from the C.V., whose major axes produced pass through the C.V., but each will appear from the E.P. an exact circle. If, however, all were drawn in their respective positions exact circles, they would appear to the eye, still kept at the E.P., ellipses whose minor axes produced pass through the C.V.

Of course, each of the visual rays could (not should) cut the picture plane at right angles, but the picture *plane* would have to be abandoned for a surface of double (not single) curvature—viz., a hollow sphere struck from the E.P. In such case the picture itself would have to be a similar hollow sphere, as are some panoramas, and then, and then only, would it be and look correct to represent all spheres by circles.

E.P. eye-point, vertically above the station point.

C.V. centre of vision, the point found on the picture plane by dropping a perpendicular on to it from the E.P.

Line of Sight: the above-named perpendicular produced.—I am, &c.,

Lancashire. Delta.

"THE AGE OF ELM JOINERY."

Sir,—Mr. W. Dart (of Crediton's) remark that the framework of the old doors at Exeter's Guildhall is of elm, has, I believe, always been a universally acknowledged fact. He asks whether any other samples of elm joinery over 200 years old are known. There are innumerable specimens of elaborately carved linen chests in existence in the West Country, most of them dating from an earlier period than this. At the celebrated sale of the eccentric late Mr. Bethel Walrond's collection at Dulford House, near Cullompton, in September, 1878, over 100 of these ancient coffers were sold. All were of Jacobean date, and more than two-thirds of them were made of elm.—I am, &c.,

Exeter, Dec. 24. H. H. R.

CHIPS.

The Hackney District Board of Works has borrowed £10,000 for the purpose of the Clissold Park Acquisition Act. The South Hornsey Local Board have decided to contribute by means of a loan £6,000 towards the balance required to make up the purchase-money of the park as a recreation-ground.

The death is announced of Mr. John Willacy, who for the last fourteen years has held the appointment of town surveyor, for Weston-super-Mare.

A stained-glass light in the east window of St. Michael's Church, Malton, was unveiled on Christmas Day. The window has been supplied by Messrs. Heaton, Butler, and Bayne, of London. The subject is the "Crucifixion."

A medallion portrait of the late Sir E. C. Kerrison, Bart., has this week been placed in the dining hall of the Albert College, Framlingham, Suffolk, of which the deceased was one of the founders, and the first vice-president. The sculptor is Signor Giuntani, of London.

The South Parade and Holme Hill Schools, Grimsby, have recently been enlarged for the Grimsby School Board, providing extra accommodation for 148 children. Mr. E. W. Farebrother, F.R.I.B.A., was the architect, and Mr. T. Simmson, the contractor.

The committee of the Edinburgh Town Council who have charge of the memorial to the late Sir William Chambers have decided that the memorial should take the shape of a colossal statue in bronze, ten feet high, on a suitable stone pedestal, and the amount which it is contemplated spending on it is about £1,000. The committee will throw the competition for the statue open to sculptors both in England and Scotland.

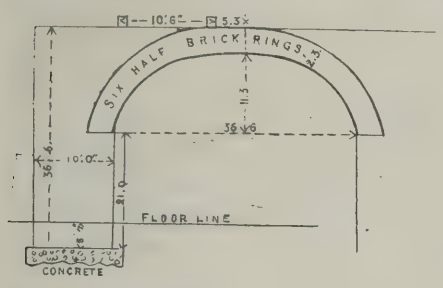
A new three-light stained-glass window, executed by Messrs. Hardman and Co., of London, has just been placed in the parish church of West Knighton, near Dorchester, by the officers of the Duke of Cambridge's Own (Middlesex) Regiment, in recognition of the gallantry displayed by Lieutenant W. P. Cockeram, who was killed in action in Burmah.

Intercommunication.

QUESTIONS.

[9515.]—**Valuations.**—Will "G. H. G." or some other experienced reader, give me examples of—1. How to estimate the value of a 75 years' renewable (on payment of fine) leasehold property, 47 years expired, gross annual rent £120, ground rent £10 (renewal fine as per table on lease 4½ years' purchase)? 2. How to estimate the value of the reversion, supposing the lessor wanted to sell his interests in the property? 3. If the above was held on a 99 years terminable lease, how would you estimate the value?—YOUNG SURVEYOR.

[9516.]—**Stability of Arch.**—Would some scientific reader of this column give me the working out of the stability of the three-centred arch given below? Thickness



of arch and abuttal, 1ft. 10½in.; materials, brickwork in mortar; tie-beams rest on the wall above the arch at the points shown; that nearest the centre carries 3 tons, the other 2 tons. Wanted to know the safe load at the points where the tie-beams rest, and if the arch and pier are in a state of stability? Can the brick rings be regarded as voussoirs? The working out is particularly desired.—VERNIER.

REPLIES.

[9480.]—**Masonry.**—I am surprised at Mr. Powell not seeing the close connection there is between my question and his own. An arch-stone is evidently the stone of an arch, and, therefore, to be able to define any stone as an arch-stone, you must first be able to define the structure to which it belongs as an arch. The proper answer to my question would have been to have quoted some work on Masonry or Architecture where a cupola was defined as a spherical arch. But to cut the matter short, I may tell Mr. Powell that amongst architects the word "voussoir" is used. Apart from the quotations I have already made from Gwilt's "Encyclopædia" and Dobson's "Treatise of Masonry," I may add that I have heard my friend, Mr. Charles Barry, use that word repeatedly. On the other hand, by questioning the practical masons who attend my class, I find that practical masons do not know the term "voussoir"; but to their answer they added the following rider: "What we want is to learn how to make the moulds for stone-cutting and how to apply them, and this we get from you to our complete satisfaction. As to the expressions you use, they are of no consequence, as we understand very well what you mean." I hope Mr. Powell and those practical masons who are interested in this most useful of all sciences to them, will take heart by the opinion so clearly expressed by their brother masons who follow my lessons. They will see that far from asking them to go up a precipitous staircase, as Mr. Powell expresses it, I lead my pupils along a very easy inclined road. The class for practical masons will begin on the 10th of January, when I hope to meet Mr. Powell and many other intelligent practical men like himself.—LAWRENCE HARVEY, Architect, Teacher of the Class of Masonry, City and Guilds of London Institute.

[9482.]—**Products of Gas Combustion.**—To satisfactorily answer "R.'s" query of last week, it would be necessary to make a careful analysis of the result from the combustion of both flames separately. Never having had an opportunity of doing so, or seeing the result of any such analysis, I am not in a position to speak with any certainty. I have only detected the peculiar smell mentioned by "R." when the flame has been burning in contact with asbestos, and never in the laboratory, where there has been several "Bunsen" flames going at the same time. From this I infer that the smell arises rather from the asbestos than from the flame itself. The only other way I see of accounting for it is that it might be due to certain impurities in the gas, which only give rise to the peculiar smell under the action of the Bunsen flame.—SCIENCE.

[9484.]—**Chesterfield Spire.** — Perhaps a few further particulars relative to this spire may be worth space in this column. It was under the shadow of Chesterfield's spire that Harrison Ainsworth wrote his well-known novel, "Rookwood," in 1831. The author refers to it therein as a "queer, twisted steeple, which, like the uplifted tail of the renowned Dragon of Wantley—to whom houses and churches were as capons and turkeys—seems to menace the good town of Chesterfield with destruction." One writer says, in Ford's history—"That he minutely examined it, and found one of the four upright beams drawn out of its tenon, and shrunk several inches." Another authority says—"Some years ago, to place its crookedness beyond a doubt, the situation of the base was subjected to a careful measurement, when it was found to deviate from the perpendicular 6ft. towards the south, and 4ft. 4in. towards the west, giving its greatest angle of inclination somewhere near to the south-west angle." Early this century the Rev. G. Hall wrote—"It is built of wood and covered by lead, and no doubt was once straight and perpendicular; but the sun, at the time its power is strongest—*i.e.*, between one and two o'clock—has shrunk the wood, and warped the spire in the direction it now appears." In the beginning of this century the following letter (still preserved) was addressed to the vicar and churchwardens:—"Sheffield, Dec. 20, 1827. Gentlemen,—Agreeable to the request of Mr. Bainbridge, I attended on Monday, the 19th of December, instant, to inspect the steeple of your church, and am quite of opinion that it is unsafe and dangerous to remain in its present state; for, on inspection, I found the old timber much decayed, and the construction of the whole so imperfect that it would be impossible to repair it, even at any expense, so as to insure its standing many years, being extremely weakened by its being so much out of plumb to the south, from the tower to its centre, and to the west from its centre upwards. I should, therefore, recommend that the steeple be taken down to prevent the possibility of an accident, the event of which would inevitably do considerable damage to the roof and body of the church, and erect on the tower, which is strong and sufficient, a stone steeple.—I am, Gentlemen, your most obedient servant, E. W. DRURY." The town, however, soon got up in arms, horrified at the bare thought of losing their quaint specimen of architectural eccentricity, and the steeple was spared. John Mannings, who posed as a bit of a poet, idealised the whole thing after the fashion of poets, and wrote:—

> "Whichever way you turn your eye,
> It always seems to be awry:
> Pray can you tell me the reason why?
> The only reason known of weight,
> Is that the thing was never straight.
> Nor know the people where to go,
> To find the man to make it so;
> Since none can furnish such a plan,
> Except a perfect upright man.
>
> So that the spire, 'tis very plain,
> For ages crooked must remain;
> And while it stands must ever be,
> An emblem of deformity."

In 1869, during some violent gales, a large portion of the lead was blown off. It is variously stated to be 230ft. and 250ft. high. In Dickens's days, a riddle was propounded in *Punch*—"Why is Chesterfield Church steeple like one of Charles Dickens's best novels? Because it is all-of-a-twist! ('Oliver Twist')."—HARRY HEMS.

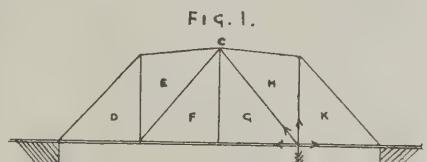
[9490.]—**Measurement of Shafts.**—"G. H. G." should remember "If the blind lead the blind they fall into the ditch." His reply is very rule-of-thumb. Why should brickwork be paid for that has not been done, and that has no relation as to actual cost to what was done? Of course, unless there are special circumstances, what was not done should not be paid for, and anything extra that was done should be measured and paid for at its own value, not by an extra price on the quantity of brickwork that may be more or less, so that "G. H. G." misses with both barrels, although he is seldom as Byron wrote—

> "Dogs blink the covey, flints refuse the spark,
> And double barrels, d—— them, miss the mark."

The fact is, the query did not give proper information for a precise reply. It is to be presumed that a flue was intended, and, if so, was it specified and shown, and of what size, and was it deducted in the quantities?—and what was done should be followed, right or wrong. If, as appears likely from the query, all was done as intended and specified except that no extra was allowed for extra labour on brickwork of shafts, and if the contractor knew what he was tendering for, he is entitled to no extra. What was done in the quantities or detailed estimate should be followed as to measurement and price, if remeasured at all.—M. M.

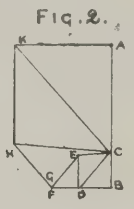
[9500.]—**Strains in Truss.**—First draw the truss representing all the applied loads including reactions (as shown in Fig. 1). This we call the Frame Figure. 2nd.

Fig. 1.



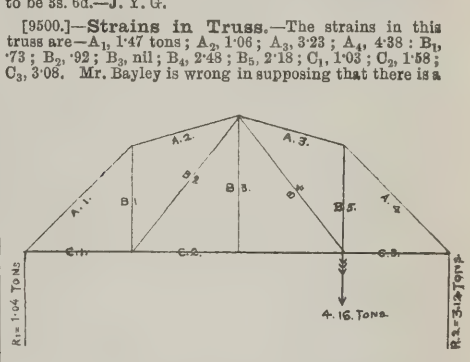
On each side of the line of action of any force, place a letter, according to "Bow's" system of notation, and in doing so it will be found convenient to travel always in one direction, e.g., always with or against the hands of a watch. In my diagram I have moved round the figure with the hands of a watch, thus A B represents the applied load, then B C and C A, still moving in the same direction, represents the forces at the left and right hand abutments respectively, and A B, B C, and C A represent in the present case all the external faces; but in addition to these we have the force actions in the members of the truss, and these again will be represented by the same method of notation by placing a letter on each side of each member; therefore we have the further continuation of the lettering by moving still with the hands of a watch, and in the spaces between the members placing D, E, F, G, H, K, all as shown. Now, to draw the stress diagram (Fig. 2) on any scale, draw $a\,b$ parallel to A B (Fig. 1), and measure this on any scale so as to represent the magnitude of A B, in the present case 1·16 tons. Thus $a\,b$ is downwards, and $b\,c + c\,a$ are equal to $a\,b$; but act upwards. Further $b\,c = \frac{3}{4}$, and $c\,a = \frac{2}{3}$ of $a\,b$, as will be seen from diagram, Fig. 1. Now, turning our attention to left-hand abutment for instance, we have three forces, B C (the reaction), C D (the stress in the upper boom), and B D (the stress in the lower boom), all acting through one point and in equilibrium; therefore by triangle of forces any triangle drawn so as to have its sides parallel respectively to B C, C D, and D B will have its sides proportional to these forces. Thus in Fig. 2 (our stress diagram) we have $b\,c$ parallel and equal to B C; therefore from b and c respectively draw $b\,d$, $c\,d$ parallel to B D, C D (Fig. 1), and $b\,c\,d$ is the triangle of forces for the joint on left-hand wall. Next, if we pass to the first bottom joint from left-hand wall the solution is impossible, because there we have three unknown forces, and solution at any one point is only possible where we have not more than two unknown. Pass on, then, to the first joint on the upper boom, and we have three forces, C E, E D, and D C acting on a point, and again in equilibrium, and again for these the triangle of forces can be drawn. Further, since we have just found $c\,d$ (Fig. 2), the stress in C D (Fig. 1), there only remains for us to find the stresses in C D, D E. Now, $c\,d$ (Fig. 2) is parallel and equal to C D (Fig. 1);

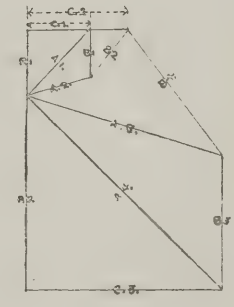
Fig. 2.



therefore from c and d draw $c\,e$ and $d\,e$ respectively parallel to C E and D E (Fig. 1). $c\,e$ represents the stress in C E, and $d\,e$ the stress in D E. At the first lower joint from the left we have now only two unknown, viz., $e\,f$ and $f\,b$, which may be drawn as before, parallel to E F and F B, and so on for the remaining joints. If Edward Bayley will be at the trouble to draw the figure as I have indicated, he will find that f and g coincide in Fig. 2, the physical interpretation of which is that the stress in the middle vertical member vanishes, or is zero under the given load, and therefore in the present instance F G is a superfluous member. Now, to find the kind of stress in each member, say, we take the joint where the weight is supported, Fig. 1, and move round it in the order in which we lettered the members. In passing round from B we come successively to G, H, K, A and back to B. Now, in passing from B to G (Fig. 1), look at Fig. 2 and see how we travel in order to reach g from b, and it will be found that we go from right to left; hence the stress in B G is away from the joint. In passing from G to H look again at Fig. 2; and in passing from g to h it will be seen we go up and again away from the joint. And so for H K it will again be seen we go away from the joint, so that all the members meeting at this joint are really in tension, and the compressive strain which Edward Bayley thinks is evidently acting in this member is all imagination. The determination of stress diagrams for all kinds of roof and bridge trusses, bending moments, and shearing stress in loaded beams, &c, will be found very carefully set forth in a textbook specially prepared for students, engineers, and architects, and to be issued about Christmas by Collins and Co., London and Glasgow, the price of which is only to be 3s. 6d.—J. Y. G.

[9500.]—**Strains in Truss.**—The strains in this truss are—A_1, 1·47 tons; A_2, 1·06; A_3, 3·23; A_4, 4·38; B_1, ·73; B_2, ·92; B_3, nil; B_4, 2·48; B_5, 2·18; C_1, 1·03; C_2, 1·58; C_3, 3·08. Mr. Bayley is wrong in supposing that there is a





compression strain on B_5 (the member that corresponds to A in his sketch). The thick lines in the diagram are in compression, and the thin lines in tension. B_3 is a superfluous member.—A. G. B.

[9502.]—**Sapwood.**—Under certain circumstances, it is difficult to distinguish sap and heartwood in Baltic yellow fir. If the tree is felled in the winter and converted in the following summer, the sapwood will be of the same pale straw colour as the heartwood, whether the log be floated or not; but upon exposure to the weather, in the process of seasoning, the heartwood assumes a reddish tint, and, as a natural consequence, the two classes of wood are clearly distinguishable. If the wood has been floated, it becomes kind and mellow, as a great part of the natural oils or secretionary matter in newly-felled wood is dissolved. If unfloated, the sap, from its marked whiteness, and from its habit of exuding resinous matter, is very distinguishable. In this state the wood is strong and hard. Discoloured sapwood, that is sapwood ranging from a light to a deep blue or black, is, unfortunately, too clearly distinguishable. This condition is brought about by the logs being too long in the water, or from the wood getting damp and being placed in a confined atmosphere, such as the hold of a ship. It is the result of the fermentation of the albuminoids, or soluble vegetable matter

of which the cells and tissue of the sapwood are so largely formed. This fermentation develops a low form of fungoid growth, varying in intensity until the point of dry-rot or utter dissolution is reached. Its existence depends upon moisture and a high temperature, and hence, except in a confined atmosphere, where its growth, associated with decomposition, engenders heat, it is only active in the summer-time. Baulk timber is invariably kept afloat, although it makes the wood tender and leads to its early dissolution, for the reason that in this state it is more readily and cheaply handled. This system of floating is more popular in London and on the East Coast than it is in Liverpool and on the west coast, where it is invariably landed and piled under travelling cranes. The objection to this latter system is that it is difficult to handle the timber and to obtain special lengths and sizes from a cargo, and, further, that it depreciates in value in the summer season, from external shakes, the result of drying in the bulk. If the sapwood is blue or discoloured, its presence and its junction with the heartwood may be easily traced; but it is not safe to say that it is bounded by a particular ring, for, although the wood is deposited in rings, the process of hearting is not so defined. The deposition of heartwood is often erratic, and instances are found where the process is more advanced on one side, or in one part of the tree, than in another. Wood undergoes the process of hearting, when, by the annual addition of sap rings, it becomes buried in the woody stem of the tree to a greater depth than is required for the ascending sap or life-blood of the tree. The inner cells of the sapwood, as they thus fall out of use, become receptacles for the lodgment of secretionary matter peculiar to the tree. This matter in the fir tree, from being resinous, insoluble in winter, and offering ill food and lodgment for parasitic vegetation, converts the imperfect porous and perishable sapwood into compact and durable heartwood. The question of shreds of sapwood being allowed on converted timbers is a point no writer in these columns can decide. Sap is present in all imported woods; but it is a common thing for architects to rule it out in the framing of their specifications, and it is common for this ruling to be read with a qualification, for a deal of sapwood in practice passes into consumption. Were this not the case, we might be afflicted with a famine in wood. "R." may take it that sapwood, with the exception of that associated with a few tropical woods, is softer than heartwood, and that the softness increases with discoloration until the point of dissolution is arrived at. Discoloured sapwood, if in a wet state, will improve or assume a lighter colour by drying; but when once turned blue, it can never be made to assume its original whiteness. Sapwood in felled timber will remain sapwood until the end of the chapter, for the process of hearting, which is beyond the influence of man, ceases with the felling of the tree and the removal of the bark. —Wm. Stevenson, The Park, Scarborough.

[9505.]—**Frost and Selenitic Mortar.**—In the old-fashioned times we discontinued building our brickwork in the winter; but now we are obliged to build all the year round, taking the chance of Jack Frost tripping us up. I have lately had a considerable quantity of brickwork destroyed, which was built with selenised lias lime, the lime bought already selenised, and ground and afterwards made up by me by grinding in a mill. I should be glad to have the opinion of some of your experienced readers as to what kind of mortar it is best to use in face of the risk of frost attacking the work before it is thoroughly set. I am not having in mind so much a light frost, which merely affects the outer part of the joints, but a frost which freezes the heart of the work and disintegrates the mortar. It would appear that although Portland cement, from its rapid set, would often resist a frost which would affect lime mortar; yet when once the partial set of Portland cement is disturbed, it will not again unite, but remain permanently in a pulverulent condition. I should like to know whether the selenised lime mortars would act similarly in this respect to Portland cement. They have a rapid partial set; but, for a considerable time after, the mortars made from them contain much free water, which the frost would expand, and so pulverise the mortar. Will it again set after this? And if so, which lime is best in this respect —selenised lias or selenised Dorking? Would Dorking lime not selenised and used hot be better than either of the selenised limes on account of the heat developed in slaking? And would the mortar thus made again set to any extent after having been once expanded by frost? It appears to me that it would; as mortar made in this, the ordinary way, can be heaped and kept for considerable times, and although it gets hard and stiff, can be beaten up and used, and is, in fact, the better for having been kept. This does not apply to Portland cement or selenised limes, which must be used on the day on which they are made up.—W.

[9506.]—**Hydraulics.**—Presuming that the piece of oak "Buoyant" mentions is seasoned and not fresh filled, it would of its own weight displace in fresh water 1,604 cubic inches; or supposing the piece to float on edge, it would be submerged 13·374in. A weight of 20·024lb. would cause the log to sink until the top edge was level with the surface of the water. These are obtained as follows:—

30in. × 18in. × 4in. = 2,160 cubic inches volume of piece of oak.

·743 = specific gravity of seasoned oak.

252·5gr. = weight of a cubic inch of water (distilled).

1 − ·743 = ·257 = difference between the specific gravity of water and that of the oak.

2160 × ·743 = 1604·88 cubic inches. Mass of water displaced.

18in. × ·743 = 13·374in. Depth piece would sink of its own gravity.

$$\frac{\cdot 257 \times 252{\cdot}5 \times 2{,}160}{7{,}000} = 20{\cdot}024\text{lb.}$$, or weight that would hold the piece of oak in equilibrium floating with its top edge level with the surface of water; anything beyond this would tend to sink it. The depth of water has nothing to do with its buoyant property.—Hydrostatique.

[9509.]—**Plugging Wall.**—Cut a hole of dovetail section 3 or 4in. deep, then a block of wood a little less in size, same shape, so as to leave a space round the block. Rinse the hole out, bed and fix wood in with good plaster or cement and clean sand, then tighten while soft with thin roofing slate, the wood to be put sideways of the grain, not endways, or screws will not hold in. Another way is to cut out a half or whole brick, inserting a dry wooden brick. Tighten round with iron or slate wedges. —Jas. Pulham.

[9509.]—**Plugging Wall.**—Let "Woodrose" have a plug made of dry wood by chopping a piece off the edge farthest from the workman, then turn it round and do the same to the other side, thus making a twist in it. Let the thickness be nearly equal, and not taper. If this is driven into a mortice properly made, no power can withdraw it. The farther it is driven the tighter it will be. Oak or other hard wood is best where screws are used.—William Peachey.

[9513.]—**Damp-Courses and Concrete over Site.**—I know damp-proof courses are necessary wherever there is at any time an excess of water which falls near the walls, which is absorbed according to the nature of the materials, especially of brick. Every healthy dwelling-house should have a stratum of damp-proof concrete over all the surface of ground, especially of basements, except built on solid impervious rock high and dry. It is a pity, or worse, to endeavour to evade such a good by-law, though some concrete I have seen put in, just for sake of complying with the law, by some cheap house-builders, is of but little good, not being of close texture and impervious, as intended.—Jas. Pulham.

CHIPS.

A remarkable man died at his residence, at Barnard Castle, on Sunday night, in the person of Mr. William Smith, who had attained the age of 75 years. In early life the deceased had a blacksmith and shoeing forge in an obscure part of the town. The need for the introduction of sanitary machines being suggested to Mr. Smith by the Rev. W. F. Wharton, at that time rector of Barningham, plans and models of street-sweeping machines and road-scrapers were quickly made by him. The original mechanism of the invention was rapidly improved upon and patented, and a world-wide sale was commanded. Mr. Smith quickly amassed a fortune. He has left a large grown-up family.

The laying of the new water supply mains to Merthyr Tydvil from the reservoirs at Cwmdaff, Brecknockshire, a distance of 31 miles, has just been completed. The work has been two years in progress, and has cost, for material and labour, about £150,000. It is part of the great scheme now being carried out by the borough of Cardiff, and will, when the Cantreff reservoir is completed, form a high-level service for Cardiff, Llandaff, Penarth, and Whitchurch.

On Saturday morning the premises of Mr. Henry Morris, joiner and builder, Birmingham-street, Dudley, were partly destroyed by fire. The damages amount to about £1,000.

A spire has just been added to St. James's Church, Thornton, near Leeds, an edifice built in 1872 on the site of an old chapel-of-ease, from designs by Messrs. T. H. and F. Healey.

Mr. Edward A. R. Innes, resident engineer at Port Natal, died at Pietermaritzburg on the 16th inst., aged 35 years.

Mr. William James Beadel, M.P., the President of the Surveyors' Institution, has been appointed a deputy lieutenant for the county of Essex.

The partnership hitherto existing between F. Esam and J. J. Muller, of Bexhill, Essex, architects and estate agents, has been dissolved.

Mr. Harry Hems gave his 21st Christmas dinner to the aged poor of Exeter on Monday, when sixty men and women, whose ages ranged between 60 and 90, sat down to a bountiful spread in the large wood-carving room at the "Luckie Horseshoe," and after dinner an address was given by the Bishop of Exeter.

An application has been made by the Market Harborough Local Board to the Local Government Board for powers to borrow £22,000 for the purpose of waterworks for the board's district. Major Tulloch held an inquiry on Tuesday week. The application was opposed by the Union Canal Company and the Rugby Local Board. The inspector undertook to lay the objections before the Local Government Board.

A new Gothic church at Eppleton, dedicated to All Saints, has just been consecrated by the Bishop of Durham. The church has cost nearly £4,000.

The Jubilee Committee at Westbury-on-Trym have provided a new clock in the church tower at a cost of about £225. The clock takes the place of one which had indicated the time for upwards of a century; and it has three dials. Moreover, the quarters will be chimed and the hours struck. The makers are Messrs. William Potts and Sons, of Leeds, from the designs and plans of Lord Grimthorpe. The clock was set going on Thursday, the 22nd Dec. Messrs. Potts and Sons were the makers of the clock recently erected at Stoke Bishop Church.

A large mission hall, class-rooms, and gymnasium, and four shops, covering a large area of ground, are being erected at New Clee, for the Rev. H. Hutchinson, from designs of Mr. E. W. Farebrother, F.R.I.B.A., architect, Grimsby. Mr. Fred Grant, of Cleethorpes, is the builder.

Our Office Table.

Mr. David Maclaren, architect to the Dundee School Board, died at his residence, West Park-road, Dundee, on Wednesday week, at the age of 39 years. He was a native of Dundee, where he received his first professional training in the office of his uncle, Mr. James Maclaren, architect. Subsequently he entered the office of Mr. Maclure, Glasgow, where he obtained valuable experience in the erection of schools, an impetus having been given to such work about that time by the formation of School Boards in Scotland. The Dundee School Board advertised for competitive plans for new schools, and Mr. Maclaren's plans were accepted. He was subsequently appointed architect to the Dundee School Baard, and entered into partnership with the late Mr. James Ireland. Mr. Maclaren was recognised as one of the ablest School Board architects in Scotland, and his plans of schools were so highly appreciated by the Education Department that they were cited as models to other Boards. In addition to the public schools, many large buildings, such as the Sailors' Home, University College, and the Harris Academy, were erected from his plans.

We were glad to notice that among the awards at the recent Adelaide International Jubilee Exhibition was one of the highest class, the "first order of merit," to Mr. Robert W. Edis, F.S.A., F.R.I.B.A., of Fitzroy-square, N.W., for his drawings of the Constitutional Club in Northumberland-avenue, London, and of restorations and additions to Bishop's Palace at Buckden. We understand that the recipients of the first order of merit will receive a diploma and medal in March next.

The time for depositing Private Bills which will be brought before Parliament next Session having expired, it is ascertained that no fewer than 215 will be proceeded with, being an increase of 22 as compared with the number deposited last year. Of these an unusually large proportion relate to London and the Metropolis, for 43 are Bills that either entirely or in part have reference to schemes in and around London. The scheme for an Outer Circle Railway, promoted in 1882, and since abandoned, is revived; the line will run from Ealing to Tottenham, forming junctions with all the railways running north and west of the metropolis at the termini, and at Kingsbury, Hendon, and Edmonton. The London, Chatham, and Dover Railway Co. seeks to extend the Blackheath Hill branch from the termination of the extension now in progress between Blackheath Hill and Greenwich to Charlton. A branch line from Wimbledon to Sutton, *viâ* Carshalton and Cheam, is in contemplation. The chief works proposed by the Metropolitan Board of Works' Bills are a deviation in the line of the Blackheath tunnel and the formation of a recreation-ground at Ladywell, Lewisham. The City Corporation seek powers to enable the City coroner to hold inquests upon the occurrences of fires. For proposed tramway extensions eight Bills have been deposited. The companies who are seeking extensions of their present systems are the North London, the London, Camberwell, and Dulwich, the London Street, the Harrow-road and Paddington, and the London Tramways Companies. A new company, under the title of the South-East Metropolitan Tramways, seeks power to construct a line from Lewisham to Greenwich.

Several discoveries of interest have lately been made in the excavations at Pompeii. Many silver vessels and three books were found in a house in the 8th district under circumstances suggesting that their owner, a lady named Dicidia Margaris, had packed them and died before she could remove them. Her name we learn from the books, documents, and title-deeds. These are the usual wood tablets, 8in. by 5in., coated with wax, and several of them are fastened together in book form. For the first few days after their discovery they were perfectly legible, except where damp had destroyed the wood; after that time the layers of wax peeled partly off, splitting up into small portions. The contracts all refer to slave-dealing transactions, and were made in the year 61 A.D. The silver plate formed a set for four persons, but is incomplete. It com

prises four goblets with four trays, four cups with handles, four smaller cups, four others, four cups with feet, a cup without a handle, a filter, a small bottle with perforated bottom, a spoon, and a small scoop. The total weight of the articles is nearly 127oz. troy. There was also found a silver statuette of Jupiter on a bronze pedestal, as well as a bronze dish with raised edge and inlaid with a silver plate, and three pair of ear pendants. Among other recent discoveries at the Pompeii excavations are numerous surgical instruments, mostly of bronze, also a small pair of apothecary's scales and a set of weights; a stew-pan of bronze with silver inlay, glass vessels, terra-cottas, gold rings, and ear pendants.

A COMBINED level and rule has been patented by Messrs. Wickham and Roach, of Burnside, Connecticut. The block constituting the main body of the level has at one end a tube bent to the form of an arc and ten degrees larger than a quadrant, being divided into degrees from 0° to 90°. In the back of the block is a groove adapted to receive a folding rule, there being also a recess in the groove to hold a screw-pointed pin for fastening the level to a tree or post by passing the pin through a hole in the block. A longitidunal bore, parallel with the bottom of the block, has crossed wires in each end, and is intended for use in sighting, and to the face of the block is secured a plate, giving the scale of perpendicular of any angle up to 60°. The rule is formed in two sections, connected by a pivot-pin, one face of the rule being divided into inches, while the other is marked with angle lines, so arranged that when any two lines formed upon the two-rule sections are brought together in a straight line, the numbers placed in connection with the meeting lines will indicate the angle at which the true lengths of the rule are extended. The free ends of the rule sections are pointed, so that the rule may be used as dividers.

FOR some time private excavations have been made intermittently in Cyprus, which have yielded interesting results. These have now been prohibited by the authorities, with the result that the matter has been taken up by the Society for the Promotion of Hellenic Studies. This association has opened a Cyprus Exploration Fund, and a committee has been appointed, which includes amongst its members Mr. Sidney Colvin, Professor Jebb, Professor Sayce, and Sir Frederic Leighton. The society contributes £150, and the same sum is presented by the British School at Athens, whose director, Mr. Edward Gardner, will direct the explorations. The best of the "finds" will go to the British Museum and the Universities of Oxford and Cambridge. It is hoped that the authorities will approve of excavations conducted by this organisation; but their sanction has not yet been obtained.

MESSRS. BURT AND POTTS have just issued their 1888 catalogue of wrought-iron casements and frames, about which we can only say much the same as we have done before—that it is one of the few really indispensable to the architect, who goes as a matter of course to Burt and Potts for metal casements and frames, and knows he is absolutely safe in their hands. The manuscript list of testimonials from leading architects accompanying the catalogue is one any firm might be proud of. The majority have been given during the present year, and the well-satisfied tone of the writers, including such men as Messrs. Bodley and Garner, Ewan Christian, John Douglas, Goldie, Child, and Goldie, R. W. Edis, C. J. Ferguson, T. G. Jackson, Paley and Austin, W. H. Seth-Smith, V.P.S.A., A. Waterhouse, and many other well-known architects, abundantly guarantees a large accession of fresh patronage for Messrs. Burt and Potts during 1888.

A MICHIGAN inventor, Mr. Joseph Hambitzer, of Houghton, has devised a form of sash support and lock in which a plate, having two oppositely-inclined surfaces, is secured to the window casing adjacent to the sash and adapted to receive a roller between either of its inclines and the sash to support and lock the latter in position. A thick, flat plate is held by screws against the inner face of the casing, adjacent to the fall of the sash—the inner edge, near the top of the plate, being inclined downwards towards the sash, and its inner edge near the bottom being inclined away from the sash. A roller is suspended from a cord attached to the plate, so that when the roller is removed from its seat, it will leave both hands of the operator at liberty for adjusting the sash; but by placing the roller against either of the inclines, the sash will be firmly supported and locked in the ordinary way against an upward movement by placing the roller at the top, and against a downward movement by placing it at the bottom.

LEGAL INTELLIGENCE.

THE POWER OF CORPORATIONS TO REJECT PLANS CONFORMING TO THEIR BY-LAWS.—This point is proposed to be raised in the case of Veitch *v.* the Mayor and Corporation of Newcastle-on-Tyne. In the Queen's Bench Division, on Dec. 21, before Mr. Justice Wills and Mr. Justice Hawkins, sitting as a divisional court, Mr. J. L. Walton moved *ex parte* for a rule directing a writ of mandamus to issue to the mayor, aldermen, and burgesses of the city of Newcastle-on-Tyne, and also to the members of the improvement committee of that city. The applicant, Mr. Veitch, proposed to build some houses within the limits of the city of Newcastle, and, in conformity with the by-laws, he submitted plans for the consideration of the improvement committee. These plans were disapproved, and Mr. Veitch then waited upon the committee and asked them upon what grounds the plans had been disapproved. The committee declined to state the reason, and he then asked if the plans were or were not in conformity with the by-laws, and if they were rejected on the ground that they did not conform to the by-laws. The chairman of the committee said "You must ask the town clerk," and the town clerk, who was present, then said the by-laws had been complied with, and that was not the reason for which the plans had been disapproved. The applicant then submitted that the committee had no power to reject the plans if they were in accordance with the by-laws, but the committee declined to discuss the question with him, saying their disapproval was final. The plans were then withdrawn and again submitted to an architect, and, with his assistance, some slight deviation from one of the by-laws was removed, so as to make them absolutely in every respect in accordance with the by-laws. Thus altered, the plans were again submitted to the improvement committee, and again rejected on the 19th October. After the election of members of the corporation then pending, again Mr. Veitch waited on the committee, who still declined to approve the plans, and the position Mr. Veitch was in was this: that he could not build without being liable to penalties. Mr. Justice Wills: Yes, if he violates the by-laws he may have his buildings pulled down and be liable for penalties. I suppose the committee have a right to reject the plans for nonconformity with the by-laws. Mr. Walten: Yes; but they admit that our plans are in conformity with the by-laws. Mr. Justice Wills: You have said enough to entitle you to your rule.

WALLEN V. DICKINSON.—In this case the plaintiffs sought compensation for the non-fulfilment by Mr. Dickinson, builder, of an agreement in respect of the lease of a portion of land at Poplar. The extent of the land was 92,175ft. gross, and 79,715ft. net. Mr. Dickinson agreed to expend £25,000 in building upon the land within 18 months. This he failed to do, and it was put forward that the Board of Works had refused to sanction his plans, and in consequence he found it impossible to go on with the building. On behalf of the claimants, Mr. Edward I'Anson gave an estimate of £5,070, and Mr. F. Wallen, one of the claiming trustees, surveyor, valued the compensation due at £6,606. On the other side Mr. W. Rex thought no more than £10,000 or £15,000 could be expended with profit on the land. The case was referred to Mr. W. J. Beadel, M.P., for decision, and he has given an award for £2,475.

THE ACTION AGAINST THE FORTH BRIDGE CONTRACTORS.—The First Division of the Court of Session at Edinburgh gave judgment on the 21st Dec., in a reclaiming note from a judgment, by Lord Trayner, in an action by the Steel Company of Scotland, Glasgow, against Tancred, Arrol, and Co., contractors, Forth Bridge Works, for £100,000 for breach of contract, in respect that the defenders had bound themselves to take from the pursuers the whole of the steel required in the construction of the Forth Bridge, and the defenders had been supplying themselves elsewhere with steel. The defenders held that the question fell to be decided by arbitration; that the defenders were not entitled to take from the pursuers more than 30,000 tons; and, further, that according to the custom and practice of the iron and steel trade in Glasgow, the expression 30,000 tons more or less, mentioned in the contract, did not cover more than five per cent. variation on either side of that amount. Lord Trayner, in the Outer House, repelled the plea of arbitration, and allowed proof on the other parts of the case. On a reclaiming note, the First Division adhered to the Lord Ordinary's interlocutor, except so far as allowing a proof regarding the custom of trade was concerned. The Court accordingly repelled the pleas of arbitration and the custom of trade, and remitted the case back to the Lord Ordinary to take proof on the rest of the case.

THE LAYING OUT OF PRIVATE STREETS.—By the direction of the Local Government Board, Major-General E. Phipps Carey held an inquiry on Friday, at Liverpool, into an appeal by a number of property owners and builders against the decision of the Toxteth Local Board with regard to the sums alleged to be due to the board from the owners for private street improvements. Mr. Layton, in stating the case for the appellants, said that Messrs. Coltart owned some land in Toxteth-park, which in 1882 they laid out and sold for building purposes. Plans were submitted to the board and approved, having been previously inspected by Mr. Hall, the surveyor to the Toxteth Local Board. Unfortunately, Mr. Hall died in 1884. The board now denied that the streets were constructed under Mr. Hall's supervision, and with his approval. It would, however, be shown that Mr. Hall gave instructions to the contractor who did the work, and specifications of the work and a description of the materials to be used were sent in. Mr. Shand said the board had never received such specifications. Mr. Layton said he would prove that the specifications had been sent in. He pointed out that the board had adopted private streets constructed on similar specifications. Mr. Hall was succeeded in office by Mr. Price, who demanded that a number of alterations should be made in the sewering and flagging at the expense of the owners, and while he required the owners to make the flags of a certain size, he approved and used smaller flags himself. Some of the flags rejected by the surveyor had been bought by owners, sold at a profit, laid in Liverpool streets, and afterwards approved by the Liverpool Corporation. He considered the interference of the board was arbitary and uncalled for. Evidence was called in support of the appellants' case, and to show that the flagging in the streets in dispute was of a character which in no way called for the interference of the board. Mr. Robert Wylie, architect and surveyor, Liverpool, said that in 1886 he examined one of the streets, Greenleaf-street, and found that the flagging done by the owners was quite good enough for any street. There was no ground for interference by the local authority. At this point the inquiry was adjourned till January 6th.

IN RE ALBERT TAYLOR.—(Sittings in Bankruptcy, Dec. 20. Before Mr. Registrar Linklater.)—The bankrupt, a builder, carrying on business at Woodford, applied for an order of discharge. The receiving order was obtained in March last, and the statement of affairs showed liabilities £1,029 in the aggregate, with assets of nominal value. The bankrupt began business as a builder in 1879 with £100 capital, and in 1882 gave up business on his own account, and had since lived upon his earnings as a journeyman builder, and upon a legacy of £880 received under the will of his father. He attributed his failure to losses on building operations and by bad debts. The Official Receiver reported that the bankrupt had applied no portion of the money derived from his father's estate in payment of the debts which he then owed, and that he had brought on his bankruptcy by unjustifiable extravagance in living. The petitioning creditor and another creditor also opposed on the ground that the bankrupt had vexatiously defended actions sought for the recovery of debts due from him. Mr. Registrar Linklater said the charge of vexatious defence was established, and the bankrupt's conduct had been very reprehensible. He received from his father's estate enough to pay off the debts which he then owed, but he had not done so, and the case presented very bad features. The order of discharge must be suspended for two years.

The Sheffield Guardians last week appointed a professional gentleman as a valuer at a salary of £300 a year. His appointment seems likely to be a sinecure, for the overseers, with whom the valuations rest, are determined neither to recognise him nor the position which the guardians have created. Fortified by opinion of counsel, they will employ their assistant overseers when valuations have to be made.

Mr. Robert Coath, who for more than half a century has carried on business as a builder at Liskeard, died last week, aged 77 years. The funeral on Saturday was attended by the members of the local Freemasons' lodge, and a large number of townsmen.

A stained-glass window was unveiled on Christmas Day in the south aisle of Kentisbeare Church. The artist was Mr. C. F. Drake, of Exeter.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Clerks of Works' Association. Monthly meeting, Carpenters' Hall, 8 p.m.

TUESDAY. — Birmingham Architectural Association. "Optical Refinements in Architecture," by W. H. Bidlake, M.A.

WEDNESDAY.—Civil and Mechanical Engineers' Society. "Salmon Passes," by A. Fairlie Bruce. 7 p.m.

FRIDAY.—Architectural Association. "Brasses of the 14th and 15th Centuries," by A. Oliver. 7.30 p.m.

SATURDAY.—Association of Public Sanitary Inspectors. "Our Gipsy and Van Children," by Geo. Smith, of Coalville. 6 p.m.

Architectural Association.—"Brasses of the 14th and 15th Centuries." A. Oliver. 7.30 p.m. January 6.

Halford Church, Salop, was reopened on St. Thomas's Day, after partial rebuilding. The nave has been taken down and rebuilt with additional buttresses. The walling is executed in random courses, the masonry being done with Cosford stone. The old roof of the nave has been replaced by one of pitch pine, and of this material the choir stalls are also made. The passages of the nave are laid with tiles from the manufactory of Woollascroft, Staffordshire, and the chancel with encaustic tiles by Goodwin and Son, Lugwardine Works, Hereford. The floors under the pews and in the sacristy are of wood, block-paved, by Mr. Roger L. Lowe, Farnworth, near Bolton. The glazing of the windows was carried out by Mr. Done, of Shrewsbury, and the painting and varnishing by Mr. R. France, of Shrewsbury. Mr. J. Edwards was foreman of the works; Mr. Nicholson, of Hereford, was the architect; and Mr. J. Groves, of Shrewsbury, the builder.

The ceremony of cutting the first sod of the new St. Helens and Wigan Junction Railway, which is to directly connect the important manufacturing town of St. Helens with the Manchester, Sheffield, and Lincolnshire, Midland, Great Northern, and other railways, will take place during the last week in January. The Earl of Derby has promised to perform the ceremony. The site chosen is that on which the new central station will be erected between the St. Helens Town Hall and College-street, and as near as possible to Corporation-street.

CHIPS.

Receiving orders in bankruptcy have been issued in the cases of Peter Williamson Thomson, of Willington-quay, Northumberland, surveyor; and Alfred Tattershall, Arcadian-road, Chitt's Hill-park, Wood Green, trading at Calabria-road, Highbury, and Crescent-road, Alexandra Park Estate, Wood Green, builder.

The *City Press* states that the site of the northern approach to the Tower Bridge has been cleared since the death of Sir Horace Jones. The northern approach cannot be started yet for some time, but all freehold and leasehold claims on both sides of the river have been settled, most of them while Mr. Andrew Murray was the acting architect.

The local authority of Grantown, N.B., has adopted a scheme for water supply prepared by Mr. Roberts, C.E., of Kingussie.

Lady Elizabeth Villiers, who has contributed £1,250 to the Peterborough Cathedral Restoration Fund, has promised to defray the cost of a new choir screen for the same cathedral. The general restoration is meanwhile at a standstill for want of funds.

The first meeting was held at the London Bankruptcy Court on the 21st inst. of the creditors of James Whitaker, of Cromwell-gardens, West Kensington Park, builder, the total liabilities being returned at £54,114, of which £10,563 are expected to rank, and assets *nil*. The proceedings resulted in bankruptcy, and a trustee was appointed, the official receiver acting as a committee of inspection.

The operations necessary for the removal of the extensive establishment of Messrs. Sharp, Stewart, and Company from Manchester to Glasgow are completed, and next week the firm of Sharp, Stewart, and Company, of Glasgow, will be at work. The shareholders of the company and of the Clyde Locomotive Company, which will be merged in the new concern, have assented to the amalgamation and removal.

Messrs. Hoult and Wise, of Liverpool, have been instructed by the proprietor of Tranmere Ferry to prepare plans for reconstructing the high level pier at Tranmere, destroyed six weeks since.

Mr. John Hargrave Wraith, surveyor, of Darwen, has been placed on the commission of the peace for that borough.

An important link in the chain of railway communication between the northern and western suburbs of the metropolis will be supplied by the opening for passenger traffic of the new junction line between the Great Western and North and South-Western Junction Railways at Acton, which will come into use on Monday next. Commencing on that date, a service of trains will be run by the Great Western Company between Southall and Willesden Junction.

Mr. H. T. Munns has received from the Testimonial Committee a commission to paint a full-length portrait of Sir John Morris, to be hung, when completed, in the Town Hall, Wolverhampton.

The death is announced, in his fortieth year, of the well-known Italian sculptor, Signor Giovanni Baptista Amendola, best known in England by his statuettes of Mrs. Alma Tadema, Lady Milford, and Mrs. S. Lewis, and by a bas-relief of Orpheus.

On Tuesday week services were held at Uttoxeter Parish Church to celebrate its reopening. The unsightly box pews have all been removed from the body of the church and modern open seats substituted. As the old pews were of oak, the wood has been used in constructing the new seats, which harmonise well with the gallery, where the old pews remain. The church has been painted inside. A large 12-branch gas pendant lights the body of the church and smaller ones have been fixed under the gallery. The cost of the work is about £400, and Messrs. Thomas Cross and Sons were the builders.

A stained-glass window was unveiled on Friday in the Church of St. Michael, Malton, in commemoration of the restoration of the church. Messrs. Heaton, Butler, and Bayne, of London, were the artists.

The theatre at Shrewsbury was reopened on Boxing Day after internal reconstruction, decoration, and refurnishing, carried out by Mr. Oliver Jones, from plans by Mr. J. L. Randal, both of Shrewsbury.

Offers have just been accepted for the erection of a church from plans by Messrs. Chalmers and Robson, architects, Glasgow. The new building, which will be in the style of Early English Gothic, is to accommodate 320 sitters, and will cost about £700. The congregation have meantime secured the use of the hall of the Innerbrothock Free Church as a place of worship.

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